APPRAISAL TO IMPROVE CANAL IRRIGATION PERFORMANCE: IN SEARCH OF COST-EFFECTIVE METHODS

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The Purpose of Appraisal

To improve irrigation performance, governments and aid agencies are undertaking major investments in physical rehabilitation, canal lining, control structures, communication equipment, drainage, watercourse reconstruction, and on-farm improvements such as land levelling. In practice the choice of components, detail, and priority of these programs are based more on the general professional opinions of national and international experts than on extensive deliberate appraisal and analysis of particular irrigation systems. ideas about what it *is* best to do vary according to so-called "state of the art" thinking, but surprisingly little attention has been paid to the processes which generate those ideas, or to methods of appraisal and analysis for identifying needed actions to improve irrigation systems. The purpose of this paper is to discuss methods, and contribute to their development and use.

Approaches to Appraisal

It will help to define our terms. Various words - ***appraisal, diagnostic analysis, evaluation, investigation, observation, analysis, diagnosis, prescription*** - have been used. In this paper, *the* term ***appraisal*** is synonymous with ***diagnostic analysis*** or ***diagnosis and prescription*** or ***project identification, design and appraisal*** (Fig. 1).

SEQUENCE

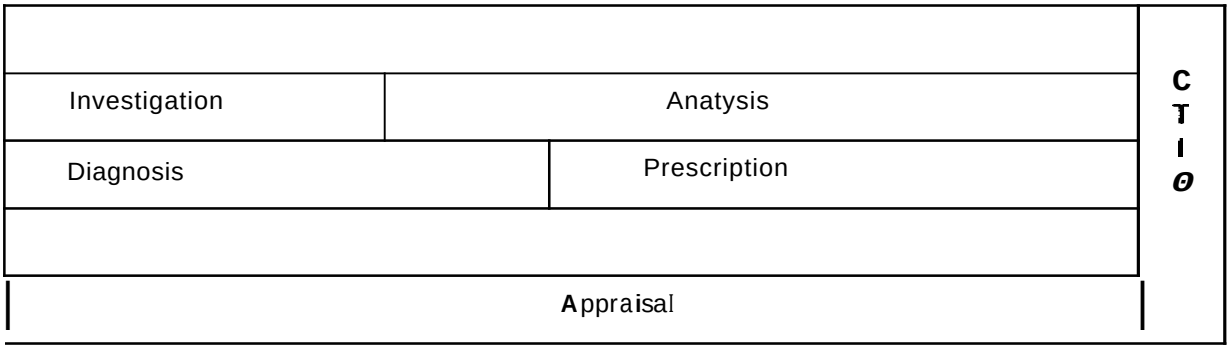

Fig. 1. *Appraisal: Overlaps of* ***word*** *meanings.*

Appraisals of canal irrigation systems are often "quick and dirty" as when a cursory visit is made to the project area resulting in a mistaken conception of the actual situation. Appraisals which are done over a long period of time, however, do not necessarily result in better decision-making. These "long and dirty" approaches may consist of long, drawn-out multidisciplinary research in which each discipline wanders off into the minutiae of its specialized by-ways, rendering more difficult the tight integrating analysis needed to generate clear recommendations for action. By the time research results are finally analyzed and reported, it is often too late to have any effect on policy decisions.

The term, *Rapid* Rural *Appraisal* (RRA), refers to techniques which attempt to optimize cost-effectiveness with an emphasis on timeliness of report completion. RRA methods aim to produce fairly quick, relatively clean ,research and recommendations. While there is a sizeable literature on RRA techniques in general. little work has been done to apply these techniques to the issues of canal irrigation, perhaps due to the sheer complexity of canal irrigation systems. Individual irrigation specialists who practice RRA follow implicit, personal methodologies which have yet to be systematized, tested, and reported.

The RRA approach advocated in this paper is integrally linked to action to improve irrigation performance and thus should be thought of as a type of action, as well as a type of research. The action orientation of RRA guards against over-refinement of technique in favor of practicality. In some situations RRA will involve active interventions which can be monitored and modified as the best way of learning about an irrigation system quickly. Learning from action may be of particular vatue in complex systems where predictions based on simulations require more investment than a simple "tive" experiment. The importance of action as an outcome of RRA or as part of the procedure itself is tied to the critical status of irrigation systems. We cannot afford to deliberate while the opportunity cost of not improving irrigation systems is constantly rising.

One major criticism of rapid methods of assessment is that they require a very scarce resource: high caliber and experienced professional expertise. In this paper we argue that all professionals, from the most junior to senior, will benefit from a reconsideration of their study methods, from avoiding biases and probing gaps. RRA techniques are basically a form of applied systems analysis. It is a way of thinking that attempts to use scarce resources in the most efficient manner.

The Complexity of Irrigation Systems

It has become conventional wisdom that canal irrigation systems should be analyzed as wholes. They have many connected parts, and leaving any of these out is liable to lead to only partial understanding and misleading diagnosis. Irrigation systems can be examined in terms of 1) domains, 2) dimensions, and 3) linkages.

Domains. The physical domain includes not just the main system down to the outlet, but also field channels, fields, and drains. The bio-economic domain includes the supply or purchase of inputs (including credit) before crop growth; all biological organisms (livestock, grass, trees, weeds, fish, perhaps birds); and the processes of husbandry, harvesting, storage, consumption, and sale. The human domain includes farm households and laborers on the one hand, and irrigation and other departmental staff on the other. The latter are organized in a hierarchy and spread out over the physical system, while the former are organized in village communities or hydrological groups. Any appraisal of the whole canal irrigation system should take account of all three domains and should consider problems of boundary definition for each domain. In practice, boundaries are seldom where they first appear to be: water leaks and drains; credit and inputs flow in and out; laborers migrate; families move; officials are transferred.

Dimensions. Canal irrigation systems are also complex in terms of space (the network of canals, branches, distributaries. minors, field channels) and time. While the spatial dimension is obvious, the time dimension is often neglected. The historical growth (construction, decay, rehabilitation) of the system, seasonal variations in irrigation conditions, irrigation cycles within seasons, and daily

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[1] See Potten, David 1985 "Rapid Rural Appraisal Emergence of a methodology and its application to Irrigation," a bibliographic review presented at the International Workshop on Selected Irrigation Management Issues Digana Village, Sri Lanka IIMI

variations (e.g., night/day) need consideration when appraising an irrigation system; any given moment must be viewed in its proper context. Performance is a function of a long process proceeding through space and time, from capturing water to satisfying human needs.

Linkages. Another perspective on canal irrigation systems focuses on the linkages between domains and the efernents within them. Some **of** these linkages are well understood (e.g., crop water requirements), while others have been largely neglected (e.g., management and incentives of irrigation staff; organization of farmers). The true complexity of canal irrigation systems has yet to be fully appreciated.

The **Uses *of* Rapid Rural Appraisal**

Rapid appraisals of canal irrigation systems have been conducted for a variety of purposes and in various contexts. **A** rough typology includes the following four categories:

1. Appraisals conducted as one aspect of standardized programs such as on-farm improvements, canal lining, or rotational schedules to determine how the program can be implemented in **a** given case; the question of whether the standardized program is appropriate is seldom asked.

2. Appraisals to develop diagnostic methods, which may have a training emphasis (as in USAID's Water Management Synthesis Project) or a monitoring and evaluation emphasis (e.g., Bottrall's 1981 World Bank report), and may concentrate below the outlet (USAIO) or include the main system (Bottrall).

3. Appraisals which yield recommendations that are never implemented for a variety of reasons, not least of which may be that they do not fit into an explicit operational plan.

4. Appraisals which result in action; this is the goal and seems to have been attained in India's National Water Management Project. At a local "do-it-yourself" level, some irrigation project managers have conducted informal appraisals **of** the systems under their control and made improvements they felt were needed.

Recent experience suggests that appraisals are most effective when 1) each irrigation system is viewed afresh as a unique case, 2) the entire system is considered, from the farm level to the main system, 3) there is an operational **plan** for reacting to the recommendations, and 4) there is continuity of staff involved in both appraisal and action.

Analytical Techniques for Appraisal

There is a wide range of approaches to rapid appraisal. One option is between thought and action: How much and what kind of research is necessary? Another is the necessary trade-off between ideal solutions and feasible recommendations. The best practical solution is one where everyone gains and no one loses, as when improved management alleviates waterlogging problems of head-end farmers while providing secure water supplies to tail-enders. A proposed solution based on sound engineering principles and logical economics will not succeed unless it also has political support.

Of the various options for ordering and analyzing information, five analytical approaches stand out: 1) Resource-based, top-down approaches which start with the water resource, its capture and storage, and then work downstream to the farm level; 2) performance-based, bottom-up which starts

from downstream symptoms of system ills (e.g., tait-end shortages or low yields) and works back upstream to determine the cause; 3) algorithms and other diagrams to express the logical linkages and interactions among the elements of an irrigation system; 4) menu maps which depict the overall set of functions, activities and responsibilities of the various departments and individual staff who manage the irrigation system; and 5) key questions and probes (e.g., How is water allocated during times of scarcity?) which aim at understanding linkages between parts of the system (e.g., head-tail, farmers-officials).

The Mechanics of Rapid Appraisal

Before a RRA begins, consideration must be given to the objectives of the irrigation system under study, as well as the objectives of the appraisal itself. The composition of the appraisal team should reflect both the technical and the social sciences, but should be kept as small as possible (perhaps 2-7). Narrow specialists can be a liability; the ideal are multidisciplinary individuals whose horizons are not limited by their formal training. The time required for an adequate "rapid" appraisal may be in the order of two weeks (though most so-called appraisals are often done in 2-4 days). Time is needed for reviewing background information, for identifying useful informants, and for meaningful discussions with farmers and officials.

One basic tool for eliciting information during the appraisal is the checklist, which can take many forms. Not everything needs to be known; the checklist serves as a guide to what is probably most important. The key to rapid appraisal is to move quickly and surely to the main problems, opportunities and actions, to consider alternatives and avoid obvious biases. The sources of information and insight that should be consulted include the following: 1) Key people (officials, farmers, laborers, specialists); 2) maps, photographs, or just a good hill-top view; and 3) documents (project appraisals, background reports, monitoring data, manuals and circulars, weather records).

RRA is only one of a series of preceding and subsequent activities for understanding and improving a canal irrigation system. The team must consider the history of the project and the people (e.g., local irrigation staff) who have been part of the system's history and will be part of its future. In addition to careful selection of the appraisal site, careful preparation must be made to explain the RRA objectives to project staff, and to seek their guidance, assistance, and collaboration. The pay-off to thorough preparation comes not only during the appraisal activities, but in the results of those activities. Unless project staff are involved in the appraisal, the recommendations are likely to be both ill-conceived and poorly received.

Recommendations should consider existing programs and budgets, and should include at least improvements that can be made immediately as a means of orienting the long-term agenda. Those who conduct appraisals rarely write about what they do or how they think. For programs of training and action, practical methods are needed. To this end, three activities are proposed:

1. Develop subroutines or modules to break the subject down into manageable units, allowing the gradual build-up of experience and its systematic testing;

2. Conduct empirical studies of appraisals *so* that the individuals who carry out RRAs can gain a better understanding of how they arrive at their recommendations;

3. Collect, sift, analyze and disseminate the experiences and techniques that have proven to be useful in rapid rural appraisal.

Those directly involved in project management and appraisal need to become more active in writing about their methods and experience. Their rules of thumb can be combined with more formal procedures to further advance our ability to appraise irrigation systems rapidly and effectively.

RAPID APPRAISAL **DISCUSSION: A SUMMARY**

The discussion began with a brief presentation by Berkhoff about India's Improved Water Management Plan and the role of rapid appraisal (RA). One issue was who should do appraisals: "Who tests ***and*** monitors *the system to* see if it's doing what it's supposed *to* **be** doing? You can't expect scheme operators to do that, although they may have perceptions of how it's working. Someone must have a sense of how the system as a whole fits into the environment as **a** whole and I don't see how that can come from anyone **but** planners." Berkhoff was referring to operational plans for an entire system, but what about the routine knowledge necessary to run part of that system? Carruthers noted that: "I was thinking of the executive engineer and managers in the field." Merrey addressed the **same** point: "Should a country like India be thinking about institutionalizing the capacity to send out RA teams constantly, ***or*** should we be thinking in terms of teaching existing managers to **do RA** themselves as a continuous process?"

One main issue centered around the question of how rapid is "rapid?" Coward suggested the term "sensible" appraisal as being more accurate. Chambers agreed: "The original idea was to call it *cost-effective* (giving recognition to the vatue **of** time). The main point is to have approaches and methods both in investigation and analysis to draw down from the shelf as part of the repertoire for **use** by people - managers, visiting teams, or whomever - who are trying to improve a particular system."

Not **all** participants were ready to drop the term "rapid." Rao cautioned that, while RA is useful for finding or correcting immediate problems, it cannot replace a thorough investigation of the whole system. Sundar noted that sometimes making no decision Is worse than making a slightly wrong decision. When a decision **must** be made quickly. RA may be appropriate. Furthermore, we should remember that rapid appraisals are done **by** people having long experience. However, there **are** cases where RA may be ill-suited to the serious consequences **of** a wrong decision: "If you ask me to build a dam, I am not going to **assess** the hydrology on a rapid basis; I will take my time to assess that hydrology."

How does one do **a** rapid appraisal that can yield significant information? There **was** some doubt that it can **be** taught at all. **"It's** a losing proposition," said Wallach. **"I** think **RA** will remain the **province of** people who have a certain mental suppleness, curiosity, and energy. **We** need to observe how *these* people work and draw lessons from them. The best way to learn appraisal **is** to try doing it with people who know how to do it."

Carruthers responded that these lessons can be extracted, written down, and learned. "We're trying to accelerate the experience of others **by** recording it and giving some guidelines. We're talking about avoiding traps that have been spotted by people who have done it before. It's still an art form but we think there is some distilled experience that can be handed on." Lowdermilk noted, "It's **a process** of learning from experienced people who know their craft and then trying to do it better."

The concepts of "rules **of** thumb" and "tricks of the trade" were mentioned several times as fitting the level of detail that is desirable. To be rapid it has to be rough; corners must be cut: The **key** is to cut corners that are not very significant and focus on a few points that have special meaning. **As** Wade put it, "We're talking about ways to get **a** quick general sense about how a canal system is **performing** and the effectiveness of its management." **He** suggested several indicators that could **be** useful:

1. What is happening in the drains? How much water goes into them and how often are the escapes used?

3. What is the ratio of water diverted into the system to the area actually irrigated (e.g., land area per cubic meter of water)?

4. How many years have the senior managers been in their positions?

5. Who controls canal gauge readings: the irrigation staff upstream or downstream from the gauge? Is there incentive to falsify the readings?

The issue of performance indicators was taken up by several of the participants. Saldanha pointed out that once you decide on a set of indicators, it still remains to determine causality. "There is also a problem of linkage," Carruthers observed. "The same problem can be expressed in different ways. One can't simply assign weighted values to the indicators and add them; scoring systems don't work because of the complexity of interactions. This is why in the end it's an art form."