FARMER MANAGED IRRIGATION AND GOVERNANCE OF IRRIGATION SERVICE DELIVERY- ANALYSIS OF EXPERIENCE AND BEST PRACTICE

Mathew Kurian[•]

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For further information contact:
ORPAS - **Institute of Social Studies** - P.O. Box 29776
2502LT The Hague - The Netherlands - FAX: +31 70 4260799
E-mail: **workingpapers@iss.nl**

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ABSTRACT

Irrigation management transfer (IMT) has gained wide acceptance in policy circles in recent years. IMT has the potential to reduce the budgetary burden on the State, improve efficiency of irrigation systems and ensure the sustainability of cost-recovery mechanisms. However, a review of evidence indicates that success of IMT policies has been limited. In particular, IMT programs that have focussed on farmer participation in water allocation, cost-recovery and maintenance have achieved limited success. In recent years multilateral agencies like the World Bank and ADB have attempted to improve the governance of farmer managed irrigation. The governance strategy has essentially focussed on ensuring predictability of DMC policies, transparency and accountability of NRM strategies and beneficiary participation in service delivery. This paper examines ADB staff reports and loan documents to review the performance of farmer managed irrigation projects supported by the Bank.

1. INTRODUCTION

In recent years in response to the growing appeal of participatory approaches, irrigation management transfer (IMT) policies have proliferated. National governments of approximately twenty-five countries are presently implementing IMT programs with support from multilateral agencies like the World Bank and ADB. IMT policies essentially envisage the turnover of irrigation systems to private enterprises, joint management boards or farmer' s groups. Depending on the scope of transfer programs, the management of entire systems (like head works and canals) or specific components of systems (like tertiary canals) are devolved of control by government agencies.

Farmer-managed irrigation assumes importance in the context of IMT programs that devolve management of systems to farmer' s groups. Farmer' s groups are given responsibility to monitor water allocation rules, collect Irrigation Service Fees (ISFs) and undertake periodic maintenance. However, the success of farmer-managed irrigation to date has been limited especially in relation to issues like O&M and cost-recovery. A number of evaluations have pointed to poor systems efficiency, conflicts over water allocation and confusion over water rights (World Bank, 1994, IIMI, 1997). In recent years, multilateral agencies have emphasized the need for good governance to improve the performance of farmer-managed irrigation (ADB, 2001). In particular, such policies have emphasized the need to ensure convergence between inter-sectoral policies and NRM strategies with a view to ensure predictability, transparency and beneficiary participation in service delivery.

This paper is an attempt to review the experience of the ADB with implementing farmer- managed irrigation projects. Three research questions are addressed by the paper:

(i) What are the key themes that characterize the debate on farmer managed irrigation?

(ii) To what extent have governance issues been conceptualized and integrated in ADB FMIS projects?

(iii) To what extent have best practices identified by the review been incorporated in the design of second - generation ADB projects

The paper is organized as follows. Section I outlines the rationale and key themes of farmer managed irrigation interventions. Section II describes the analytical framework that was adopted for a review of ADB FMIS projects. Section III discusses the main findings of the review. Section IV examines the extent to which best practices identified by the review have been incorporated in the design of second - generation ADB projects. Section V highlights the main conclusions of the review.

1.1 Farmer Managed Irrigation- Rationale and Key Issues

The discussion on farmer-managed irrigation may be situated within the larger debate on IMT. The phenomenon of IMT has been used variously to refer to "turnover" (as in Indonesia and Philippines), "management transfer" (Mexico and Turkey), " privatization" (Bangladesh), " disengagement" (Senegal), "post-responsibility system" (China), "participatory management" (India and Sri-Lanka), and "Commercialization" (Nigeria).

Management Transfer may take many forms. It can mean contraction of the scope of government managerial responsibility to encompass only the largest facilities in the system, leaving management of tertiary distribution facilities to farmer groups or other private sector facilities. Transfer may also encompass the entire irrigation system, including intake, distribution and drainage works. IMT can even comprise transfer of responsibility for groups of separate systems to management entities under farmer control (IIMI, 1995, p. 4).

Irrigation Management Transfer as a strategy has gained wide acceptance in policy circles in recent years. Among the important reasons cited for the growing acceptance of IMT are (Table 1):

(i) The potential for IMT to reduce the budgetary burden of the State of operating and maintaining irrigation systems
(ii) The potential to improve system performance and productivity
(iii) Response to pressure exerted by international funding agencies
(iv) Response to broader nationalization, democratization and privatization policies and progress
(v) The potential of IMT to enhance sustainability and reduce detrimental environmental impacts of irrigation systems

The momentum that IMT policies have gained have been influenced by the following driving forces (IIMI, 1994, pp. 2-3):

(i) The perception that public irrigation agencies lack the incentives and responsiveness to optimize management performance.

(ii) The claim that farmers have a direct interest in cost-efficiency of irrigation and in preventing the deterioration of irrigation systems so as to better ensure financial sustainability of irrigation.

(iii) The assumption that a management system which is more accountable to farmers will be more equitable and responsive.

(iv) The view that the cost of service provision should be borne by beneficiaries.

Table 1: Rationale of Farmer Managed Irrigation Projects

Rationale	Assumption	Means	End	Goal
Improved systems performance	Technical design is sound	Ensure compliance with operational rules	Water availability improved	Equity effects of irrigation service delivery enhanced
Government budgetary support towards operations and maintenance reduced	Staff levels will fall/maintenance costs will be borne by beneficiaries	Ensure cost-recovery through compliance with Irrigation Service Fees (ISFs) payment schedule	Routine maintenance ensured	Efficiency of investment enhanced
Negative externalities reduced	Beneficiary consultation prior to system construction/ Topographic survey	Ensure catchment protection/better design of facility	Provision of ecological services like Non Timber Forest Products and water ensured/ effects of soil erosion/salinization/flooding reduced	Detrimental environmental effects of project intervention mitigated

2. KEY THEMES

2.1 Compliance with Water Allocation Rules

Water allocation rules refer to procedure that defines how water discharged through an irrigation system will be used by farmers. Rules could be based on an area-based system, volumetric system or a time based approach. For instance, farmers may agree that individual plots will be irrigated for one hour following which water is to be released to the next plot. Alternatively, farmers may agree that one acre of land be irrigated before water is released to farmers further down the distribution canal. The Warabandi system that is operational in parts of Pakistan and northwest India follow a combination of the above two principles of water allocation. In the Philippines on the other hand, experiments are under way in areas managed by the National Irrigation Administration (NIA) to introduce a volumetric system of water allocation through the use of proportional weirs and measuring gauges. However, the important point to be underscored here is that farmer compliance with the rules, whether based on area, time or volumetric approaches is critical to improving water availability.

An evaluation of farmer-managed projects of The World Bank revealed that operation of the systems was often flawed. "The most common problem was insufficient water delivery, and in fact often none, at the tail end of the canals received water" (The World Bank, 1994, p. 85). Another issue highlighted by a review of 26 studies on operation of farmer-managed irrigation systems is the need to distinguish between increases in water availability in the system and the degree of equity with which it is used. Only 38 percent of the studies attempted to examine the equity effects of increased water availability in systems under farmer management (IIMI, 1997).

2.2 Compliance with Irrigation Service Fees

Compliance with ISFs is critical to ensuring that funds to undertake routine system maintenance are raised. Depending on whether management of the entire system (headworks, main and tertiary canals) is devolved to farmer groups or whether the system is jointly managed with government agencies, the maintenance costs are accordingly borne by stakeholders. An evaluation of 208 World Bank projects revealed that cost recovery was unsatisfactory in 68 percent of projects (World Bank, 1994). It is also the case that FMIS tend to defer annual maintenance activity, which subsequently adds up to large investment needs for "rehabilitation". The literature indicates that farmers in jointly managed systems are particularly interested in undertaking maintenance of tertiary canals. Farmers consider maintenance of main canals and headworks to be too costly and the responsibility of the government.

Evidence from Nepal indicates that farmers are more likely to contribute labor towards maintenance activity. In the case of Haryana, wealthier farmers tend to make monetary contributions towards repair of earthen dams while marginal and small farmers usually contributed labor towards maintenance activity. In the Philippines, farmer's compliance with ISFs showed a tendency to decline during a period of drought (as was the case with the El Niño phenomenon in 1997). A study of three Water User Associations (WUA) that was carried out in the wake of an IMT program in Colombia revealed that fee collection rates declined in two of the three WUAs while remaining unchanged in the third (IIMI, 1998).

The discussion on cost recovery must distinguish between farmer ability to pay and willingness to pay for water. Farmer ability to pay is reflected in the value of irrigated agriculture. For instance, in the coastal provinces of Turkey where cash crop production predominates, irrigation fees represented only three percent of variable cost of production. As long as irrigation fees did not increase further, farmers were able to comply with user charges; which also explains investment in O&M (Svendsen et. al, 2000). Farmer ability to pay may also be influenced by degree of government subsidization of agriculture. For instance, in countries like Bangladesh and Indonesia where government subsidies were withdrawn in the wake an IMT program, farmers were unable to pay ISFs which subsequently led to deterioration of irrigation structures due to poor O&M (IIMI, 1997).

The issue of farmer willingness to pay on the other hand is determined by reliability of water supply. A combination of institutional failure and water loss due to poor system maintenance may contribute to low reliability of water supply. Further, farmer willingness to pay may also be explained by the comparative cost of procuring water from private sources like tubewells. It has been pointed out that in Rajasthan, where women are the traditional fetchers of water, households with a large number of women are less willing to pay market determined rates for water (Reddy, 1999). Such households rely on women in households to fetch water from local sources that may involve waiting in queues for a long time. This is primarily because of the low opportunity costs of women's labor.

2.3 Catchment Protection and System Design

Catchment protection is essential to ensure that siltation of irrigation infrastructure is prevented. Proper management of catchment areas like grazing lands or forests is premised on adequate knowledge of multiple land use practices. For instance, landless households with no tangible benefit from irrigation may resort to open grazing of cattle in catchment areas with implications for rates of soil erosion. Higher grazing pressure in catchment areas has been a major source soil erosion, especially in fragile hill environments (Dhar, 1994). However, it must be pointed out that the exact relationship between catchment degradation and siltation of irrigation infrastructure may depend on specific basin characteristics like slope, soil type or distance from dams (see Chomitz et. al, 1997, Ho, 2001).

The perceived benefits of farmer management of irrigation is also dependent on sound technical design of irrigation structures. For instance, in the case of the Joint Forest Management Program in the Indian state of Haryana, approximately thirty four percent of dams that were constructed in the Morni-Pinjore Forest Division silted up almost immediately after construction and did not provide irrigation for a single year (Kurian, 2000). This was primarily due to the fact that inadequate attention was paid to technical issues like site selection and rates of sediment delivery. In Senegal it is reported that irrigation management transfer has increased waterlogging and salinization due to poor management practices by new managers hired by farmer associations (IIMI, 1997). With a view to improve system design and mitigate the harmful effects of irrigation projects multilateral agencies are increasingly placing emphasis on beneficiary consultation and training in the process of constructing physical infrastructure such as dams and diversion structures (World Bank, 1998, ADB, 2000).

A river basin perspective is useful to ensure catchment protection but also to ensure that water requirements in command areas are adequately addressed. For instance, differences in groundwater depth in the Haryana Shiwaliks influences farmer's decisions to strike tube well drilling. Beyond a depth of approximately sixty feet, farmers find the costs of exploiting groundwater prohibitive, thereby increasing their reliance on public irrigation systems. Differences in access to groundwater influences cropping patterns. For, instance in areas where tubewell expansion has taken place paddy cultivation has been undertaken with implications for higher per acre water requirement. It is also important to note that in areas where private tubewell expansion has aided paddy cultivation, the potential for farmers to sustain co-operation in management of public irrigation systems has been weakened.

Unbridled tubewell expansion has adverse implications for the environment in terms of salinization and depletion of underground acquifiers (Shah, 1993). Further, tubewell expansion may increase the possibility of rationalizing use of water from public systems. For instance, farmers may use water from public systems as well as private sources to grow high value commercial crops. On the other hand farmers ability to share tubewells may be constrained by factors like price or location of tubewells in relation to cultivated plots. In such cases farmers reliance on public irrigation systems for food crop cultivation may be considerable. Given the differences in water requirements among farmers within a command area, there are bound to be demands placed on irrigation systems for supply of water. In Nepal, for instance it has been noted that increasing water availability for one FMIS has resulted in reduced water availability in another FMIS within the same river basin. A system of water extraction shares has been suggested as a solution to the challenges of supplying water on a river basin scale. Essentially, water extraction shares for farmers are devised based on an assessment of sustainable re-charge levels, cropping patterns, choice of irrigation technology and soils in a micro-region (Moench, 1998).

3 GOVERNANCE OF FARMER MANAGED IRRIGATION IN ASIA-TOWARDS AN ANALYTICAL FRAMEWORK

We noted in the above discussion that at the heart of the debate on farmer-managed irrigation were issues of cost recovery and O&M. To ensure efficient O&M, we argued compliance with water allocation rules and sound system design was paramount. In this section, we lay down the broad contours of a framework to examine ADB' s experience with farmer managed irrigation.

3.1 Irrigation Management Issues in Rural Asia

(i) Poor coordination of inter-sectoral policies (e.g. Groundwater) have been responsible for adverse environmental effects like salinization and lowering of the groundwater table.

(ii) The assessment of land under irrigation is made particularly difficult by different approaches used to compute irrigation. For countries like Bangladesh and Bhutan paddy fields, cultivated during the wet season, are not considered irrigated land. In other countries fields cultivated during the wet season are included in irrigated area.

(iii) In may countries no distinction is made between irrigated and rainfed crops. Although rice cultivation represents about 45 percent of all crop areas in the region, there are differences in its regional distribution

(iv) Large-scale irrigation projects in the past ignored multiple land use practices and over-estimated capacity of reservoirs leading to smaller area being irrigated than at appraisal.

(v) Although there is growing consensus at the policy level on the importance of farmer participation in irrigation management, governance issues have been poorly conceptualized and integrated in project design.

(vi) Poor conceptualization of governance dimension in project design has been reflected in low system efficiency and poor cost-recovery.

3.2 ADB's Evolving Role in Irrigation Management

ADB has so far implemented 437 water related projects, for which financing totaling $15.7 billion has been provided (ADB, 1999). Initially, ADB projects were typically supply driven and concentrated on creation of irrigation infrastructure such as dams. In the process, issues of cost recovery and efficiency of water use were not emphasized. Moreover, most ADB loans were identified, processed, administered and evaluated within their subsector reflecting a fragmented approach to planning and implementing projects in DMCs. For example, it has been pointed out that legal aspects of irrigation projects were addressed in less than one quarter of approved. Further, water conservation aspects were addressed in only one third of approved projects.

However, in recent years in response to the growing pressure on limited water resources, ADB projects have tended to take a more integrated view of issues in planning and implementing water related projects. From a pure concern with project finances in the 1970's, ADB projects in the 1990's have begun to address cross-cutting issues like environmental conservation and private sector participation (ADB, 2001). ADB's Water policy emphasizes the need for cost recovery and beneficiary participation in aspects of project design and implementation (ADB, 2001). Towards achieving this end, the policy highlights the need for good governance, capacity building and attention to distributive aspects of projects. By focussing on distributive aspects of project implementation, ADB projects are attempting to engage with issues of pro-poor growth (ADB, 1999).[1] This signifies a move towards addressing issues of organizational and institutional sustainability in addition to the previous focus on financial sustainability of projects as reflected in economic analysis of internal rates of return.

3.3 Analysis of Governance of Farmer-Managed Irrigation- Key Elements of a Framework

Efficiency and Equity: ADB' s increasing concern with the sustainability of institutions and pro-poor growth has focussed attention on the governance dimension of development projects. A focus on governance is particularly relevant for irrigation projects since efficient service provision can be critically dependent on it. Further, poor governance as reflected in conflicts over water allocation may hurt the poor like small and marginal farmers more severely. Considerations of equity and efficiency are reflected in factors like availability of water between head and tail end farmers, difference between per-capita water requirement and availability, distribution of cost among water users and farmer contribution towards maintenance.

ADB' s conceptualization of the governance dimension in development essentially comprises three components. The components include:

(i) Predictability of DMC policies
(ii) Accountability and Transparency
(iii) Beneficiary Participation

In the context of FMIS issues of predictability, transparency and participation may operate at all levels. For instance issues of predictability may operate at the level of national policy or at the level of WUA rules for O&M. For example, will cost-recovery as a policy be pursued as a principle of sound water management or will it be open to negotiation depending on the political regime in power? Further, accountability issues may arise with respect to monitoring water use and the role of external agencies in FMIS. For in-

[1] Pro-poor focus of other bilateral and multilateral agencies like UNDP and DFID is reflected in the emphasis on rural livelihoods

stance, how will use of water be monitored- on the basis of area or volume? Finally, beneficiary participation may be reflected in participation of farmers in forums that decide on rules at the level of policy making through working groups. Participation may also occur at the level of WUA's. For example, how are benefits and costs of using a publicly owned utility likely to influence farmer participation in cost-recovery and O&M?

Institutional Analysis: Ensuring sustainability in all its dimensions - organizational and environmental appears to be the greatest challenge of FMIS. An engagement with issues of sustainability acknowledges the centrality of institutional analysis. Institutional analysis in the case of FMIS highlights issues of collective good provision, distribution of benefits and costs across users using a collective good, local relations of power and exchange and the influence of local ecological variation. Institutional analysis also highlights the fact that distribution of benefits and costs, relations of power and local ecology may change over time. External interventions that effectively employ institutional analysis may be better placed to respond to change while empowering marginalized groups by reducing levels of risk that poor communities are exposed to.

From Project to Post-Project Phase: The importance of institutional analysis is supported by the fact that WUAs may perform well during project phase because of monitoring of project staff. However, in the wake of project implementation compliance with O&M procedures and cost-recovery may not be so effective. An ongoing study of watershed management in the Haryana Shiwaliks highlights the fact that WUAs that had a record of high compliance with ISF during project phase descended into conflicts over water allocation in post-project phase (Kurian, 2000). Further, even among WUAs that complied with allocation and ISF collection rules during project phase, little investment was made towards routine maintenance of irrigation infrastructure.

As a result of accumulated damage to infrastructure, the costs of undertaking "rehabilitative" repairs became prohibitive for WUAs. As a result of poor system efficiency arising from poor maintenance, compliance with allocation and ISF rules also began to decline during post-project phase. Due to the fact that farmer's groups do not usually bear maintenance costs, the involvement of agency staff in system management has remained more or less unchanged in the wake of an IMT programme (Kurian, 1997). This runs counter to the rationale of FMIS that assumes that budgetary support to irrigation management would fall once farmers became more actively involved in system management.

Information Gaps: From the point of view of designing an effective project intervention that addresses issues of efficiency and equity there are four issues of paramount importance. These issues are information gaps, sequencing, strategic focus and performance indicators (Appendix 3). For instance, what kind of information is required to ascertain level of accountability of a system of water rights? At what point of the project cycle should project managers target this issue? What are the strategic issues that need to be addressed by project managers. Finally, what are the performance indicators that project managers can identify to ascertain project impact?

3.4 Methodology Adopted for the Study

Data Sources**.** The study relies on a study of ADB project documents to examine the factors that contribute to the success or failure of farmer-managed irrigation interventions. Project documentation was reviewed to ascertain the influence of cultural setting, institutions and specific project interventions on farmer participation. Project documents reviewed for the study includes Report and Recommendation to the President (RRPs), Project Performance Reports (PPR), Project Performance Audit Reports (PPAR) and Back to Office Reports (BTOR). In addition, consultants reports prepared prior to loan appraisal were reviewed.

Projects Reviewed**.** ADB Irrigation projects with a farmer managed component are/were operation in Laos, Cambodia, Vietnam, Indonesia, Pakistan, Nepal, Bangladesh, Sri Lanka, and Philippines. However, considering that the objective of the study is to examine the effectiveness of such interventions, projects were selected on the basis of availability of project documentation. Projects in Pakistan, Laos and Philippines for which loans were sanctioned after 1998 were nevertheless reviewed to appreciate the extent to which issues such as environment and gender had found recognition in the context of the poverty alleviation strategy and Long-Term Strategic Framework of the Bank.

The following projects were selected for the review:

(i) Command Area Development Project (L 1399), Bangladesh (1995)

(ii) Irrigation Management Transfer Project (L1311), Nepal (1994)

(iii) Kirindi Oya Irrigation and Settlement Project (L324, L612), Sri-Lanka (1977/1982)

(iv) Farmer-Managed Irrigation Systems Project (L1378) Indonesia (1995)

(v) Irrigated Command Area Development Project (L818), Indonesia (1994)

Data Analysis. Data analysis was limited to review of project documents to identify country specific issues related to design and implementation of farmer managed irrigation projects. A comparative study of cross-country experience that followed facilitated a problem tree analysis to identify generic issues constraining project implementation and outcomes. The generic issues were then classified into causes and effects with an attempt being made to identify information gaps. A review of evaluations of IMT carried out by IIMI and The World Bank together with empirical studies on common pool resource management facilitated the problem tree analysis. Project Completion Reports (PCR) were available for only two projects (L324 and L 818). Given the severe limitations of existing project evaluations in explaining participatory processes at the level of farmer organizations, an attempt was made to incorporate, wherever relevant, findings of an ongoing review of WUAs in Haryana, India (Kurian, 2000).

4. DISCUSSION OF STUDY FINDINGS

4.1 Governance Issues Highlighted in ADB Farmer Managed Irrigation Projects

The primary objective of most of the projects reviewed was economic growth with poverty reduction; the only exception being Loan 1378 (Indonesia), where poverty reduction was the over-arching goal (see Appendix 1). All the projects reviewed envisaged increases in income and employment generation as outcomes of the intervention. Among other outcomes envisaged included increases in area irrigated, improvements in system efficiency and increases in crop production.

Given the great diversity of policy environments, planning structures and farming practices, a range of constraints were highlighted by our analysis of country specific projects (Appendix 2). Our review indicates that at the level of inter-sectoral policies the under-performance of agency managed irrigation is now generally recognized. In particular, under performance is characterized by lack of beneficiary participation in O&M and poor collection of ISFs. DMC governments are increasingly emphasizing the need for greater cost recovery to undertake O&M in the context of dwindling budgetary sources of funds.

First generation ADB FMIS loans went to finance large-scale infrastructure and resettlement projects. Such interventions were characterized by a high level of success with execution of physical components like construction of dams. However, the large-scale nature of such interventions together with the fact that limited attention was paid to capacity building measures like staff motivation led to cost-overruns. Further, in some cases the storage capacity of reservoirs was overestimated leading to smaller area being irrigated than at appraisal. Large-scale projects quite naturally also tended to overlook the implications of multiple land-use practices within subcatchments. As a result in some cases irrigation infrastructure such as head works of dams and distribution channels were destroyed by livestock.

The level of cost recovery is poor. Farmers tend to be interested in O&M for tertiary canals and consider maintenance of main canals to be the responsibility of the government. Irrigation efficiency is low implying that compliance with water allocation rules is low. Low compliance with water allocation rules could be due to poor knowledge of rules on the part of farmers and poor clarification of water rights. It is clear that farmers are willing to pay ISFs provided water provision is reliable. Low reliability of water provision could be attributed to the fact that project benefits are poorly conceived in terms of a pro-poor focus. As a result, only wealthier farmers with plots at the head of an irrigation canal receive water.

4.2 Generic Issues Highlighted in Review of ADB Projects

Governance of farmer managed irrigation suffers from constraints that occur at the level of DMC policies, natural resource management strategies and organizational principles adopted for WUAs. Our review of generic constraints highlights six issues that demand attention from the point of view of improving governance of farmer managed irrigation projects (i) Staff motivation, (ii) Watershed characteristics, (iii) Distributive Impact of Project Benefits, (iv) Water Rights and Water Pricing Modalities, and (v) Organization of WUAs.

Staff Motivation: Field staff of line departments are an asset in the process of designing and executing farmer-managed irrigation projects. Field staff have detailed knowledge of watershed characteristics, water allocation institutions and an understanding of previous externally aided interventions. However, their contribution to project design is usually limited to attending training programs or accompanying external consultants on rapid field appraisal missions. Further, training programs for field staff are usually organized once issues such as formation of WUA are completed and water allocation rules have been formulated.

Field staff for their part, view farmer managed projects as a burden. This is because they are supposed to undertake greater tasks such as community consultation, base-line mapping, etc. In most cases, no increases are made in their transportation budget, their salaries remain the same and initiative is not recognized. In still other cases, field staff who have contributed enormously towards a project are transferred, thereby adversely affecting continuity in the relationship between government agencies and rural groups (Kurian et. al, 1997).

Poor field staff motivation has been known to affect the quality of project design and execution. For example in the case of the Command Area Development Project (Bangladesh), field staff formed WUAs in a hurried fashion and paid scant regard to community consultation. On average, three WUAs were formed in one day. In many cases, such WUAs remain defunct. In Nepal fifty percent of WUAs formed were weak. In the case of the Irrigation Management Transfer Project in Indonesia, field staff made arbitrary visits to WUAs without any pre-conceived idea of what was to be achieved at such meetings. Poor motivation of field staff is related to their poor material conditions (salaries/facilities) and the levels of corruption in government agencies. Morale of field staff may also be affected by the nature of bureaucratic procedure. For instance, project documents from Indonesia note that there were delays in the release of revised project budgets leading to delays in hiring of community organizers with subsequent delays in project execution.

Notwithstanding the importance of well-motivated field staff, most projects tend to reserve attention to field staff towards the middle of the project execution phase. However, in terms of sequencing, we argue that field staff may be consulted early. Consultation with field staff may begin even at the stage of consultant's report prior to loan appraisal. Loan appraisal mission may devote time towards consulting field staff on the design issues of the proposed project. In particular, attention may be paid towards identifying and removing procedural hurdles that prevents their full participation in projects. Important performance indicators of staff motivation may include quality of baseline survey reports, prioritization of proposed project areas and continuity of consultation processes beyond project phase.

Watershed Characteristics: An evaluation of 14 irrigation systems in the hills of Nepal pointed out that the availability of multiple sources of irrigation can influence the organizational strength of WUAs (Winrock, 2001). In the case of the Kirindi Oya project the importance of integrating livestock management in river basin planning was emphasized. The literature on common pool resource management contains a rich assortment of studies that examine similar themes. For instance, studies have highlighted the role of groundwater depth and access to alternative sources of irrigation in fostering farmer interest in management of common pool resources (see Dubashi, 2000). Wade's studies of canal irrigation in south India highlights the role of differences in soil type in fostering cooperation among farmers (Wade, 1988). Studies on the Zanjera system of communal irrigation management in the Philippines have highlighted the role of land scattering as a device that fosters interest of farmers in entering into co-operative agreements (Kanbur, 1992).

Evaluating farmer interest in a common pool good like an irrigation canal is critical in determining the potential for farmer participation in service delivery. Adoption of a watershed framework may prove useful in delimiting the scope of planning and consultation. However, in most cases, it may be pertinent to ensure that hydrological boundaries coincide with boundaries which makes it socially and culturally possible to ensure organization of farmers. For instance, a study in Himachal Pradesh indicates issues such as slope and elevation may play an important role in determining land use practices that encompasses neighboring watersheds as well (Datta, 1998). Another study in the Shiwalik hills, Haryana indicates that farmers belonging to one watershed may differ in terms of access to markets and development of infrastructure like schools and electricity due to differences in elevation. Such differences in the pace of economic development may constrain populations drawn from different elevations of a watershed from working together in WUAs.

From the point of view of sequencing, it is important to focus on farmer interest at the initial phase of project design. A focus on farmer interest as reflected in an examination of basin characteristics can have implications for the scale of project interventions. For example, differences in access to alternative irrigation from private sources along the length of a main canal may determine potential for cooperation in farmer management among groups of farmers. In cases where the potential for farmer management are concentrated in small pockets, it may be more cost-effective to focus on stand alone systems rather than a contiguous system of interconnected canals. Innovations in engineering design must play close attention to differences in farmer interest in a common pool irrigation system. For example, in the context of NIA irrigation systems in northern Philippines relevant questions that arise include: should a Farmer Irrigation Group (FIG) coincide with a turnout (lowest outlet)? Are all farmers in an FIG likely to exhibit similar levels of interest in O&M and cost recovery?

Ascertaining the distribution and level of farmer interest in a public irrigation system needs to be done prior to appraisal. Cost-effective data collection from a representative sample of households in the proposed command of an irrigation system may include the use of qualitative coding. Coding of relevant parameters and assignment of weights is increasingly finding acceptance among external donor agencies (see James, 2000, Dayal et. al, 1999, Pincus, 1996).

Another issue related to basin or watershed level planning is that of multiple land uses. The irrigation Management Project in Nepal and the Command Area Development Project in Indonesia encountered forestry, livestock and agricultural land uses. Multiple land use issues need not be limited to watersheds but may arise at the level of micro-watersheds as well. Issues of deforestation arising from livestock grazing and fuel wood collection may be related to issues such as access to land or irrigation. For instance, a project document in Indonesia notes " erosion prone grassland and sparse secondary growth forest used occasionally by farmers for shifting cultivation have been converted to irrigated paddy fields because of access to irrigation. This has stabilized the environment because erosion has been greatly reduced and the farmers' increased farm income has deterred them from practicing further shifting cultivation in the project area" (PCR, L818, 1994, pp. 9). On the other hand, village studies in the Haryana Shiwaliks reveal that peasants with an assured supply of water as a result of well-functioning irrigation institutions may devote land area to raise fodder thereby reducing pressure on public forests in upper catchment areas (Kurian, 2000). Therefore, from the point of view of enhancing catchment condition, important performance indicators may include rates of sapling regeneration, soil erosion rates, water quality, changes in groundwater levels, species diversity, qualitative indicators of livestock use and extent of fire damage (IFRI, 1997).

Distribution of Project Benefits: In addition to differences in farmer interest in participating in management of public irrigation management systems, there are differences in distribution of benefits and costs across groups of farmers. Distribution of benefits and costs among farmers may determine the potential for farmer participation in O&M. Farmers may be able to derive benefits from irrigation services depending on factors like land size, availability of family labor, access to credit, etc. For example, it is a well documented fact that farmers with titles to land may be in a better position to access formal channels of credit because of their ability to pledge a collateral (World Bank, 1998, ADB, 2000). Further, a recent study in Vietnam suggests that households with larger acreage of un-irrigated land stood to gain more from an irrigation project (Walle et. al, 2001).

On the other hand, farmers may also bear different costs from using an irrigation system. In the case of common pool goods, it has been hypothesized that the potential for cooperation in management may be aided by relative homogeneity of costs that users bear (Oliver and Marwell, 1992). The distribution of costs that different categories of users bear may differ from season to season or may change depending on whether rainfall patterns are normal or deficient. For instance, during the El Niño phenomenon, ISF collection rates for NIA managed irrigation systems in northern Philippines declined (NIA, 2001). While the figures indicate aggregate changes in collection rates, no indication is provided about collection rates across different categories of farmers. For instance, did large landholders comply with collection of ISFs to a greater extent when compared to small farmers? Did small farmers find the costs of water use too high in proportion to benefits?

In addition to relative heterogeneity in interest and costs, heterogeneity of household endowments may also determine the extent to which a group may participate in O&M. The literature on common pool resource management highlights the fact that wealthier individuals with sufficient level of interest in a public good may take the initiative to provide the good (Oliver and Marwell, 1992, Olson, 1965). Further, studies have also pointed out that heterogeneity of endowments among households need not necessarily translate into inequity in distribution of benefits from management of public goods. Studies have highlighted the role of " good patrons" in management of common pool resource management in Japan, The Netherlands and South India (Baland and Platteau, 1996, Mosse, 1997).

This point is particularly important in the context of the growing recognition of the potential role that the private sector can play in irrigation service delivery (see IIMI, 1995). An ongoing study in the Haryana Shiwaliks reveals that water management organizations tend to be more efficient and better addressed equity issues when management was under a contractor who was responsible for water allocation and collection of water charges (Kurian, 2000). Interestingly, contractor based water provision (in contrast to provision by a cooperative) showed a tendency to arise in groups that were characterized by relative heterogeneity in distribution of household endowments like arable land and livestock.

The inability to foresee the distribution of benefits and costs in ADB farmer managed irrigation projects may also influence economic analysis at appraisal stage. From the point of view of the pro-poor focus of ADB, there are some shortcomings in economic analysis with regard to cropping intensity. It has generally been recognized that cropping intensity is an excellent indicator of the performance of an *irrigation system* (World Bank, 1994). However, cropping intensity that is a crucial variable in calculations of EIRR (at appraisal) is based on aggregate figures of farmers in a command area.

ADB project document for Indonesia notes that " the systems have large differences that will influence the benefits, and these differences have not been fully acknowledged in either project preparation or implementation. Alternative uses for land or labor, particularly coffee production in upland areas, constrain the pace at which farmers are prepared to convert land to paddy field. Socioeconomic conditions, particularly differences in farming experience and attitudes between transmigrants and local people, appear to be a major determinant of cropping intensity and the speed of land development" (PCR, 818, 1994, pp. 11).

There are bound to be variations in cropping intensity across groups of farmers within a group depending on size of land owned. A hypothetical example of three farmers illustrates differences in cropping intensity during wet and dry seasons[2] (Table 2).

Table 2A: Differences in Cropping Intensity based on Household Endowments (Based on Calculations for Two Seasons)

Land Owned by Farmer	Cropping Intensity in Normal Wet Season + Dry Season Irrigated	Cropping Intensity in Wet Season with Less than Normal Rainfall + Dry Season Unirrigated
10	(16) 80%	(13) 65%
5	(10) 200%	(9) 180%
2	(4) 200%	(4) 200%

Table 2B: Differences in Cropping Intensity based on Household Endowments (Based on Calculations for Dry Season Only)

Land Owned by Farmer	Cropping Intensity in Dry Season under Irrigation	Cropping Intensity in Dry Season without Irrigation
10	(8) 80%	(5) 50%
5	(5) 100%	(4) 80%
2	(2) 100%	(2) 100%

Notes: Figures in parenthesis refer to land actually cultivated (operational area)

$$\text{Cropping intensity} = \frac{\text{Area cultivated in Wet Season + Area Cultivated in Dry Season}}{\text{Land Owned (Cultivable Area)}} \times 100$$

The above tables highlight the following points:

- In wet season under normal rainfall and in dry season with irrigation, small farmers may have high cropping intensities when compared to large farmers because larger farmers tend to cultivate large areas (Table 2A). Farm studies have pointed to the possibility of large farmers cultivating larger acreage in response to improved access to modern irrigation with a view to maximize economies of scale (Ellis, 1998).
- The above table indicates that, in wet season with less than normal rainfall and in dry season without access to irrigation, small farmers may be able to achieve higher crop-

[2] The following assumptions are made in the process of describing differences in cropping intensities of different categories of farmers. We assume: (1) Large farmer' s operational area may be influenced by contextual factors like supply of family labor to carry out on-farm operations, price of inputs like water and seeds. (2) A market for food products exists that would orient at least a part of farmer' s production towards sale. (3) Large and medium farmers would reduce their operational area under unirrigated conditions while small farmers would continue to cultivate their entire land to meet food requirements. On-farm food production can be critical for small farmers since their engagement in non-farm employment may be limited to low paying jobs.

ping intensity figures when compared to medium and large farmers (Table 2A). However, evidence from Haryana indicates that higher cropping intensity figures do not reveal differences in levels of risk that different category farmers are exposed to (Kurian, 2000). For example, the Haryana study shows that due to insufficient returns from growing cereals (due to stagnant terms or trade) small farmers were on average devoting the largest acreage to growing non-cereal crops like radish that were commercially more remunerative. However, price volatility of non-cereal crops like radish were high. Price volatility could potentially increase the risk of small farmers. Increased risk could be reflected in inability of small farmers to use proceeds from sale of non-cereal crops to meet food requirements through purchases from markets.

- Cropping intensity figures does not distinguish among crops that different farmers grow. For example, the Haryana study indicates that large farmers devoted on average the largest land area to fodder cultivation. Increased fodder cultivation from private fields facilitated income diversification through sale of milk in urban centers.
- The poor are worse off in unirrigated conditions. However, disadvantaged groups like women in poor households are particularly worse off during the dry season. Small land holdings make it imperative for men to take up non-farm jobs in towns while women are left with the responsibility of household chores of cooking, fuelwood collection and undertaking on-farm operations.
- We observe that under unirrigated conditions in the dry season the difference between the cropping intensities of large and medium farmers and between medium and small farmers tends to decline when irrigation becomes available during the dry season. For instance, the difference in cropping intensity between large and medium farmers declines from 30 percent to 20 percent while the difference between medium and small farmers declines from 20 percent to nothing under irrigated conditions.
- What is also clear from the example is that when irrigation becomes available cropping intensity tends to increase. However, cropping intensity increases are driven by increased intensities of large size farms. This is an issue that is seldom highlighted by standard EIRR calculations of cropping intensity. However, due to higher marginal benefits to large farmers under irrigation their stake in efficient service provision may increase. Higher potential benefits to large farmers from efficient service provision

could potentially offer opportunities for private sector participation in service provision.

From the point of view of sequencing, it is important that due attention is paid to distributional issues of project design at appraisal stage (Box 1). A recent paper demonstrates that inability to pay attention to distributional issues at appraisal stage can result in incorrect project selection (see Walle and Gunawardena, 2001). Based on data on an irrigation project in Vietnam, the authors point out the inadequacies of the Q*uick and Dirty (Q&D)* method based on means that is currently used by multilateral agencies. By contrast, the S*low and Clean (S&C)* method that the authors recommend is based on regional means and data collected from a representative sample of households. The authors conclude for projects where the cost exceeded 400 Dongs per meter, the loss resulting from using the QD method as against the SC method was in the range of 75 to 255 percent. The authors acknowledge the high costs of more rigorous data collection methods. However, they point out that "when irrigating as little as 3 percent of Vietnam's nonirrigated land, the savings from the more data-intensive method are sufficient to cover the full cost of extra data required" (Walle and Gunawardena, 2001, pp. 141).

Box 1

Acknowledge Influence of Staff Motivation, Watershed Characteristics and Distributional Impacts in Project Design

'The design of the implementation arrangements for both land and irrigation development was weak, which affected the synchronized construction of these facilities. Irrigation development proceeded ahead of land development and a large backlog of undeveloped land with completed tertiary system ensued. Although additional land and tertiary facilities are being constructed within the command areas in some of the project's irrigation schemes, project staff participated to only a limited extent in the implementation of these schemes. Greater participation would have provided more information on the overall progress of development of each irrigation scheme.

To ensure success, project design should be based on a comprehensive evaluation of physical, environmental and socioeconomic conditions in the project area. Under this project, inadequate attention was paid to soil and topographic conditions and assessment of socioeconomic conditions (involving alternative cropping, alternative uses of labor and beneficiary attitudes towards irrigated agriculture)' .

Source: PCR, L 818-INO, 1994, pp. 16

Organization of Water User Associations (WUAs): ADB Project documents highlight the importance that is attached to WUA formation in the context of farmer managed irrigation interventions. Formation of WUAs is among one of the first tasks that is undertaken during project implementation phase. We argue, however, that formation of WUA should follow only when a comprehensive survey of watershed characteristics and distributional impact has been completed. Valuable resources and time of project staff may be invested in formation of WUAs only in regions where substantial interest in farmer managed irrigation has been recognized. In the case of the Northern Water Resources Sector Project in Sri-Lanka, the need for NGO involvement in formation of WUAs through establishment of pilot WUAs was highlighted.

It must also be pointed out that ADB projects place emphasis on organizational procedures like record keeping and use of fines and sanctions for non-compliance. In the case of the Command Area Development Project in Bangladesh, for instance, it was noted that rules were too abstract with a focus on activities during project phase. However, while formal sanctions and systems of fines may be important in ensuring transparency and accountability at the level of WUAs, little is done to establish whether alternative structures could be evolved that are rooted in the local context of inter-locked institutions. Evidence from an on going study in Haryana indicate that water contractors ensured compliance with allocation rules and payment of user charges by relying on the complex network of exchange relations (See Box No. 2).

We argue that it may be wise to defer training of field staff and farmer representatives until sufficient information on socioeconomic and environmental aspects of the project area has been collected. Insights on membership, monitoring mechanisms, the role of external agencies may be gleaned prior to institutionalizing O&M rules. It may also be wise to institute pilot projects in independent project sites to test different operational procedures and gauge beneficiary compliance with them. The procedures could then be fine-tuned and applied on a larger scale to cover the proposed project area. Such a staggered approach offers the potential of ensuring greater organizational sustainability. Relevant performance indicators of efficacy of process of organizing WUAs may be compliance with cost-recovery norms, compliance with water allocation norms and maintenance and frequency of conflicts.

Box 2

Compliance with Water User Charges through Social Exchange Relations

‘ Another interesting facet of water user charges in Bharauli is the role of local level processes in ensuring compliance. Contrary to what most NGOs or donor agencies may expect, compliance with water user charges is mediated by a complex web of exchange relations. For instance, Bardhan in his discussion of interlocking factor markets cites Bhalla's 1976 study of Haryana villages; "the worker gets his supplies of essential consumer goods on credit from the village shopkeeper or grain dealer, which are repaid with his labour services to the cultivator-employer (in terms of unpaid wages), who then in turn repays the original creditor by adjusting his account with the latter for grain deliveries or purchases"(Bardhan, 1984, pp. 161). Such interlinked exchange relations also influence modes of payment of water use charges for use of earthen dams. For instance, Singh Ram, a marginal peasant in Bharauli pays for use of water from the dam over a period of six months. Sometimes, he also borrows money from the water contractor, Bant Ram. The contractor keeps an account of his dues. Sometimes, no cash payment is made to clear off his debt with the contractor. But instead Singh Ram is asked to work as hired labour on Bant Ram's land and his wages are adjusted in accordance with the debt he owes Bant Ram for a variety of services’ .

Source: Ongoing Study on Participatory Watershed Management, Haryana.

4.3 Best Practices for Governance of Farmer Managed Irrigation Service Delivery.

Based on the review of five ADB Farmer Managed Irrigation projects we identified the following best practices. With the exception of the Kirindi Oya project, all projects were implemented from 1995 onwards.

- Enhance Staff Motivation as part of a strategy of public sector reform by targeting incentive structures and systemic corruption

- Establish extent of beneficiary interest in use of a Public Irrigation System by focussing local ecological variation
- Pursue dis-aggregated economic analysis of beneficiary groups to establish potential for farmer participation in O&M, cost-recovery and private sector participation in service provision
- Ensure collection of baseline socioeconomic and environmental information to enhance outcomes of ex-post project evaluations
- Identify relevant performance indicators for project monitoring purposes
- Focus on suitability of fit between hydrological and sociocultural boundaries to enhance organizational sustainability
- Undertake training of Field staff and WUA representatives to consolidate gains of community consultation process

4.4 Section IV: Are Past Lessons being incorporated in project design? Evidence from second generation ADB projects

In order to examine whether past lessons derived from previous FMIS projects are being incorporated in design of second generation projects we reviewed the following projects:

(i) Punjab Farmer Managed Irrigation Project, Pakistan (TA No. 2452_PAK, 1999)

(ii) Southern Philippines Irrigation Sector Project, Philippines (TA No. 2841- PHI, 1998)

Staff Motivation: In the case of the Punjab project the Bank's sector strategy acknowledges the importance of improved public sector efficiency. Consultant's reports prior to loan disbursal also recognize the fact that poor staff salaries leads to rent seeking and corruption. However, project intervention does not include any specific component that addresses this issue.

Beneficiary Interest in Use of Public Irrigation System. In both the Punjab and Philippines project there is a vast improvement in processes that attempt to examine potential beneficiary interest in systems. The Punjab consultant's report carried out a detailed social assessment, while in the case of the Philippines there is an explicit recognition of the need for community consultation at beginning of feasibility study. The consultant's report in the case of the Philippines acknowledges that community consultation takes time and informing farmer’s of their rights and responsibilities is important. One of the most significant improvements in the Philippines case is the recognition that membership in irrigators associations must be closely aligned with boundaries of the tertiary canals.

Potential for Farmer Participation in Cost-Recovery and Maintenance: In the case of the Philippines case the importance of adopting a “before project-after project” perspective is highlighted. For instance, the need for “self-reliant” irrigator’s associations for management of gates at the level of turnouts has been recognized. Two points are highlighted in this context: (i) selection of service area, and (ii) equal water rights. However, cost-recovery measures remain highly top-down as reflected in NIA’s proposal to increase ISFs to achieve break even. Predictability of cost-recovery policies also remains an issue. For instance, in the wake of the change in political regime the socialized ISF structure (that stipulated different rates of fee collection based on land size and season) was abandoned. In the case of the Punjab project, on the other hand, consultant’s report makes detailed assessment of three issues:

(i) Distribution of farm and non-farm income of farmers by location along canals-head versus tail end
(ii) Case studies of individual farmers and gender analysis
(iii) Inter-dependence of land uses – forestry and agriculture

Data Collection and Analysis Processes: The Punjab consultant’s report is an example of detailed data collection of individual farmers that are potentially to be involved in management of canal systems. The Philippines case highlights the need for topographical and hydrological studies along the length of distribution canals. Consultant’s reports also highlights the fact that improved assessment practices adopted by projects supported by other multilateral agencies are being incorporated. Environmental assessment acknowledges the implications of conversion of forests in catchment areas to paddy cultivation.

Focus on Suitability of Fit between Hydrological and Sociocultural Boundaries: ADB projects are gradually acknowledging the need for detailed assessments at the level of turnouts. The Philippines consultant’s report, for instance, notes that “the design of tertiary systems should be the basic input in the design of main canals”. With a view to operationalizing this strategy, the report emphasized the need to move from using 1meter contour plans to 20 cm. plans that provide more detailed information on soils and slope characteristics of irrigated plots. The report also recognizes the need to reduce excessive policing of gates by staff of NIA by focussing on installation of fixed flow structures. A transition away from "excessively gated structures", the report notes could eventually lead to a reduction in staff numbers.

While on certain issues there is definite forward movement in the case of new generation ADB projects, progress is lacking in the case of others. In particular, five issues have more or less been neglected:

(i) Identifying potential for private sector participation
(ii) Collection of socioeconomic and environmental baseline information
(iii) Identification of performance indicators
(iv) Identifying innovative cost-recovery mechanisms that ensure accountability
(v) Proper sequencing of training programs for field staff and representatives of WUAs.

CONCLUSIONS

Based on a review of second generation ADB FMIS projects, it is evident that departmental reform should be the focus of future interventions. For instance, line agencies given their technical expertise could potentially play a facilitative role in collection of socio-economic and environmental baseline information and identification of performance indicators for project monitoring. The issue of staff motivation that we highlighted in this report is critical to overall public sector reform. Improved staff motivation could potentially affect quality of extension services and improve community consultation with consequences for overall project execution.

Consultant's reports in Second-generation ADB projects have acknowledged that design of tertiary distribution systems should be an important input in choice of irrigation technology. We also noted that ADB irrigation projects have gradually moved from reliance on large - scale projects towards relatively smaller scale interventions. However, from the point of view of ensuring viable water user organizations challenges still remain. For instance, project design may encourage innovation in engineering design, especially since water requirements within a catchment may differ across groups of households depending on cropping patterns or access to alternative irrigation. Further, within watersheds when organizing groups may be challenging due to differences in cultural composition or access to markets, stand - alone options may be explored to ensure suitability of fit between hydrological and sociocultural boundaries.

The review highlights the fact that well functioning irrigation institutions are critical to ensuring equity, efficiency, water availability and mitigating detrimental environmental impacts. However, the design of well- functioning irrigation institutions is predicated upon adequate institutional analysis. Institutional analysis could potentially highlight distribution of benefits and costs for different categories of farmers using a public irrigation facility. Institutional analysis important from the point of view of ascertaining potential for cost-recovery and farmer participation in O&M. Given ADB' s pro-poor focus, institutional analysis could potentially improve project selection and proper targeting of marginalized groups like women and small landholders.

Our review highlights the fact that even minor improvements in irrigation systems can result in vast improvements in system efficiency, especially in water scarce areas. Moreover, using a hypothetical example, we argue that access to irrigation in dry season agriculture can potentially reduce differences in cropping intensities of large and marginal farmers. Further, given recent evidence that suggests that returns from investing in irrigation may be higher in rain-fed areas when compared to irrigated areas, we argue that ADB farmer managed irrigation projects may target dry season agriculture in rain-fed areas as a matter of priority. Our optimism in farmer participation in O&M in such areas is heightened by studies that suggest that potential for co-operation among farmers tends to increase during periods of resource scarcity.

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ABBREVIATIONS

ADB	–	Asian Development Bank
BTOR	–	back-to-office report
DMC	–	Developing member country
FMIS	-	Farmer Managed Irrigation System
IIMI	–	International Irrigation Management Institute
IMT	–	Irrigation Management Transfer
ISF	–	Irrigation Service Fee
NIA	–	National Irrigation Administration
NRM	–	Natural Resource Management
O&M	–	operation and maintenance
PPAR	–	Project Performance Audit Report
PPR	–	Project Performance Report
RRP	–	Report and Recommendation to the President
WUA	–	Water User Association

APPENDICES

Appendix 1:Profile of ADB Projects Reviewed

Loan No. 1399 (Bangladesh)

Main Project Components

Develop and rehabilitate irrigation structures

Establish WUAs for O&M

Integrated pest management

Development of small scale fisheries

Expected Project Outcomes

Increase irrigated land area

Increases crop production

Generate agricultural employment

Loan No. 1311 (Nepal)

Main Project Components

Rehabilitation of existing irrigation infrastructure

Establish WUAs for O&

Expected Project Outcomes

Increased farmer incomes

Employment generation

Greater cost-recovery leading to O&M

Reduce income inequalities between farmers at head and tail end of irrigation network through system improvement

Loan No. 324 (Sri-Lanka)

Main Project Components

Construction of irrigation infrastructure

Land re-settlement

Expected Project Outcomes

Increase annual paddy production

Increase milk and fodder production

Provide permanent housing

Expand agricultural labor requirements

Increase annual farm income

Generate foreign exchange savings due to increased paddy production

Loan No. 1378 (Indonesia)

Main Project Components

Rehabilitation of small-scale irrigation systems with farmer participation

Expected Project Outcomes

Increased family income

Improved efficiency of irrigation system

Loan No. 818 (Indonesia)

Main Project Components

Construction and improvement of tertiary systems

Institutional strengthening

Expected Project Outcomes

Increase in command area

Appendix 2

Country Specific Issues Highlighted in Review of ADB Projects

Country	National/Sectoral Policies and NRM Strategies	ADB Project Formulation and Implementation	Water User Association
Indonesia	• Projects executed by government go against the bottom-up approach of the ADB • agricultural credit access limited	• 86% success with physical execution • percentage of poor covered less • no change in cropping pattern • original target of FMIS rehab scaled down due to loan constraint • slow progress with WUA registration • cropping intensity unchanged • changes in price of farm products affected expected cropping intensity forecast • travel allowance of trainers not included in project budget • BME system not used to assess poverty impact • delays in starting projects leading to cost overruns • cost recovery calculations affected by economic crisis • arbitrary nature of village visits • working group meetings emphasized • delays in release of revised project budget • shortage of community organizers	• WUA role poorly understood by farmers • poor collection of water user fees • lack of clarity on role of women in WUA • water levels are too low
Sri Lanka	Irrigation and resettlement	• Selection of beneficiaries • earth fill dam technology, Paddy cultivation area • farmers expected to pay 50% of O&M costs by 1990 • does double cropping lead to increased farm incomes? • EIRR assumptions debatable – cropping intensities will increase, farm incomes will increase • environmental and social impact find little place in original proposal • project outcomes not distinguished from project impact (employment and income generation) • Less flow into reservoir than originally envisaged • why tractors as part of institutional credit	• Maintenance of irrigation infrastructure with exception of head works has traditionally been undertaken by farmers • concept of WUG arise in mid 1980s • water rights not clarified • water allocation rules not complied with • farmers engaged in maintenance of tertiary canals but not main canals • WUG formation by agency staff • conflicts between herders and cultivators • cost recovery poor because feel it is government re-

Appendix 2, continued

Country	National/Sectoral Policies and NRM Strategies	ADB Project Formulation and Implementation	Water User Association
		• Local ecology disturbed –salinity, water pollution from use of fertilizers • farm incomes not increased • Basin-wide approach emphasized • Dam sitting issues highlighted • differences in soil types and cropping choice highlighted • Large vs small dam least cost options • irrigated area less than at appraisal • sideline activities like milk marketing under livestock component of project failed • project accounting procedures complicated • sectoral coordination problems • irrigation efficiency low at 28% • limited poverty impact-nutrition highlighted • affluence patchy-new houses • institutional analysis absent-treated as by product of project implementation rather than as a project objective • least cost project interventions overlooked • rice production and cropping intensity increased but other farm crops production limited • two sustainability challenges – catchment protection and cost recovery • need to integrate livestock management in watershed level planning highlighted **Northern Water Resources Development Project** • Staff motivation and transfers of agrarian service staff highlighted • expected project benefits – poorly conceived in terms of pro-poor focus-70,000 rural families, 12,000 days of employment, increase in paddy production, net annual incremental income, improvement in social status of women	sponsibility to maintain channels and also farmers cannot afford • O&M of tertiary canals influenced by leadership and proportion of non-resident farmers at a temporal scale too there are changes – Pumping of water from rivers, use of PVC pipes • rehab of tanks and wells • forested hills under pressure from vegetable farming • WUA used as forums for consultation but not foci for action • cost recovery poor, farmers willing to pay provided service provision is reliable • ADB mission close to project completion (northern water resources) noted that monitoring and maintenance activity by farmer's groups is not assured • role of NGOs in WUG formation highlighted

Country	National/Sectoral Policies and NRM Strategies	ADB Project Formulation and Implementation	Water User Association
Nepal	• Under-performance of agency managed irrigation schemes recognized: Lack of beneficiary participation in O&M • poor collection of ISFs • lack of legal sanctions and penalties • Are WUAs better suited to perform this task when compared to gov't depts? • Irrigation policy emphasizes need for small schemes and not large ones	• institutional impotence of implementing agency to be overcome by greater reliance on consultants • mobile credit unit to improve farmers' access to credit • project delays • staff shortages highlighted • Basis for EIRR calculations debatable from point of view of pro-poor growth strategy: net returns to labor • farm income • cropping intensity • social and technical approaches used for sustained irrigated agricultural development inadequate – pilot WUA training program suggested	• Command areas in hills smaller when compared to plains • 50% of projects have weak WUAs
Bangladesh	Emphasis on cost recovery for O&M Should governments in remote regions because returns are greater there?	• WUA must coincide with hydrological boundaries highlighted • Does cost recovery lead to better O&M? • Innovation in design of irrigation structures – to meet peculiar demands of a rice based agricultural system • ISFs to meet on farm maintenance, pumping costs and upkeep of pump house and key infrastructure • poor turnout construction	• Why form a multiplicity of WUGs? Does a federation of WUGs help? • WUA formation by field staff of line agencies • hurry to elect office bearers • rules too abstract with a focus on activities during project phase • Post- project conditions not visualized in formulating water user rules.

Appendix 3

Targeting Information Gaps to Improve Governance of Irrigation Service Delivery

Generic Issues	Information Gaps	Sequencing	Strategic Focus	Performance Indicators
Staff Motivation	• Watershed features (slope, elevation, land use, cropping patterns • Documentation of previous project interventions • Local institutions (markets, land tenure, water management)	• TA Stage	• Salaries • Transfers • Incentives • System- wide corruption	• Quality of baseline reports • Prioritization of proposed project sites • Continuity of Processes that encourage field staff consultation beyond project phase
Watershed Characteristics	• Distribution of beneficiary interest in management of irrigation system	• TA Stage	• Alternative sources of irrigation • Land scattering • Soil Types • Elevation and Slope • Identify *menu* of technical options (stand alone versus/contiguous system of canals and distribution networks)	• Groundwater levels • Water quality • Sapling regeneration in catchment areas • Intensity of livestock use • Extent of fire damage • Soil erosion rates
Distributive Impact of Project Benefits	• Potential for farmer participation in O&M • Potential for private sector participation in irrigation service delivery	• TA Stage • Appraisal	• Disaggregated economic analysis focusing on distribution of farmer endowments (land, labor, and livestock etc.)	• Farm incomes • Agricultural yields • Non-farm Income • Cropping Intensity
Water Rights and Water Pricing Modalities	• Customary water norms • Willingness to pay • Ability to pay • Mechanisms for cost-recovery	• TA Stage • Project Inception	• Transparency and accountability of cost-recovery mechanisms	• ISF collection rates • Efficiency and equity of water use
WUA Organization	• Suitability of Fit between hydrological and sociocultural boundaries • Scale of project intervention (WUAs versus confederation of WUAs together with feasible technical options from *menu*)	• Project Inception	• Membership and representation norms • Monitoring mechanisms- area based versus volumetric • Clarify role of external agencies • Clarify norms for sharing of proceeds of cost-recovery between State and WUAs • Training of field staff and members of WUAs	• Compliance with cost-recovery norms • Compliance with water allocation norms • Extent of participation in maintenance of system • Frequency of conflicts