IIMI RESEARCH PAPER NO. 3

RAPID APPRAISAL TO IMPROVE CANAL IRRIGATION PERFORMANCE: EXPERIENCE AND OPTIONS

Robert Chambers and Ian Carruthers

OCTOBER 1986
INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE
SRI LANKA

Citation: *IIMI pub 86-10*

Chambers, R. and I. Carruthers. 1986. Rapid appraisal to improve canal irrigation performance: Experience and options. Digana Village, Sri Lanka. International Irrigation Management Institute Research Paper No. 3, pp20.

rapid methods/canals/research institutes/irrigation management/planning/financial planning/developing countries/

DDC 631.7.8

Summary: Rapid Rural Appraisal (RRA) refers to field evaluation techniques which attempt to optimize cost effectiveness and timely completion of reports. While there is a sizeable literature on RRA techniques in general, little work has been done to apply these techniques to canal irrigation. This paper investigates and reports such applications.

Please direct inquiries and comments to the:

Communication and Publication Office
INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE
Digana Village via Kandy, Sri Lanka.

Tel: 74274, 74334, 74251; Tlx: 22318 IIMIHQ CE

RAPID APPRAISAL TO IMPROVE CANAL IRRIGATION PERFORMANCE: EXPERIENCE AND OPTIONS

As more priority is given to improving performance on existing canal irrigation systems, it becomes more important to understand and improve the process of identifying precisely what to do. Many types and combinations of actions are possible, but how to identify which are best has been neglected. Each irrigation system is unique and requires a specially tailored program. Detailed appraisals of the large numbers of existing projects impose impossible demands for high-level specialists and lead to long delays in the delivery of information. Cost-effective approaches and methods are needed which make manageable demands on staff and lead to implementable actions with early benefit.

This paper assists in the search for such methods. It draws on experience with rapid rural appraisal (RRA) in other fields[1] and on experience with canal irrigation mainly in Asia. Appraisal is used in the general sense to mean investigation and analysis. Primary attention is given to practical investigation, i.e., finding out about existing canal irrigation systems. Diagnostic analytical approaches are treated in detail in a separate paper (Chambers and Carruthers 1985).

RAPID APPRAISAL AND CANAL IRRIGATION

In appraising existing canal irrigation systems, as in other rural development, past approaches have polarized. On the one hand there have been practices described as "quick-and-dirty" where "dirty" refers to cost-effectiveness and suggests the method is slip-shod or dubious. These approaches rely on the hurried visits of "rural development tourists" and are vulnerable to biases and misperceptions (Chambers 1983: 10-25; Potten 1985). Often, visiting officials and experts jump to conclusions, come with their conclusions ready made, or are presented with conducted tours and evidence designed to support what are known to be their pet ideas. Brief visits rarely challenge preconceived ideas, and frequently generate prescriptions that reflect the training and preferences of those who carry them out.

On the other hand there are appraisal practices which are "long-and-dirty." Such practices lead to the collection of masses of routine irrigation data which may be inaccurate or misleading, and are rarely analyzed in time to affect policy decisions. At this level of research, these practices take the form of long, drawn-out multi-disciplinary research in which each discipline wanders off into the minutiae of its specialized by-ways, leaving gaps, and rendering more difficult the tight integrating analysis needed to generate good recommendations for action. The outcomes of the practiced forms of both short and long approaches are all too often action without appraisal, appraisal without action, inappropriate prescriptions, or just getting it wrong.

It may help to visualize these approaches by use of the pyramid presented in Figure 1. The points of the pyramid represent desirable goals relating to the accuracy of information, to the timeliness or speed of acquisition, to the quantity of information required to minimize sampling error, and to the relevance or accuracy of specification of the variables to be studied. An investigator can choose to operate at a point somewhere within the pyramid, but to move from one point, say from the apex at A, implies repeated observations to minimize measurement errors will conflict with collecting the large number of observations needed to ensure a representative sample of the population (point C). Point D is termed Relevance, a goal which may require a broad or narrow scope of study depend-

[1] For a concise review of RRA and its irrigation applications, see Potten 1985.

ing upon the problem to be studied. To shift a study design from a point within the pyramid requires some sacrifice or trade-off. Thus, with a given level of resources, increasing the scope of a study to enrich the hypotheses being tested will require a smaller sample size, less time per item of study, and/or a longer study period.

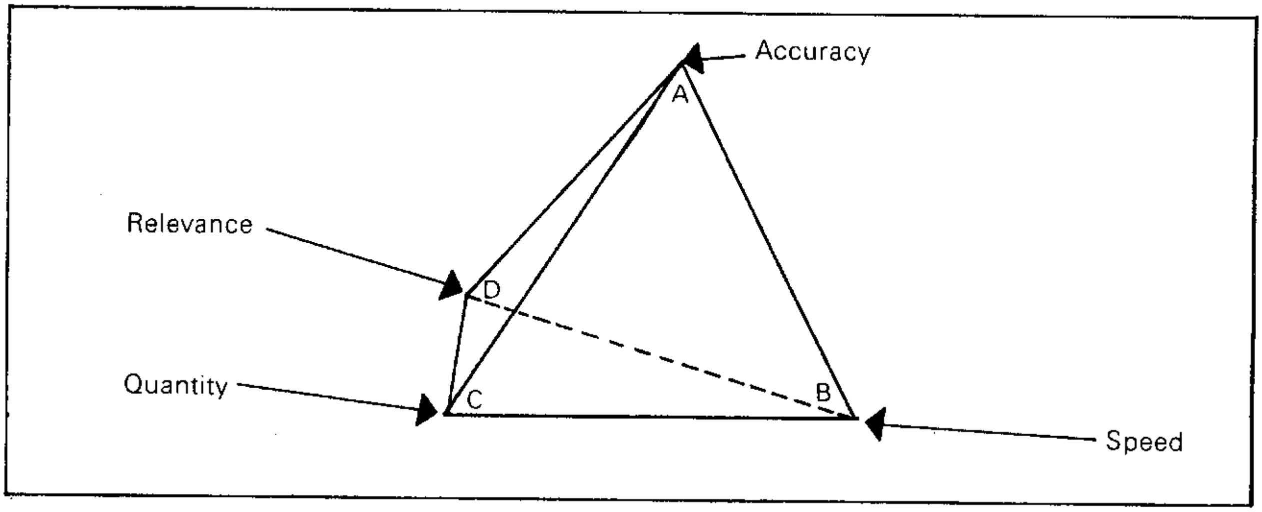

Figure 1: Trade-off between conflicting goals in surveys

The term Rapid Rural Appraisal refers to those techniques that attempt to optimize cost-effectiveness with an emphasis on timely reporting and low demands on staff. Point B in Figure 1 is commonly approached in the quick-and-dirty surveys of visiting experts investigating complex problems or evaluating policy options. RRA methods attempt to produce fairly quick, relatively clean research and recommendations. Points in the ACD plane may represent good work from an academic viewpoint such as a scholarly thesis, but may be costly and come too late to affect decisions. An aim of RRA is to approach B while retaining the appropriate degrees of accuracy, quantity, and relevance of information.

For some years the search has been on in several disciplines for more cost-effective methods of investigation (Potten 1985). The resulting techniques of RRA developed in various fields attempt to deliberately offset the biases of rural development tourism. Techniques combine types of information and methods of investigation such as informal surveys, interviews using checklists rather than questionnaires, group interviews, and other ways of working with and learning from local people. RRA methods are especially applicable where the economic and social environment changes rapidly and where time-bound decisions are needed. They complement, but are not a substitute for, long-term monitoring and detailed scholarship. They do not justify slipshod work. They have their own rigor. They are techniques for gaining an improved (optimum) level of understanding given the constraints prevailing. RRA is not a radical departure from traditional scientific method but rather a reminder that resources are scarce and carry high opportunity costs.

Contrary to what critics might argue, there is no reason why RRA should be a monopoly of the experienced. All professionals can use its techniques, and all, from the most junior to the most senior, can benefit from a critical look at their methods of investigation, including avoiding biases and probing gaps, and giving rapid access to existing knowledge.

Techniques of RRA have, however, been little developed or used for canal irrigation. One reason may be the complexity of canal irrigation systems. It is relatively straightforward to assess the nutritional or health status of a population, the use of rural services, or the nature of a farming system. In contrast, investigation and analysis of existing canal irrigation systems as complete entities present a different degree of challenge.

APPRAISAL AND ACTION

Appraisal can be part of research, training, or monitoring, but the approach advocated in this paper is linked to action to improve performance. There are three reasons for this.

First, an action orientation provides a discipline against over-refining and over-complicating the early stages of investigation. Emphasizing action sharpens thinking and guards against long, drawn-out observation, data collection, and measurement, when those are unnecessary.

Second, improving performance is a continuous process in which learning from action feeds back into reappraisal. To focus on appraisal without concern for action is like diagnosing and prescribing treatment for a patient without giving the treatment, or like adjusting a rifle sight without firing and seeing where the shots hit. Some academics elaborate alternatives and refine choices at the cost of learning from action. The criterion of cost effectiveness, rigorously applied, points towards short cuts, simplifications, rules-of-thumb, intuitive jumps, quick tests of feasibility, elimination of false trails, improvisations, and interactive learning from action. Optimal simplicity is found in an interactive process in which appraisal and action are held in balance. Perhaps the more complex the system appraised and acted on, the more important it is to learn from action.

Third, is the financial challenge facing irrigation departments. In many countries government financial liabilities, including public sector indebtedness and revenue short-falls, have created a recurrent budget crisis (Howell 1985). Some 50 to 80 percent of irrigation management costs are typically salaries and wages. These costs have risen faster than non-salary costs and add pressure for rapidly improved performance. In addition, with advances in agricultural technology, the opportunity cost of not improving irrigation systems continues to rise. These are cogent arguments for early development and testing of appraisal methods, and for moving swiftly from appraisal to action.

EXPERIENCE GAINED AND LESSONS LEARNED

The experience gained over the ages with appraisal to improve canal irrigation systems performance must have been extensive, but little has been committed to paper. In looking for examples this paucity of written material presents a problem. Drawing on recent cases, we can distinguish four types of situations, each with its own lessons. These are: (1) standardized programs,(2) appraisal for training and research,(3) appraisal without action, and (4) appraisal with action.

Standardized Programs

Professional predispositions and the bureaucratic imperatives for standardized programs can combine to neglect both the complexity and uniqueness of an irrigation system. They misprescribe and often generate massive waste. Setting targets for physical or organizational achievement can encourage unthinking implementation in inappropriate conditions and misleading reporting of achievements.

One example over the past decade has been on-farm development. There has been a growing consensus that improving main system management to assure water at the outlet is a precondition for farmers' active involvement below the outlet in organization, on-farm development, and maintenance.[2] Yet various countries have invested billions of dollars in on-farm development and organization below the outlet without assuring reliable and adequate main system water distribution and without significant efforts to improve water delivery to the outlets.

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[2]See, for example, Wickham and Valera 1978;74; Duncan 1978; Asopa and Tripathy 1978:39; Moore 1980:19,41; Bottrall 1981; Svendsen 1981; Singh 1983:12-14; Oxby and Bottrall 1983; Clyma et.al.1983:274-5; and Pant 1984:18.

The Command Area Development Authorities (CADA) of India, now (1985) covering some 18 million hectares, have mostly been confined to activities below the outlet, where their physical works have often treated symptoms rather than causes. Engineering designers of rehabilitation programs have noted the lack of farmer involvement in construction, field levelling, and maintenance and have neglected the inadequate, unpredictable, and untimely delivery of water supplies to the outlet. The diagnostic reflex was simple and wrong. Water waste was visible below the outlet, as was the lack of field channels. Engineers believed the farmers were to blame and that the problem would be solved by constructing channels, and by educating and organizing the farmers. Experience now teaches otherwise. Something is indeed achieved by these approaches, but it would have been more cost-effective to have concentrated first on assuring a good water supply to the outlets. Where that has been done, farmers have often taken care of field channels and field levelling themselves without the need for heavy government investment.

Other examples of standardized programs in India concern canal lining, taking main system water delivery down to 5 to 8 hectare chaks, and introducing warabandi (timed rotation between farmers with time proportional to land area). These approaches tend to be implemented regardless of local conditions. Yet there are conditions in which canal lining can be harmful, by reducing groundwater recharge; it remains to be proven that 5 to 8 hectare chaks are an advantage over larger sized chaks-the ideal size is likely to be highly location-specific: and warabandi requires various preconditions, including a constant flow at the outlet, which outside Northwest India are very much the exception rather than the rule. The results of such widely standardized programs implemented can be demoralization of staff, disillusionment of farmers, and poor value for investment.

But such programs have fitted nicely with professional and bureaucratic capacities and needs. They variously require construction activities which suit engineers, shift responsibility for main system management away from government and onto farmers, and are amenable to target-setting for implementation. The combination of professional and bureaucratic reflexes, on this evidence, is not only inefficient, but positively dangerous as standardized treatment. The medical equivalent would be treating all patients in a hospital, regardless of their condition, with the same largely untested drug. It is not surprising that the outcomes of such programs have been disappointing. Had the methods, personnel, and programs been available, it would have been better to have tested the remedies more carefully, and then diagnosed, prescribed for, and treated each project in its own right.

Appraisal for Training and Research

Deliberate attempts have been made to develop appraisal methods. Two that have been written up are the Water Management Synthesis diagnostic methodology (WMSP n.d.) and Bottrall's (1981) appraisal and framework.

The WMSP diagnostic methodology. The diagnostic methodology of the Water Management Synthesis Project (WMSP n.d.) originated with Colorado State University/WAPDA action research in Pakistan, especially on the Morna Project (Lowdermilk and Freeman 1978). It was subsequently repeated and further developed in Egypt. Diagnostic methodology workshops have been held in various other countries including India (Clyma et al. 1983; Jayaraman et al. 1983; Katariya 1983). Numerous manuals have also been prepared.

The full output of the work of Colorado State University and others in the sequence of work, including the Water Management Synthesis Project, is so substantial that it invites measurement in meters of bookshelf. Any brief attempt to learn from the workshops and manuals is bound to be selective and incomplete.

The diagnostic analysis workshops entail detailed professional appraisal through fieldwork and analysis of the "farm irrigation system," also described as the "on-farm system." The appraisal is conducted by a multi-disciplinary team usually including an agricultural engineer, an agronomist, an agricultural economist, and a sociologist or extensionist. One strength of the method is its field realism and its "bottom-up" nature, emphasizing the farmer's eye view of irrigation. This makes it a good professional experience to complement and correct the normal top-down view. The workshops in India have led to reports containing useful information and insights. Perhaps the most significant finding has been the rapidly acquired evidence of daily variations in flow through outlets (Jayaraman et al. 1983:98-9; Clyma et al. 1983:139). But the chief purpose of the workshops, for which they appear well suited, has been professional development for participants through field investigations below the outlets.

The manuals examined (WMSP n.d.; Lowdermilk et al. 1980) describe data to be collected and methods to be used in diagnosis. While they cover much useful information, the manuals do not set out to appraise whole systems, and in consequence neglect the main system and its management. When used as a training method, the product is said to be an "important evaluation of the major constraints to increased agricultural productivity *caused by poor on-farm water management practices*"[3] (WMSP n.d.:v). *The Problem Identification Manual provides* procedures ..." for a systematic approach to objective evaluation of existing farm irrigation systems,"[4] (Lowdermilk et al.:1). The main system is treated not as a primary focus but a residual. The manuals cannot, therefore, lead to a balanced prescription for improving system performance. The Problem Identification Manual provides its procedures "as preparation for a systematic search for socio-technical solutions to problems," and its flexible systematic approach will, it is said, "help delineate priority research needs and improvements;" but it explicitly does not provide a guide for the identification of all problems of any irrigation system (ibid:1). It is strong on full checklists of data to collect but does not provide a diagnostic method for a whole irrigation system, only for a few selected parts.

The diagnostic methods developed are, thus, specialized, and focused on isolated subsystems below the outlet. They have been used to identify programs of action below the outlet, such as the Asia Development Bank and USAID-assisted watercourse improvement programs in Pakistan. They do not, nor do they claim to, provide guidelines for the diagnostic analysis of whole systems, although some elements of their methods may be of use for that more difficult task.

Bottrall's appraisals. In the late 1970s Anthony Bottrall conducted research commissioned by the World Bank on large irrigation projects in Pakistan, India, Indonesia, and Taiwan, concentrating attention on their management. The original terms of reference included:

> To develop on the basis of case studies a framework for monitoring and evaluating the efficient use of resources in the management and operation of the projects.

Subsequently the Bank requested the development of "prototype guidelines" for evaluating irrigation project management (Bottrall 1981: 1-2). Although not required to do so, Bottrall indicated action that could and should be taken to improve management.

The methods used to make rapid appraisals for these case studies of individual large irrigation systems (Bottrall 1983) are of interest. Each case study was carried out by Bottrall (an agricultural economist), an engineering consultant, and a local researcher. In retrospect, he considered that an additional person would have been useful for more detailed research at the watercourse and farm levels to balance the tendency for a management study to take a top-down view. Two to three weeks were usually spent in each study area, plus one to two weeks' general orientation including discussion with planners and administrators at the national level and brief visits to other schemes for comparison. Bottrall makes useful observations about field methods which appraisers of whatever discipline will find of practical value. These include illustrations of findings which came from interviews with farmers, cross-checking staff answers, inspecting records, spot checks, and confessional discussions. He also has good advice to offer others, for example to resist pressures to include in their evaluations quantitative estimates of the causes of scheme performance.

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[3] our emphases

[4] our emphases

Appraisal Without Action

Appraisal can be intended to lead to action but fail to do so. An instructive example of this is the appraisals carried out by a Central Water Utilization Team in India between 1975 and 1980. The first Conference of State Irrigation Ministers in India, held in July 1975, recommended that "operation programs for supply of waters in command areas of major irrigation projects should be formulated and reviewed periodically by the state authorities with the assistance of a Central Team, with a view to maximizing the benefits from available waters," (CWC n.d.Ghataprabha report). A Central Water Utilization Team, set up by the Department of Irrigation, visited 24 major projects in 13 states.

The intended team for each visit included an irrigation engineer, an agronomist, an administrator, an economist, and a social scientist (sociologist). There were difficulties finding economists and sociologists with suitable backgrounds and orientation, and in practice the team often consisted of an engineer, an agronomist, and an administrator. In one case where the members are listed, however, there were three senior engineers, one senior hydro-geologist, and one staff member from the Central Soil Salinity Research Institute. Most of the field appraisals took three to five days, and project staff accompanied the teams on their visits. The resulting report lists recommendations for each project under three headings--engineering, agronomical, and administrative and legislative, corresponding it would seem with the three team members--with a fourth heading for fisheries in seven of the 24 cases.

An impressive number and range of deficiencies were detected and listed. Those most commonly identified were:

Improper water management. (Evidently referring to the field level).	23
Excessive seepage and need for determining it. Lining of canals is required.	22
Poor extension services. Lack of Pilot Projects, demonstration farms etc.	20
Inadequate drainage system and water-logging.	19
Absence of conjunctive use of ground and surface water.	18
Inefficient canal structures and their improper maintenance.	13
Lack of communication facilities in the command.	12
Lack of field channels and proper maintenance.	11
Improper operation of reservoir and canal system.	10

The number of recommendations ranged between 10 (Malampuzha) and 34 (Harsi, and Mahanadi Delta System). Projects appraised near the end of the five years averaged over twice as many recommendations as those appraised at the beginning. There was no significant difference in the number of days in the field.

The recommendations were strong on engineering and agronomy. They followed traditional professional lines, emphasizing structures (lining canals, drainage, maintenance, communication facilities), poor extension services, lack of field channels, and proper maintenance. Improper operation of reservoir and canal system was identified in only 10 of the 24 cases, and inadequate water to tail-enders in only five.[5] Where recommendations did touch on the supply of water, they tended to be rather general, for example, for the Mahanadi Delta Irrigation System: "Proper coordination between officials of Irrigation and Agricultural Departments may be ensured to plan irrigation water supply to maximum area from the available water resources."

For a few projects, the timing of crop calendars was the subject of recommendations but in no case did the recommendations amount to an operational plan for the distribution of water.

The appraisals and recommendations were followed up with questionnaires about implementation every three months, but the results were disappointing. There appears to have been little impact on the management and performance of the systems. The impact was, rather, more general in raising awareness of widespread problems of certain types.

Appraisal With Action

The two examples of appraisal with action are instructive and different. The first involves an outside team, a series of visits, and a program of investment. The second is a do-it-yourself effort by an irrigation manager with no outside assistance.

Approaches to water management in India: Visiting team plus program. In India, the World Bank has evolved an approach to irrigation management, both in the context of its on-going projects and in that of a proposed national water management project. This approach springs from a long process of learning by the World Bank and the Government of India from major investments in new projects and structures, including on-farm development, and bears on improving the management and performance of existing systems.

The initial activity is normally a series of discussions at the state level, followed by field appraisals carried out by a team from the World Bank comprising staff and consultants, and, since the initiation of preparation for the national project, Government of India representatives. The immediate objective in each case is the preparation of an operational plan. Appraisals have been rapid, taking days rather than weeks, but with frequent return visits. Project staff and staff of other departments at the project level have been closely involved. They have been primarily responsible for data collection and, under the guidance of state officials, increasingly responsible for evolution of the operational plan itself. The operational plans have concerned such aspects as dates of water releases and rotational schedules in support of desired cropping developments. Under the national project it is envisaged that appraisal would increasingly be undertaken by national and state level officials and project staff, and that provision would be made for physical and other investments designed to support the operational improvements.

A striking outcome is the sharp difference between the operational plans. For Upper Krishna in Karnataka (425,000 ha when fully developed)[6] the aim was to establish an operational plan which from the start reflected the ultimate scarcity of water in what will be a very large scheme in an arid zone: schedules have therefore been adopted that discourage paddy and sugarcane (which are in principle banned) and ration water in relation to land.

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[5]This low figure is surprising, given the common knowledge that tailend problems are near universal, not just in India but in the World. Two possible explanations are (a) that some of the projects were in early stages of growth, before water shortages became evident, and (b) that the time available and the large size of the systems did not allow the team to visit tailends or hold discussions with tailend farmers.

[6]Area figures are the approximate Cultivable Command Areas.

For Dantiwada in Gujarat (45,000 ha), the plan was to change from a demand to a rationing system during rabi (dry season), introducing warabandi, allowing for 35 percent intensity on each farmer's fields, and with a predetermined rotational schedule reflecting the availability of stored water.

For Nagarjunasagar in Andhra Pradesh (900,000 ha), the plan included carryover storage to ensure an early start to the kharif (wet season), a definite well-publicized date for water issue, and a block by block staggering of paddy transplanting. It also included an overall zoning of the main canal, canal water budgeting, and rotational issues after the end of kharif to support cotton and other irrigated dry crops and to discourage a second paddy crop.

For Sathanur in Tamil Nadu, (17,000 ha) the proposals developed for the national project aimed to revise the operating rules for the reservoir and procedures for water distribution to achieve new cropping objectives. The revisions included some intermittent supplies, separate issues for direct supply to field areas and intermediate tanks, and predetermined guidelines for responding to rainfall.

Besides these software measures, some hardware improvements will also be included under the National Project, and the central team will be involved on a continuing basis with the local project management in monitoring and modifying the plan and its implementation. For on-going World Bank projects, design modifications are envisaged in some cases to support the new operating proposals.

The impact of the program is reported to be encouraging. In only one case, the Hirakud Project in Orissa (160,000 ha) has the operational plan not proved implementable. The cause in that case was the incompatible requirement for power generation and for the proposed irrigation regime. On the Upper Krishna, Dantiwada, and Nagarjunasagar Projects the benefits reported variously included higher cropping intensities, more water to tail reaches, more reliable water supplies, less water used per unit area irrigated, and changes of cropping patterns to crops with higher value-to-water rations. The methods of appraisal that led to the operational plans have not, however, to our knowledge been written up. Accounts of the data sought and found available, the methods of investigation, and the analytical procedures of the appraisal teams would provide valuable insights, especially for others who undertake appraisals to draw up operational plans as and when this approach is extended to other projects, whether within India or elsewhere.

Main system management on the Morna Project: (A manager's do-it-yourself). The second example of appraisal with action is reported by N.M. Joshi, the engineer in charge of the Morna Project in Eastern Maharashtra. Three problems had arisen on this project: flooding and water-logging in the headreaches became so acute that cultivators had difficulty even reaching their fields; tail-enders received an unsatisfactory supply; and demand arose for summer irrigation, requiring a carry over in the reservoir from the earlier winter season.

Appraisal was apparently carried out by Joshi himself. As night irrigation was not practiced by cultivators, Joshi sought to control reservoir releases and the pick-up weir which supplied the main canal to minimize the arrival of water at outlets during the night. To do this he observed velocities in the main canal, and found these to range from 1.05 km/hr at 30 cusecs to 1.85 km/hr at 120 cusecs. For the purpose of calculation, an average of four velocities was rounded to 1.5 km/hr, and all transmission losses were assumed to be 50 percent. With these rules of thumb, release times and volumes were calculated so that water would arrive at different points in the system mainly between 08:00 and 18:00 hours. The demand implied at the pickup weir was further rounded, to give releases of 50 cusecs from 16:00 to 19:00, 90 cusecs from 19:00 to 02:00, 60 cusecs from 02:00 to 07:00, and 20 cusecs from 07:00 to 16:00. Combined with a system of rush irrigation, these measures led to sharp improvements. Water waste at night, water-logging, and flooding were all reduced. The hectare: Mcft ratio was raised from 1.02 to 1.40.

The only account available (Joshi 1983) is short and leaves unanswered questions. It seems, however, that the reform undertaken was a do-it-yourself effort, without external assistance either in appraisal or in physical works. The reform was possible with the systems existing control capacity. The central element was the operational plan for the release and distribution of water.

LESSONS LEARNED

Drawing on the examples above, and on experience from other fields, four practical propositions can be put forward:(1) standard programs' bad fit; (2) appraisal of the whole system; (3) an operational plan; and (4) continuity and commitment for implementation.

Standard Programs' Bad Fit

There are trade offs between the bureaucratic imperative of uniformity, targets, and fund disbursement on the one hand, and individual project needs on the other. At one extreme, a rehabilitation program for many projects may be applied as a standard package. This may lead to the best achievement of physical targets and disbursements of funds and look best on paper, but its impact on performance may be weak. At the other extreme, open-ended appraisal may be applied to each project, and proposals may be drawn up without regard to any larger program which might provide resources. In between these, there are various other positions. Our judgement is that unless there is an unusually high degree of project homogeneity across the country, an investment package, such as a rehabilitation program, should be unpacked, as it were, and adapted and selectively applied following appraisal of each project and each component of the project. Appraisals of individual projects using rapid appraisal techniques, and action plans using tested components, should cost less and lead to greater net benefits than either standard programs or completely individual programs outside a national framework.

Appraisal of the Whole System

Investigation and analysis of only one part of a system is unlikely to lead to optimal proposals. The focus of the earlier WMSP work below the outlet, with relative neglect of the main system, is an example and warning. Many opportunities are likely to lie in the linkages between system components. Equally, any hydrological zone of a project or any project that is part of a larger system must be seen and studied as part of the larger water distribution system before changes are made. To do otherwise presents the danger that improvements for the action zone will be at the cost of other zones.

An Operational Plan

An operational plan for water distribution on the main system is one practical starting point; for unless and until there is a predictable main supply, farming will always be sub-optimal. However, any operational plan must be based on insight into farming qualities and opportunities. Agriculture is undergoing rapid, and sometimes radical, technical, and social change. Consequently, working methods need to be found to include agricultural staff and farmers in operational plan formulation.

The need for an operational plan is the major lesson of the three examples. The Central Water Utilization Team made many recommendations across a broad spectrum but did not draw up operational plans for water distribution. As a result, little implementation took place. In contrast,both the water management approach adopted by the World Bank in India and the Morna project had operational plans as the central focus. Dates, times, and amounts of water issues and of rotations were determined and agreed upon together with cropping patterns. This is not to say that operational plans for water distribution and cropping are the only starting point. Far from it. But experience to date suggests that if a standardized output is needed from appraisals, an operational plan of this sort is a good one.

Continuity and Commitment for Implementation

With the Central Water Utilization Team, there was some continuity through follow-up questionnaires; and project staff were consulted in developing the proposals. But the team had to move from project to project, and project-level staff may not have expected serious follow-up. With the World Bank's approach and with the Morna project, however, project staff were involved and there was continuity and follow through. In the Morna case, follow through was provided by the manager in his do-it-yourself effort. The proposed national water management approach in India benefitted from the prestige of the World Bank, a series of revisits, and an on-going program for physical investment expenditure on each project. Perhaps only exceptionally will the one-off visit of a few days lead to major change in performance. Rapid appraisal, in short, is best as part of a longer process with at least some of the appraisers having responsibility for changes and access to resources if needed.

OPTIONS AND APPROACHES FOR APPRAISAL

Three aspects of the appraisal process deserve special comment:(1) who appraises; (2)offsetting biases; and (3) recommendations.

Who Appraises

A team. One reflex for a "whole system" approach is to try to include all relevant disciplines. One might think of:

- accounts
- irrigation engineering
- hydrology
- soil science
- agricultural engineering
- agronomy
- agricultural economics
- sociology
- administration
- law
- economics
- management sciences
- system analysis

and so on. It is unnecessary to go into further specializations such as public health, drainage engineering, or agro-climatology. H.L. Mencken once wrote that "For every problem there is a solution that is simple, direct, and wrong." The simple and direct solution of adding disciplines to disciplines runs into diminishing returns and is wrong. The more people in a team, the more expense is incurred and the more time is taken communicating or not communicating. One consequence can be a series of largely unconnected reports or studies without priorities. The more people in a team, too, the more complicated the logistical arrangements. The more outsiders there are in the field, as Rhoades has shown (1982, photograph on P.16) the more likely the team is to talk to one another and not listen to and learn from farmers. It may also be that the larger a team, the more conservative and cautious its members will be, and the less likely they are to be right in new ways.

The best number for a rapid appraisal may be in the range of two to seven outsiders, people who are not project staff. The subject areas to be covered by project staff and outsiders together may commonly include: irrigation engineering and hydrology; agricultural engineering and soils; agronomy, agricultural economics, and farming systems; sociology and political economy; and management science, administration, and law. Narrow specialists can be a liability, and the ideal are multidisciplinary individuals whose horizons are not limited by their own original disciplines. Subjects can be combined or split. For any one project, some will be more relevant than others.

In practice, team composition depends on who is available. It is rare for a desired range of disciplines to be represented. There are some dominant traditions by country. In India, appraisal teams are composed like those of the CWC, of engineers and agronomists and sometimes an administrator;

in the Philippines, teams are composed of persons with an orientation to farmer participation and organization. One advantage of rapid appraisals is the short period involved. Thus, it is easier to secure the release of the specialists required and easier to offset biases towards certain disciplines.

The irrigation system manager. The outside team seems so natural to senior outsiders, that it is important to stress how much an irrigation system manager can do, either on his own or with others also on the site, not least the farmers.

It is commonly said that the best multi-disciplinary coordination takes place in the same brain. When one person does an appraisal, information is excluded for lack of time, knowledge, or interest on the part of the appraiser. There is a case for training "irrigation professionals" with some familiarity and competence in all major aspects of irrigation to reduce this limitation. Rapid appraisal has a role in that training. But even without that training, there is often much that a manager can do without delay to improve performance. Appraisals and action by managers will show high pay offs precisely where current levels of management are low, and where potential for improvement is high.

Learning from experience to date, operational plans can be recommended as a key focus for such appraisals. The case of N. M. Joshi (1983 and pp 12 above) indicates what can be done. There is no need to wait for high-powered teams. Managers can do something on their own straight away. If there is a national program to encourage them, such as regular meetings with colleagues to report on progress, compare notes, and learn from each other, so much the better. But even without that, managers can be encouraged to do better, and to report on what they do.

Source of Information and Insight

It is surprisingly easy to overlook sources of information and insight. The following is a short, indicative, but not comprehensive list:

Key people.

- Irrigators (tail, middle, head) and other local residents
- The disadvantaged, especially women and the landless
- Irrigation staff
- Staff of other government departments
- Staff of non-government organizations working in the area
- Specialists called in on an ad hoc basis

Maps, photographs, etc.

- Maps of the system and subsystems, including irrigation network, soils, topography, cropping patterns
- Aerial photographs, with time series if available
- Remote sensing and Landsat imagerv
- Aerial inspection or a view from a hill

Documents.

- Project appraisal and design documents
- Reports of previous teams, surveys, evaluations, and special studies
- Annual and other routine reports of departments
- Historical documents referring to water rights and customs

- Data from agricultural and/or soil and water management research stations, including up-to-date information about crop varieties
- Charts and tables with time series data on rainfall, water storage
- Flows
- Distribution, groundwater levels, etc.
- Manuals and circulars concerning water distribution routines and practices
- Descriptions and files concerning crises of water shortage or flooding and how they were tackled.

It is not always easy to obtain or tap such sources quickly. How to do so cost-effectively, in a short period, leads to the next series of questions.

Checklists

For rapid appraisals of communal irrigation systems in the Philippines, de los Reyes (1980) has the following headings for information to be collected: system identification; water supply; water rights; physical aspects; history and assistance received; ownership of lands; organization-, non-association and association-managed; opinions on assistance needed; water distribution; conflict; fees; maintenance; and community data.

For rapid appraisal of farmer managed irrigation systems in Nepal, Yoder and Martin (1983) have prepared a "Question Guide for the Assessment of Local Resources for Irrigation Development." This is divided into four sections: (a) general information (location, physical, population, ethnic groups, land holdings, tenancy, agricultural production, employment and migration, markets and prices, institutions, and development projects); (b) organization (membership, social composition, official positions or roles, meetings, water allocation principle, water distribution, conflicts, maintenance, conflict resolution, and organizational development); (c) historical development of existing irrigation system; and (d) technical information (water source, intake, distribution system, soil types, provision for non-crop-related water uses, physical constraints to increasing the irrigated area, and identification of local priorities and resources). Under these headings, Yoder and Martin present lists of pertinent questions.

For larger canal projects Bottrall (1981 a: 248-263) drew up a useful checklist. This is designed to give guidelines for analysis in evaluating irrigation management. Its 16 pages, are divided into three sections: The Resource Base; Indicators of Project Performance; and Identification of Causes. Its coverage is comprehensive, and it is a useful aide-memoir in conducting appraisals.

Not everything needs to be known. To plough through a long checklist collecting data item by item is to fall into the long-and-dirty trap. The key to rapid appraisal is to move quickly and surely to the main problems, opportunities, and actions, to consider alternatives and to avoid obvious biases. For this, each profession and discipline may have its own mental starting points and algorithms. Basic questioning on core issues should help individuals reach a common view. Investigators could ask what combinations of water, land, crops, and timing can be used to achieve project objectives. They should examine various key variables: size of area to be irrigated, farm sizes and water entitlements, water scheduling and delivery, location and intensity of irrigation, choice of crops and varieties and their zoning and phasing, the staggering of cultivation, and variations in spatial and temporal cultivation rights (Chambers 1984:28-34).

Offsetting Biases

Irrigation managers and visiting teams are vulnerable to the biases of rural development tourism (Chambers 1983: 10-25). These influence what is noticed, who is met, and what is learned or not learned. Some of the main biases, and how they can be offset, are shown in figure 2.

Source Bias	What to Do
Visiting only head reaches and traveling canal roads by car.	Go to the tails and off the roads; walk around.
Examining the distribution system.	Look at the drains.
Visiting only during working hours and in daylight.	Go before and after working hours, and at night.
Making only one visit, or visiting at the same time each season.	Inquire about the situation at other times, and in other seasons.
Observing only physical works such as headworks, canals, cross regulators, and gates.	Find out about process-distribution, communications-and meet people.
Visiting only demonstration trials or special projects.	Visit farmers lower down the same channel who may get less water because of a trial or project.
Meeting only the elite: staff, better-off farmers, influential people, and men.	Make an effort to meet poorer farmers, laborers, and women.
Blaming farmers for misusing the system.	Find out why farmers do what they do.
Telling people what they should do.	Listen to people and learn from them.
Visiting people hurriedly.	Plan to spend more time and be patient with people.

Figure 2: Offsetting appraisal biases.

Actions and Sequence

A rapid appraisal is only one of a series of preceding and subsequent activities. The way it is set up will depend on what has gone before and what will follow. There is a danger that it will involve a high-powered group of outsiders (senior government staff, researchers, etc.) who descend on a project, tell everyone what to do, and then leave. If the objective is to identify, initiate, or reinforce a sequence of change, the project staff must be full participants throughout, contributing their experience and ideas and influencing the proposals that emerge.

If a manager conducts his own appraisal, it may be a continuous process of varying intensity at different times. With a team, a block of time is involved. The following sketch of a possible format for the team rapid appraisal is not an ideal model; rather the purpose is to outline the possible activities and sequences. One sequence is selection, preparation, rapid appraisal, and follow-up.

Selection. If a series of appraisals is planned, the selection of projects is important. One criterion is the potential believed to exist for improved irrigation performance, especially through software discussed above.

Prepared. Before the appraisal proper, a preliminary visit by one or two outsiders is useful. Ideally they will be members of the subsequent appraisal team. They can (a) meet project staff to discuss the appraisal; (b) request project staff to complete questionnaires;[7] (c) find a place to work (big room, with blackboards, and accessible at night); (d) arrange local participants (from government departments, perhaps a voluntary agency, etc.); (e) request maps, reports, and other information sources to be centralized.

The rapid appraisal. Two weeks may be about right. The usual two to four days is too short for good discussions with farmers, for identifying, trying out, discussing, modifying, and rejecting ideas, or for assessing mixes, sequences, and the locations for discussions. It is also too short for reviewing available information, and considering what needs to be found out and how. One method is for a team to fill in a matrix comprised of the questions:

- What information is needed ?
- Who will obtain it ?
- Where will it be obtained ?
- How should it be obtained ?

This helps team members to learn each others' concerns and priorities, and leads to realistic planning of logistics. Involving project staff in this exercise will enable them to participate and contribute. A day on such an exercise may prove well spent, providing it does not box the team into a plan with little room for manoeuvre.

The First Week can include:

☐ Briefings, discussions with project staff, and drawing up an information matrix as above.

☐ First field familiarization (in pairs or small groups), including first discussions with farmers.

☐ Flight over the area.

☐ Comparison of impressions and assessment of priorities.

☐ Main field visits, including open-ended discussions with groups of farmers in different (e.g. tail, middle, head) locations. One approach is Peter Hildebrand's (1981) techniques, evolved in Guatemala, of joint visits of pairs from different disciplines, changing partners day by day. This can be adapted with outside appraisers pairing with project staff, or farmers, and so on. In the field the guided interview technique can be used together with informal interviews (Rhoades 1982) for rapid understanding of the farming system and its relation to irrigation. Some visits can also be along disciplinary lines, with straight disciplinary concerns.

☐ Evening discussions. These can alternate between sharing what has been learned and identifying new priorities, and, (if the time allows, further group discussions with farmers. A good deal of open-ended brainstorming is indicated, avoiding premature closure on solutions.

At the end of the first week, team members can aim to have a sound appreciation of the farming and irrigation systems and their seasonal operation, and some strong indication of problems and opportunities. This leads to the compilation of a tentative operational plan for the irrigation system including alternatives, listing of further information to be obtained, hypotheses to be investigated, and so on.

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[7]For this idea we are indebted to the team (Wayne Clyma, T.K. Jayaraman, Max Lowdermilk, and Larry Nelson) which in 1981 conducted a five-week course of professional development for engineers, economists, agricultural scientists, and others at Anand in India. The questionnaires they issued to Irrigation Department staff on the Mahi-Kadana Project provoked thoughtful, detailed, and useful replies, and encouraged constructive suggestions based on experience. Had this been a rapid appraisal exercise seeking to improve system performance, these questionnaires would have given the team a head start.

The second week can then be used for testing, rejecting, and modifying proposals. The tendency of busy people is to consider a second week dispensable. This should be resisted. A second week is precisely when the less obvious snags and opportunities are likely to come to light. In particular, during a second week, better information can be obtained from junior staff and from farmers. A second week is also important for assessing the feasibility of the operational plan and alternative water distribution and cropping systems, and for exploring the economic implications for households.

Follow-up. Rapid appraisal is a gratifying, self-flattering, and enjoyable activity. For outsiders, the responsibilities are often short- term. It is easier to give "good" advice than to receive it. "Good" rapid appraisal, will be bad rapid appraisal unless it leads to better performance. Three precepts can be recommended for the team appraisal itself in order to increase chances of implementation in the follow-up. First, involve project staff. Project staff should take part to a degree that the proposals are felt to be theirs, not just those of the visiting outsiders. Second, mesh proposals with current programs. Proposals should, where possible, fit existing programs and fund allocations. Third, place priority on what can be done soon. This includes considering software first: the operational plan, water scheduling, monitoring and communication, farmers' participation, and so on. Immediate action can then start processes of change. Longer-term proposals may include some pilot or experimental elements, with or without hardware.

Recommendations from Appraisals

There are two major pitfalls with recommendations.

The first is saying that nothing can be done unless something else is done first. With canal irrigation, this takes the form of saying that management (usually the distribution of water) cannot be improved until rehabilitation and modernization have taken place, or, put differently, that software cannot be improved without first improving hardware. This can be an evasion. There is mounting evidence of potential for improved performance through managerial action alone, even where structures and controls are defective. (Rao and Sundar 1986).

The second pitfall is an indiscriminate shopping list, without priorities. For action, one or a few key interventions may be all that are needed or feasible at first.

The virtue of the operational plan as a focus is that it concentrates appraisal on what can be done without delay. It may only be a stage in a long process, but it is a start. The first step is what Murray-Rust (1986) has called "operational rehabilitation," after which hardware rehabilitation may follow as and when key constraints are identified as a result of better management.

FUTURE STEPS

Techniques of rapid appraisal have many applications to canal irrigation. This paper has focussed on operational plans to improve performance, but rapid investigations are needed for other purposes as well, many of them specialized by discipline. To make rapid appraisals in irrigation more effective, the following future steps are recommended.

Empirical Studies of Appraisals

Appraisers should be encouraged to observe themselves and write about what actually happens, or accept participant-researchers who can undertake this task. Governments and agencies sponsoring appraisals could require each team to have one member responsible for writing up an account of the sequence of activities and insights, the methods used and developed, and the lessons learned.

Specialized Methods

Professionals in different disciplines should be encouraged to develop, test, and write about appropriate methods for their own specialized investigations.

Shared Experience

Managers of irrigation systems could meet and be encouraged to conduct their own appraisals and diagnoses, and develop and implement their own operational plans. Subsequently, they could meet and share their experience.

Management Briefing Papers

A series of short, practical management briefing papers could be prepared by appraisers based on the empirical studies, the specialized methods, and the shared experience, with mangers of irrigation systems as the target clients.

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