

# Participatory Management in Large Irrigation Systems: Issues for Consideration

NAMIKA RABY\*  
*California State University, Long Beach*

**Summary.** — The inclusion of farmers in the decision-making process of management of irrigation systems is now accepted as necessary to increase productivity and income among the poor in the Third World. Hence, farmer participation is not simply a call for empowerment and mobilization of a hitherto powerless group but, more fundamentally, a development strategy. The author evaluates the experience of participatory management in Sri Lanka and arrives at general conclusions, taking into account the size and complexity of the irrigation system, objectives, and capacity of agencies and farmers for participatory management as key aspects in a sustainable development strategy.

## 1. INTRODUCTION

For over a decade, participatory management<sup>1</sup> has been the avowed policy in the management of both small and large<sup>2</sup> irrigation systems in South and Southeast Asia. The status of farmers, long accustomed to their self-perception as passive recipients and perceived by the management agency as the “clients across the bureaucratic counter,” has been changed by their participation and empowerment as managers of small irrigation systems, and tertiary and, in some cases, secondary levels of large systems.<sup>3</sup> It was anticipated that this change would result in increased productivity and income generation for farmers as beneficiaries.

Over time, the literature has provided us with well-documented examples of “farmer participation” in the Philippines and its slightly lesser known but equally well-studied counterpart in Sri Lanka.<sup>4</sup> It is now pertinent to go beyond the success stories of “farmer participation” and examine the key underlying principles with which the researcher, the advocate, and above all, the practitioner must come to grips if participatory management is to become a sustainable effort.

Emerging from industrial management in the West, the underlying assumption of participatory management is that with it comes worker satisfaction and increases in productivity. Workers are assumed to be the social wealth of an organization. Their intelligence, imagination, and managing ability are resources to be tapped. They have the capacity for sound judgment at the

shop floor level and are capable of social collaboration to obtain results. Implicit in such an organization is an emphasis on the workers’ organizing and managing ability. In industrial organizations, the degree of worker participation may vary from consultation to active decision making. The style of participation may vary from joint consultation in primary working groups, partnership, and producer cooperatives, to joint consultative committees.<sup>5</sup>

Transferred to the setting of irrigated agriculture, farmer participation may take one or a combination of forms: (a) *top down* — government initiated and formally organized (e.g., the Philippines) or parallel to the bureaucratic structure (e.g., Sri Lanka); (b) *bottom up* — spontaneous organization resulting in participation and management by farmers (the communals in the Philippines are probably the closest approximation if one overlooks their overall affiliation with the National Irrigation Administration [NIA]); and (c) *interventionist/facilitator* — the “third party” approach. This last approach, in combination with the first, is the most prevalent form in

---

\*The author wishes to acknowledge the assistance of the following in the preparation of this paper: first, the funding and support of the International Irrigation Management Institute (IIMI) in Sri Lanka during the phase of field research, and particularly the useful recommendations of Doug Merrey, Head, Sri Lanka Field Operations, IIMI; second, the more recent, helpful comments of an anonymous reviewer for *World Development*.

the Philippines and in irrigation systems under the Irrigation Management Division (IMD) Sri Lanka.

The objectives of participatory management in any irrigation system are to increase productivity and income for its immediate beneficiaries, the farmers. Participatory management in the context of multidimensional national or even sectoral development, however, entails broader goals, where costs and benefits are calculated among a larger group of beneficiaries than farmers in any given irrigation system. To address this issue in a comprehensive manner, one must go beyond farmer participation as empowerment and mobilization of a hitherto powerless group. Participatory management must be translated into a *sustainable development strategy*.

In large irrigation systems that are also settlement schemes, such as in Sri Lanka, the dynamics of implementing the above strategy are different from those which made participatory management a viable alternative in smaller systems. Thus, the small physical size, the solidarity of the community, and its spatial control over the water resources within the command area are facilitating factors in a small system. This paper will address the issue of participatory management as a development strategy and identify the parameters for implementing such a strategy in large irrigation systems. The emphasis is on farmer participation in irrigation systems in Sri Lanka, with the Philippine case as a contrast.<sup>6</sup>

## 2. SRI LANKA

### (a) *Area under large irrigation systems*

Out of approximately 500,000 hectares (ha) under irrigation in Sri Lanka 350,000 ha are under large irrigation systems. Minor irrigation schemes are those with less than 80 ha (Perera, 1986, pp. 1–2). Thus, large irrigation systems under the management of the IMD and the Irrigation Department (ID) may range from 80 to over 40,000 ha. The Mahaweli Authority of Sri Lanka (MASL) has approximately 50,000 ha under its management, and this figure continues to increase.

### (b) *Management of multiple objectives*

The primary objective of large irrigation systems in Sri Lanka in their postconstruction phase is settlement. As evidenced by the more recent experience of the Mahaweli Project, however, concurrently with settlement, agencies imple-

ment other objectives. The objectives range from water management, irrigation financing through the collection of operation and maintenance fees from settlers/farmers, community services, agricultural credit, marketing and enterprise development.

### (c) *Management by multiple agencies*

The implementation of multiple objectives brings together specialists to implement each objective. Thus, in irrigation systems outside the Mahaweli Project, the line agencies representing land, irrigation, and agriculture must interact with yet another agency, the routine district administration of the government agent and his representatives at the project level who act as coordinators. This process is further complicated by crosscutting and often conflicting administrative and territorial boundaries — for example, the irrigation range, the administrative district, and the political constituency — each represented by a line or territorial functionary.

In the organizational scheme of the Mahaweli Project such divisions are submerged under the umbrella of the MASL. Even in this case, however, line interests continue to dominate operations and must be mediated for goal-focused management. Moreover, even limiting the focus of management to water, in a project of the dimensions of the Mahaweli, water use itself has the multiple objectives of hydropower, irrigation, and domestic supply. Corresponding to these objectives is a technical system with a diversion point, storage, and canal network from a single water resource, each the responsibility of an agency (the Water Management Secretariat, the Mahaweli Economic Agency [MEA], and Headworks Operations, to name a few) within the MASL family of agencies.

### (d) *Origin of farmer participation*

The compelling motivation for farmer participation in Sri Lanka and the Philippines did not come from the government's or managing agencies'<sup>7</sup> desire to empower the farmer. It was a result of the pressing economic need to make irrigation systems economically viable enterprises. Financial solvency and profitability are thus the ultimate yardstick for evaluation of such participatory efforts. But profitability for whom? There are two answers: for farmers and their households and/or the state and its bureaucratic apparatus. "Irrigation financing," "resource mobilization," and "operation and maintenance

fees" are based on the assumption of financial solvency, if not profit, for the state. Financial solvency of the farmer family, however, is a prerequisite for the latter. Yet, farmer participation in Sri Lanka originated on the inverse premise.

In Sri Lanka, the origins of "farmer participation" as a modern management experiment<sup>8</sup> date back to the USAID/Cornell Water Management Project in the Gal Oya irrigation system. The process approach *vis-à-vis* the Institutional Organizer (IO), Water User Associations, or "Farmer Organizations,"<sup>9</sup> and "Bureaucratic Reorientation" became part of management operations.<sup>10</sup> Since then, the process of farmer participation has evolved in an institutional format largely determined by the organizational culture of the particular agency managing the irrigation system.

#### (e) *Settlers as farmers*

As settlement schemes, large irrigation systems in Sri Lanka have a heterogeneous mix of settlers turned water users and cultivators. They include original occupants of lands in the vicinity, evacuees resettled during the construction of the irrigation scheme, and the landless from other parts of the country. Some are experienced farmers while others are not. It is not unknown for antagonisms to exist between the "presettlers" and "settlers." Further, cleavages exist among them based on regional, caste, and at times, ethnic grounds. More overtly, they are divided along political lines.

#### (f) *Three modes of participatory management*

There are three distinctive modes for the incorporation of farmer participation within large irrigation systems in Sri Lanka: the IMD mode; the ID mode; and the MASL mode.

##### (i) *The IMD mode*

The IMD was the first participatory management effort in Sri Lanka. Its program had much visibility. It is no exaggeration to state that "farmer participation" was a primary objective of the program. Using the technique of management by committee, the IMD implemented its program in approximately 35 large irrigation projects. Called Tract<sup>11</sup> Committees, they comprised farmer representatives elected under the Agrarian Services Act and project officials at the secondary level of the irrigation system. The Project Committee, consisting of selected farmer representatives from the tract level and project

officials, was established at the local level. More recently, following a somewhat reverse process, attention has been focused on canvassing individual cultivators within the command area to join in the formation of a legally constituted farmer organization.

The operation and maintenance of the irrigation system, excluding the tank and the main canal, has in most cases been formally handed over to the farmer organizations. The manner in which the maintenance budget (financial contributions by the agency and collections from farmers) is to be spent is a decision undertaken by the farmer representatives in consultation with farmers. Finally, farmer organizations may undertake contracts for maintenance works up to the value of Rs.50,000.00 (in two contracts of Rs.25,000.00 each).<sup>12</sup>

##### (ii) *The MASL mode*

Under its original plan, as well as in the physical layout of the irrigation system, the MASL mode was designed for farmer participation in water user groups at the turnout. This experiment did not progress beyond the initial selection of farmer leaders by the agency. It was followed by a short-lived multipurpose community/farmer organization engineered by the agency. More recently, the emphasis has been on the D (Distributory) Channel Organization of farmers for water management, and operation and maintenance work.<sup>13</sup>

##### (iii) *The ID mode*

With modest beginnings, the ID mode has resulted in the implementation of the IMD blueprint in approximately 75 large irrigation systems. The management of the tank and irrigation network is under the authority of the agent of the ID, the Technical Assistant (TA).<sup>14</sup>

### 3. ISSUES FOR CONSIDERATION

#### (a) *The nature of the agency relationship*

The clarification of the role of the agency or the nature of the agency relationship<sup>15</sup> is a key to sustainable participatory management. Hitherto all participatory efforts have been based either explicitly or implicitly on the unclear symbiotic relationship between the state and the agency. Although there is an awareness of the agency as the implementing apparatus of the state, there is no clear separation between the state as policy maker and the agency as implementor of policy. This dual role is contrary to the traditional agency relationship. A clear demarcation of

responsibilities and expectations of the agency at the level of the top management *vis-à-vis* the state is essential for the success of development programming. Through flexible decision making at this level, agency control must be transformed into strategic management, the mission of which is participatory management to achieve objective results for national or regional development.

(b) *Evaluation of the agency*

In Sri Lanka, where all agencies are bureaucratic and function in an administrative style,<sup>16</sup> it is appropriate for the state to decide on what basis it will judge agency performance at all levels of management. Is such an evaluation procedure oriented or outcome oriented? Procedure orientation is the norm and has resulted in formal, nominal attempts at farmer participation. Outcome orientation gives an incentive to produce results at the interface between the agency and farmer organization. Thus, the NIA was forced to be financially viable, and farmer participation followed. In the absence of a systematic definition of the mission and evaluation strategy of the agency, the mobilization of farmers as a pressure group will remain an incomplete solution.

(c) *Fit between agency strategy and its internal structures*

All three modes of farmer participation in Sri Lanka have neglected, overlooked, and bypassed the fit between agency strategy and its internal structures.<sup>17</sup> Creating farmer participation through executive order and internal memorandum is a nominal and limited attempt at introducing participatory management. Structures internal to the agency must facilitate such participation. This effort may include budget flexibility, staff incentives, and a systematic evaluation of task performance by project staff *vis-à-vis* the objectives of an agricultural program. Korten and Siy (1989, p. 120), for example, point out the indispensable role of the agency component for the success of participatory management in the Philippines. If this is the case within a single-interest agency such as the NIA in the Philippines, it is more so in Sri Lanka, where the management of large irrigation systems depends on the line specialists and the coordinating capacity of the territorial functionaries. For participation to become a viable management strategy, it is essential that the "management jungle" that currently passes as "coordination" be reorganized to ensure flexible but accountable

management. This step will in turn ensure reliable schedules in the implementation of a timely operational plan for settlement, water delivery, and the production and marketing of agricultural commodities. The reliable delivery of such services by the agencies will in turn be a motivating force for sustained farmer participation in management.

(d) *Size of the irrigation system and level of farmer participation*

The size of an irrigation system frames the management options and boundaries for participatory management. In the Philippines, participatory management is successful in the smaller (approximately 50 ha) systems under the NIA. In the larger systems, the Upper Pampanga River Integrated Irrigation System (UPRIIS), for example, the success of farmer participation is limited to the first stage, when the function of the Irrigator Association is limited to the collection of service fees rather than active management. It is not, however, *size per se* but the control of and access to the water resource that becomes a factor in the large participatory irrigation systems. In such systems water is transported, allocated and distributed over long distances through dams, storage systems, and canal networks. Water might be the property of one community but is transported across the territory of others. It is also often the case that the management of allocation and transport of the water is within the jurisdiction of a district authority different from that of the user. As evidenced by the research in both Mahaweli and in the UPRIS, this complexity influences the reliability of the anticipated water supply at the distribution point. Even within the circumscribed boundaries of a large project, for example, sharing management responsibility for a branch canal between the agency and the farmer becomes complicated by the number of control mechanisms and the need for coordination among the operators of such controls.

(e) *Decentralized organization*

Although the bureaucratic form of management is not the best choice for facilitating farmer participation, it is the only known form for efficiently<sup>18</sup> managing large systems with respect to the dimensions of space, time, the number of individuals held accountable for management, and the delivery of benefits to the largest number of recipients. A system need not and should not,

however, be managed in a single style as if its different boundaries or levels, in this case hydrological and managerial, were a single homogeneous entity. Decentralized management with accompanying authority and financial control is a necessary corollary to the successful participatory management of large irrigation systems. Accountability of management to higher levels through the evaluation of performance, and accountability to beneficiaries for delivering the goods are other key dimensions. Accountability is the advantage of the NIA type of management. To overlook this approach is to undermine the criterion of efficiency in managing the system which will in turn have an impact on equity, productivity, and profitability for its beneficiaries.

In an irrigation system, planning, storage, transport, and distribution are relevant components, according to which an infrastructure and management system may be decoupled in an engineering and managerial sense. Each component must be evaluated according to its distinct management style. Thus, strategic management with a flat organizational team and task force in its matrix format is best suited for irrigation planning and distribution — at the top and bottom layers of management in an irrigation system. In contrast, hierarchy with individual responsibility through administrative bureaucracy is best suited for the intermediary levels of storage and transport.

(f) *Multiple objective management systems*

The concept of “bureaucratic reorientation” (a change in attitude by bureaucrats toward farmers) has received attention, but the issue of how bureaucrats, long accustomed to line-division prejudices, reorient relationships among themselves to generate teams and realize the objectives of a cultivation plan has received scant consideration.

In all irrigation systems, the tasks of construction, settlement, and operations bring together multiple line departments, if not line interests,<sup>19</sup> and what gets priority or is monitored is glossed under “coordination.” An organizational culture cutting across line agencies or interests must be forged through systematic management training and team-building exercises.

(g) *Capacity building for farmer management*

In engineered communities, such as the irrigation settlements in Sri Lanka, capacity building

for farmer management based on ties of a moral community akin to the spirit of the *barangay* (community organization), from which the Irrigator Associations in the Philippines have derived sustenance, may take time to evolve. The catalyst or the Community Organizer (CO) has been entrusted with the task of generating and sustaining such a community spirit among farmers. But this has been often done in an antagonistic mode toward the bureaucracy. Overlooked is the essential partnership dimension of participatory management.<sup>20</sup>

A transformation from antagonism to partnership in management from the farmer’s perspective entails going beyond formal farmer organizations without corporate power to creating an organizational culture that ensures such power. This process must be followed by the professionalization of the farmers (particularly the leadership and office holders of the farmer organization) through training in management skills. Such training may cover technical skills, financial management, team building, and leadership abilities. It is with the success of this type of effort that farmer participation will transcend maintenance and move toward operation management. This step alone will result in a change of farmers’ attitude from “renter” to “owner” and provide the incentive for self management.

(h) *Organizational culture for farmer organization*

Cultural values are used as building blocks in the best of organizations rather than the reverse of imposing structural frameworks at odds with them. While the concept of water user associations, water wholesaling, or charging a fee for water may not be part of the cultural value system associated with traditional irrigated agriculture, there exists a concept of resource mobilization for maintaining irrigation systems.<sup>21</sup> The nomenclature for created associations of cultivators has always been “farmer organizations” in the vernacular references of documentation and discussion in Sinhala, as well as in colloquial references in English by members of the state and the agency. The terms “water users” or “irrigator associations” are confined to the academic literature. The distinction is between a single-strand organization governing water rights, a strand that has traditionally not been an organizational principle, to a multiple strand organization inclusive of cultural and community activities, in which water is embedded as the central organizational principle. The question, then, is to what extent it is feasible to

envisage a water-user association, or can one get more mileage out of this participatory effort, so to speak, with a multiple strand organization? If the latter is the case, to what extent can the multiple strand approach be effective so as not to dilute the central organizational principle? Settlement schemes *cum* irrigation systems are being questioned for their returns in terms of enhancing the quality of life for farmers and their families<sup>22</sup> in proportion to the initial financial investment. To what extent, then, should participatory management take into account the call for diversified economic development and the empowerment of other sectors — for example, women — whose contributions to the economy have hitherto gone unrecognized? To generate an economically viable and sustainable farmer organization one must address the issue of profitability, if not income generation for the immediate beneficiaries, the farmers turned settlers. An organization that has progressed beyond maintenance and has taken over the operation of irrigation systems with management expertise will truly become a farmer organization for irrigation management. The inclusion of input supply and marketing and the generation and creation of a fund for credit are other aspects.<sup>23</sup> Should off-farm income generation activities, such as livestock development or agro-industries, be part of the entrepreneurial interests of a farmer organization? Too many single-interest organizations will fragment the farming community and sap its strength, while too many diverse interests will result in its oblivion.<sup>24</sup>

#### (i) *Management of participation*

The final set of issues for consideration may be labeled management of participation. A strategy for participation within the management complexity of the task described above implies that participation itself must be a managed endeavor. In multiple objective irrigation systems with cross-cutting hydrological and administrative boundaries, one must inevitably make a tradeoff between the benefits of participation and overall management efficiency for realizing the objectives of the participatory effort. Participation is further constrained by the capacity of the farmers to handle their side of the management equation. The environment itself adds another constraint — as in rain-fed systems facing erratic rainfall patterns and limited capacity for forecasting where the best layout for intermediate storage is limited.<sup>25</sup> A large portion of irrigation systems in Sri Lanka operate with such environmental constraints. They act as management constraints

on the total irrigation system and result in a lack of incentive for farmer participation.<sup>26</sup> Thus, in one system “farmer participation” may be feasible at the branch canal, while it is possible at the distributary canal in another system, and only at the turnout in yet another. Within these constraints, farmer participation must be vigorously pursued above and beyond the formalism that currently accompanies such efforts.

#### 4. CONCLUSION

Participation may be seen as (a) a means of widening technological take-up at a lower unit cost in economic and administrative terms and, therefore, (b) raising production more than would be possible under implementation arrangements that concentrated on a fairly narrow range of producers, and (c) have a greater direct impact on the welfare of the population as a whole (Lamb and Schaffer, 1981, p. 104).

Traditionally in the management of irrigation systems, participation in the form of self help or community development has been used as an alternative strategy to administration/management by the agency. More recently it has been used as formal cooption of farmers as participation groups. Participatory management is a *managed* process and, as such, it is fostered and nurtured through strategy, planning, evaluation of structures and procedures, and above all, training of participants. Moreover, it is not an end in itself, and the extent and nature of its usefulness must be determined by not some idealized or politicized vision of the capacity and interests of the farmer but on sound business practices.<sup>27</sup> It has been documented (Lawler and Mohrman, 1985, pp. 65–71) that worker participation in industrial organizations, for example, can often end in limited output and can fall short of anticipated benefits. Farmer participation in the management of irrigation systems is distinctly different and even more problematic than its counterpart in industrial management. In the latter case, workers and management cooperate to create a product, meeting the satisfaction of a third party, the client. In the management of large irrigation systems, the farmer is the client, as well as the manager on the “shop floor,” but in terms of the larger picture of national development, he or she is accountable as manager to the entire nation. The separation of client and management roles of the farmer is also a separation between self-interest and the capacity to judge national interest. In multiple agency and objective irrigation systems based on information, strategic management becomes crucial at

two levels, the level of distribution involving farmer participation in particular. This is also the level at which much data are gathered from the field, which are then used by top management for control. The data should instead be analyzed and diagnosed with relevance, purpose, and skill and then converted to practical information. It is also one of two levels in which task forces of farmers *per se* or farmer and agency must come together to solve problems and then disband. A sound organization that accommodates sustainable farmer participation needs both hierarchy and the capacity to organize teams or task forces. There is no risk-free organization. An organization envisaging farmer participation does so in a multiple axial mode. Its strategy and objectives may lead to an emphasis on one or some but not all of the following: work (individually); task (teams); performance (individually); results (individually or teams); a cognitively oriented, decision-making focus identifying internal organizational principles (individually or teams); or a structurally oriented system that is focused on the relationship between the organization and its environment (teams).<sup>28</sup> The range of possibilities for farmer participation, given the emphasis on one or the other, will vary accordingly. An outcome oriented agency as discussed above must work with an outcome-oriented farmer organization.

This cooperation leads to the creation and management of access conditions at the interface between agency and farmer organization. Access to bureaucracy in Sri Lanka, as elsewhere, has cultural and political dimensions (Raby, 1985). It also has structural and process dimensions. The creation of access conditions must begin with existing organizational values that accommodate participatory management. In this respect, the traditional values of community organization from the perspective of the farmer and bureaucratic reorientation on the part of the agency must be used for monitored and outcome-oriented goals. From this collaboration comes the management of process through team building and training in human resource management for participation. The political dimension of participation entails the granting of autonomous status for farmer organizations to be legally constituted as corporate bodies having the authority and resources to manage their tasks and to be held accountable.<sup>29</sup> It also implies the mobilization of farmers for mass involvement as an effective lobby in influencing and controlling management in phases of administrative planning and institution building within the domain of distribution and, as far as possible, into other spheres within the agency — for example,

budgetary and program decision making. The structural aspect of creating access conditions is primarily on administrative reform *vis-à-vis* the storage, transport, and delivery functions of an irrigation agency functioning in a bureaucratic mode. This process will include the formalization of that agency relationship and the clarification of spheres of authority and responsibility, and systems and procedures for the delivery of services. It will enable both the state and the farmers to accept responsibility, and therefore accountability may be placed where it is appropriate. The transformation of top management's approach into a strategic entrepreneurial mode through the institutionalization of the agency relationship is a second dimension to the structural aspect. Further, it entails an evaluation of the lower levels of the agency hierarchy operating within the sphere of distribution for overlap and redundancy. The removal of such levels will create managerial space for the development and functioning of a farmer organization.<sup>30</sup> This evaluation will result in an organization design combining flexibility with accountability and taking into account the inherent limitations of the process approach (of which the Sri Lankan experiments are examples), which have resulted in it being termed "management by abandonment" (Honadle and VanSant 1985, p. 92).

In the final analysis, in creating access conditions for successful participatory management, one must come to terms with management at the interface between the domain of allocation and distribution. In industrial management after the introduction of participatory management, practical problems have arisen. Consider the following.

Team members didn't have the skills to solve many of the technical problems that arose and found it hard to get functional support. Many team members also balked at evaluating and disciplining their peers. At first the problems were ascribed to inexperience. But as time went on the teams matured, managers and workers had to admit that the old adage still holds, "Every team needs a coach" (Klein and Posey, 1986, p. 125).

In irrigation systems with multiple agencies and objectives, there is a need not only for a "coach" but also for a "referee," both members of a supercadre outside the participating agencies with professional skills in management and monitoring training. The coach should be able to impart necessary skills to farmers and agencies such as group dynamics, presentation skills, leadership problem solving, and other aspects of team work. The referee must interface with agents at the level of system allocation and

farmers at the level of system distribution, bring into the operational plan during the cultivation season his or her skills in strategic management, and monitor its progress and the performance of the management at both levels. For success he or she must have the unreserved support of the political apparatus of the state but must be above

political partisanship. The operating style of this supercadre should be based on open communication, with the ability to access information of its contributions (for example, training modules and monitoring and evaluation techniques) through both computers and publications.

#### NOTES

1. Management scientists and their counterparts in the social sciences have used different terminology to designate this phenomenon. Referred to as participative management by the former and participatory management in the latter, the distinction between the two is that while both denote participation, the second definition also connotes a notion of profitability for the farmer in his or her dual roles as client and manager.

2. In Sri Lanka, irrigation systems below 80 ha are considered small and systems above this extent large. In the Philippines, the communals and the smaller national systems of approximately 50 ha provide a contrast with the larger national systems there.

3. The tertiary level of irrigation system is at the distributary canal, while the secondary is at the next higher level of the physical system, the branch canal.

4. Of the voluminous literature from both cases, the most important studies are: for the Philippines, Korten (1982), and Bagadion and Korten (1985); for Sri Lanka, Agrarian Research and Training Institute (ARTI) and Cornell University (1986), and Abeyaratne, Ganewatte, and Merrey (1982).

5. For a discussion of the options, advantages, and limitations of these participative modes, see Parkinson and Sapre (1984, pp. 45-67).

6. Plans for restructuring irrigation management agencies in Sri Lanka are currently accepted as essential, and it is anticipated that this will lead to a sustainable implementation strategy in the near future.

7. See Korten and Siy (1989, p. 142) for the Philippines. In Sri Lanka the movement toward "resource mobilization" gained momentum due to the initial interest on the part of donors such as the World Bank and the Asian Development Bank.

8. The management of traditional village irrigation was a community effort by farmers, while the increasing bureaucratization of irrigation management emerged with the welfare/development bureaucracy introduced in British colonial times.

9. See Korten and Uphoff (1981), and Uphoff (1989).

10. The introduction of the water-user association

rather than the farmer organization was influenced by its success in the Philippines, Taiwan, and elsewhere.

11. Tracts are hydrologically analogous to turnouts or field channel groups.

12. The disparity between formal implementation and practical results is documented in Raby (1988).

13. See Raby and Merrey (1989), and Moragoda and Groenfeldt (1989).

14. The best documented example of this is *Kimbulwana* (Gunadasa 1989). The somewhat questionable nature of such a participatory effort is discussed by Merrey, Rao, and Martin (1988).

15. See Eisenhardt (1989).

16. This statement refers to the mechanical implementation of rules and procedures.

17. Central to the implementation of this relationship is financial reform, giving greater budgetary flexibility to agencies and the ability to transfer funds across agencies, job descriptions with clearly demarcated authority responsibility and accountability on the part of its occupant, and the systematic evaluation of tasks based on performance.

18. See Jaques (1990).

19. With the single exception of the inclusion of bureaucratic reorientation into the vocabulary, all attempts at institution building for participatory management have concentrated on organizing the farmers and collecting data from the field for computerization. Hence, the overall practicability of this strategy of bypassing the agency to improve participatory management, according to criteria of efficiency, productivity, and profitability, is in doubt. The exception to this is the FAO/UNDP Project on Monitoring and Evaluation Systems for Land Settlement. This evaluation system, however, is admittedly built on the premise that the strength of the monitoring and evaluation (M/E) is dependent on the administrative system for which it is devised but does not attempt to examine the administrative system itself (Arulpragasam, 1988).

20. Advocates of farmer participation citing the Philippine experience encourage the inclusion of farmers in



the decision-making process at the stage of construction or rehabilitation for sustainable participation. See Merrey and Somaratne (1989, pp. 55–57) for a discussion of problems inherent in attempting to implement this approach in a multiagency irrigation system.

21. The traditional concept of *rajakariya*, devoid of its feudalistic authoritarian connotations, has within it the economic principle of resource mobilization for the maintenance of irrigation schemes. Current attempts at operations and maintenance (O&M) financing through voluntary participation and community effort reflect this tradition and are not merely charging a fee for water.

22. In this context the Mahaweli irrigation network is by far the most intensively studied — see, for example, Siriwardene (1981), and Scudder and Vimaladharma (1989). These studies point to the failure of the development program to yield return on investment in terms of improving the quality of life of the farming family (while systems outside the Mahaweli with singular exceptions are perhaps no different).

23. In 1989, in Mahaweli System H, a similar small-scale experiment was begun in Galnewa Project. With funds from the World Bank, farmer organizations were each given Rs.30,000.00 deposited in the local bank under the name of the organization. With this capital each organization was expected to generate a financially viable, enterprising farmer organization. The outcome or sustainability of this effort is yet unknown.

24. The attempt at establishing community development organizations as successors to the turnout group in Mahaweli System H met with a similar fate.

25. In Mahaweli System H, a system considered by the agency and outsiders to have an adequate storage capacity, Scudder and Vimaladharma (1989, p. v) point out the need for a greater capacity.

26. The incentive for successful farmer participation as evidenced by *Kimbulwana* and elsewhere is a reliable and adequate water supply, and can be easily ensured in a water-sufficient if not a water-surplus system.

27. This process entails investment, production, marketing, generation and reinvestment of capital, and the training of farmer management to undertake such activities.

28. This scheme is an adaptation of Drucker (1974, pp. 45–53).

29. In Sri Lanka, a Cabinet White Paper giving corporate status to farmer organizations is in preparation.

30. This line of thinking is explored in Raby (forthcoming).

## REFERENCES

- Abeyaratne, Shyamala, Piyasena Ganewatte, and Douglas J. Merrey (Eds.), "Proceedings of a workshop on water management in Sri Lanka," Agrarian Research and Training Institute (ARTI) Documentation Series No. 10., mimeo (Colombo, Sri Lanka: ARTI, 1982).
- ARTI, and Cornell University, "The Gal Oya water management project: End-of project impact assessment," Mimeo, prepared for the Government of Sri Lanka and United States Agency for International Development (Colombo, Sri Lanka: ARTI, 1986).
- Arulpragasam, L. C. "Technical report of the consultancy on monitoring and evaluation of land settlement schemes in Sri Lanka," Vol. 1, Project SLR/84/037, Mimeo (Colombo, Sri Lanka: UNDP/FAO, 1988).
- Bagadion, Benjamin U., and Frances F. Korten, "Developing irrigators' organizations: A learning process approach," in Michael Cernia (Ed.), *Putting People First*. (New York: Oxford University Press, 1985).
- Drucker, Peter F. "New Templates for today's organizations," *Harvard Business Review*, Vol. 52, No. 1 (January-February 1974), pp. 45–53.
- Eisenhardt, Kathleen M., "Agency theory: An assessment and review," *Academy of Management Review*, Vol. 14, No. 1 (1989), pp. 57–74.
- Gunadasa, Sunil, *The Kimbulwana Oya Irrigation Scheme: An Approach to Improved System Management*, International Irrigation Management Institute (IIMI) Case Study, No. 2. (Colombo, Sri Lanka: IIMI, 1989).
- Honadle, George, and Jerry Van Sant, *Implementation for Sustainability: Lessons from Integrated Rural Development*. (West Hartford, CN: Kumarian Press, 1985).
- Jaques, Elliott, "In praise of hierarchy," *Harvard Business Review*, Vol. 68, No. 1 (January-February 1990), pp. 127–133.
- Klein, Janice, A., and Pamela Posey, "Good supervisors are good supervisors — anywhere," *Harvard Business Review*, Vol. 64, No. 6 (November-December 1986), pp. 125–128.
- Korten, David C., and Norman Uphoff, "Bureaucratic reorientation for participatory rural development," *NASPPA Working Paper*, No. 1 (Washington DC: National Association of Schools of Public Affairs and Administration, 1981).
- Korten, Frances F., "Building national capacity to development water users' associations: Experience from the Philippines," *World Bank Staff Working Paper*, No. 528 (Washington DC: The World Bank, 1982).
- Korten, Frances F., and Robert Y. Siy, Jr. (Eds.),

order to be compatible with the hardware configuration found in regency offices. FoxBase+ is a product of Fox Software, Inc., 134 W. South Boundary, Perrysburg,

OH 43551. A complete description of the software can be found in *UPPKA/MIS Operator's Manual* and *UPPKA/MIS Supervisor's Manual* (1989a & b).

#### REFERENCES

- Adams, D. W., and G. I. Nehman, "Borrowing costs and the demand for rural credit," *Journal of Development Studies*, Vol. 15, No. 2 (1979), pp. 165-176.
- Adams, Dale W., and Robert C. Vogel, "Rural financial markets in low-income countries: Recent controversies and lessons," *World Development*, Vol. 14, No. 4 (1986), pp. 477-486.
- Ahmed, Zia U., "Effective costs of rural loans in Bangladesh," *World Development*, Vol. 17 (1989), pp. 357-363.
- Aquilar, Rodolfo J., *Systems Analysis and Design* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1973).
- Badan Koordinasi Keluarga Berencana Nasional (BKKBN), *Buku Pegangan Pengurus Kelompok Usaha Peningkatan Pendapatan Keluarga Akseptor KB (UPPKA)* (Training book for leaders of women's groups of the Income-Generating Program for Family Planning Acceptors [UPPKA]) (Jakarta: Badan Koordinasi Keluarga Berencana Nasional, 1988a).
- Badan Koodinaski Keluarga Berencana Nasional (BKKBN), published draft of chapter 25, "Population and family planning" of *Fifth Five Year Development Plan (1989/90-1993/94)* (Jakarta: Badan Koordinasi Keluarga Berencana Nasional, 1988b).
- Hardjono, Joan, *Land, Labour and Livelihood in a West Java Village* (Yogyakarta, Indonesia: Gadjah Mada University Press, 1987).
- Harris, Britton, "Prospects for computing in environmental and urban affairs," *Computers, Environment and Urban Systems*, Vol. 12 (1988), pp. 3-12.
- Klosterman, Richard E., "Microcomputer technology and regional planning: Prospects and challenges for the developing world," in *Information Systems for Government and Business: Trends, Issues, Challenges* (Nagoya, Japan: The United Nations Centre for Regional Development, 1988).
- Liedholm, Carl, and Donald Mead, "Small scale industries in developing countries: Empirical evidence and policy implications," MSU International Development Papers (East Lansing, Michigan: Michigan State University 1987).
- Mann, Charles K., "Beyond the metaphor: Microcomputers in public policy and human capital development" in Stephen R. Ruth and Charles K. Mann (Eds.), *Microcomputers in Public Policy: Applications for Developing Countries* (Boulder, CO: Westview Press, 1987).
- Nystuen, John D., *The PRIMOPS Experience: Information Processing in the Design and Performance of a Health Care System* (Ann Arbor: Community Systems Foundation, 1980).
- Nystuen, John D., and Mary Judd, *Evaluation of the East Java Community Level Income Generating Program (P2K) of the National Family Planning Coordinating Board (BKKBN) of Indonesia*, Report to USAID (Ann Arbor, MI: Community Systems Foundation, 1986).
- Nystuen, John D., and Frank D. Zinn, *A Computer-Aided Management Information System for Income Generating Activities of Family Planning Acceptor Groups (UPPKA)*, Report to USAID (Ann Arbor, MI: Community Systems Foundation, 1989).
- Pinckney, Thomas C., John M. Cohen, and David K. Leonard, "Kenya's introduction of microcomputers to improve budgeting and financial management in the Ministry of Agriculture," in Stephen R. Ruth and Charles K. Mann (Eds.), *Microcomputers in Public Policy: Applications for Developing Countries* (Boulder, CO: Westview Press, 1987).
- Schon, Donald A., William D. Drake, and Roy I. Miller, "Social experimentation as reflection-in-action," *Knowledge: Creation, Diffusion, Utilization*, Vol. 6, No. 1 (1984), pp. 5-36.
- Schware, Robert, and Alice Trembour, "Rethinking microcomputer technology transfer to Third World countries," in Stephen R. Ruth and Charles K. Mann, (Eds.), *Microcomputers in Public Policy: Applications for Developing Countries* (Boulder, CO: Westview Press, 1987).
- US House of Representatives Select Committee on Hunger, *Banking for the Poor: Alleviating Poverty Through Credit Assistance to the Poorest Micro-Entrepreneurs in Developing Countries* (Washington, DC: House of Representatives, 1986).
- UPPKA/MIS Operator's Manual* (Ann Arbor, MI: Community Systems Foundation, 1989).
- UPPKA/MIS Supervisor's Manual* (Ann Arbor, MI: Community Systems Foundation, 1989).