PART B

IMPROVING THE PERFORMANCE OF THE IRRIGATED AGRICULTURE IN SUDAN

The

STRATEGY

OF THE

INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

CHAPTER 1

International Irrigation Management Institute (IIMI) and Its Global Vision

by
M. S. Shafique
(Suggestions of Dr. Dingle and Dr. Ashraf are acknowledged)

1.1 THE NEED

The heavy investments in irrigation development in developing countries in the 1960s and 1970s have in many cases not yielded benefits on the scale anticipated. Management, rather than the technology, of irrigation is considered to be the cause of these disappointments. This is the context in which IIMI was founded. It was established in 1984 with its headquarters in Sri Lanka and field operations in more than 10 countries in Asia and Africa.

1.2 BENEFICIARIES AND USERS OF IIMI'S WORK

The groups to whom IIMI should deliver benefits are, ultimately, the farming community in the developing countries. However, these are dispersed groups, and benefits can reach them only through the medium of others who are the intermediate users of IIMI's outputs. Six types of organizations are defined as intermediate users: Irrigation management organizations, policy forming organizations, water users' organizations, research institutes, universities and training establishments, and consultant organizations.

1.3 IIMI'S VALUES

Experience has led the Institute to articulate the following set of values which provide the context for the conduct of IIMI's work and its strategic choices and priorities.

* IIMI engages in activities that help alleviate poverty and improve the situation of disadvantage groups in the developing countries.

* IIMI believes that improvements in the irrigated agriculture should be sustainable, environmentally compatible, equitable and cost-effective.

* IIMI believes in the need to strengthen the compatibility between physical and managerial aspects of irrigation systems.

* IIMI believes that substantial improvements in irrigated agriculture can be made through the pooling and dissemination of knowledge and methodologies from around the world.

In addition, IIMI believes in mutual accountability among the farming community, government agencies, donors, research organizations and IIMI itself; it seeks to be impartial in its methods, conclusions and recommendations; and its sees joint activities with partners as an essential method to enhance local capacities and build consensus on important issues.

IIMI is committed to an integrated, multi-disciplinary perspective, and strives to ensure that its work follows international standard of rigor, evidence and excellence. The Institute believes in meeting different needs with appropriate and differentiated responses, with an objective of fostering client self-reliance as quickly as possible.

1.4 WHAT OTHERS ARE DOING IN THE FIELD IRRIGATED AGRICULTURE

There are numerous organizations, groups and individuals seeking to improve the performance of irrigated agriculture. Key international organizations include the International Commission on Irrigation and Drainage (ICID), the Food and Agriculture Organization of the United Nations (FAO), the International Program of Technology Research in Irrigation and Drainage (IPTRID), and the member centers of the CGIAR system. In defining its mission, identifying its goals and selecting its subject areas and activities, IIMI seeks to complement and not compete with work of others.

1.5 IIMI'S COMPARATIVE ADVANTAGE

IIMI has the following unique features which define its comparative advantage:

(a) A focus on irrigation management. Most others in the field are either working on technical elements of irrigation or on the management of elements of agriculture that are common to both irrigated or rain-fed agriculture.

(b) A special focus on research and its application, and membership in the system of International Agricultural Research Centers (IARCs) that form the Consultative Group on International Agricultural Research (CGIAR). This latter feature enables IIMI to address issues of irrigated agriculture in the global context of improving the productivity of agriculture worldwide.

(c) A global focus which enable the Institute to test potential irrigation management innovations in various contexts, and to promote intercountry exchanges of ideas and experiences.

(d) An emphasis on collaborative investigations and problem solving, which helps IIMI to work effectively in this mode with a number of different national agencies simultaneously in a given country, rather than being tied to a specific projects or agencies.

(e) An ability to harness the power of partnerships by combining the strengths of different organizations and bringing them together in variety of formats to address the key issues.

(f) Fostering trustful relationships with irrigation agencies and policy-making groups throughout the developing world.

(g) Eight years of research expertise and scientific capacity, based on highly qualified staff and a growing database.

(h) A long-term presence and resident staff in selected countries, which enable IIMI to participate in sustained action research on important irrigation management problems, and to develop familiarity with the environments that influence them.

(i) An international status and open international recruitment policies which ensure that the Institute can act impartially, not identified with a particular country, particular discipline, or particular solution to irrigation management problems.

1.6 IRRIGATION MANAGEMENT

Irrigation management is defined by IIMI as:

> *Irrigation management is a process by which institutions or individuals set objectives for irrigation systems, establish appropriate conditions and identify, mobilize and use resources to attain these objectives while ensuring that the activities are performed without causing adverse effects.*

1.7 IIMI'S MISSION

The International Irrigation Management Institute (IIMI) defines its mission as follows:

to foster the development, dissemination and adoption of lasting improvements in the performance of irrigated agriculture in developing countries.

IIMI's declared mission can be interpreted as a sustained, international, collaborative effort to bring the benefits of managerial revolution to irrigation in developing regions. In this context, IIMI wishes to play the role of a center for developing management innovations through research and helping national irrigation research, management and policy-making institutions to originate, implement, and adapt such innovations independently under national and more localized conditions.

1.8 IIMI'S GOALS

The Institute has following three goals:

(a) Generating knowledge to improve irrigation management and policy-making
(b) Strengthening national capacity
(c) Supporting the introduction of improved management and policy-making

1.9 ACTIVITIES

Experience and analysis of its comparative advantages have identified two main sets of activities which the institute will employ to achieve its goal and fulfill its mission:

(a) Research
(b) Institution building

Each of these two sets of activities contributes, to greater or lesser degree, to each of three IIMI's goals. However, research activities will of course contribute mainly to IIMI's first goal, whereas institution building activities will contribute more to the second and third goals.

1.9.1 Research

IIMI's research program aims to develop a set of generalized results to help identified environmentally sound and lasting improvements in the performance of irrigated agriculture and to contribute to the development of a generic framework of analysis of irrigation management that admits local and regional diversity. IIMI uses two principal research methodologies: *Collaborative field research*, which is normally conducted through specific projects in active collaboration with national agencies; and *generic research*, which entails evaluating and

comparing the findings and results emerging from field research across countries and regions, yielding results with multi-country applicability.

1.9.1.1 Criteria for Research Subjects

The factors affecting the performance of the irrigated agriculture are too broad and too numerous for IIMI to attempt addressing all. In selecting subject priorities, IIMI has used following criteria: (i) country and sector needs, (ii) impact potential, (iii) knowledge potential, and (iv) comparative advantage.

1.9.1.2 Selected Research Subjects

Applying the criteria for subject selection, IIMI has identified five major areas of concentration in the coming years. The Institute has decided to organize its research activities around the following specific subjects:

* Assessing and Improving the Performance of the Irrigated Agriculture.
* Sector-level management of Irrigated Agriculture.
* Improving Public Irrigation Organizations.
* Local Management of Irrigation Systems and Turnover.
* Operational Management of Water Delivery and Disposal

1.9.2 Institution Building

IIMI's institution-building activities will principally aim at strengthening national research capacity and supporting the introduction of improved policy and management, and will include:

(a) Training and Related Institutional Development
(b) Information Exchange and Networking
(c) Dialogue and Consultation on Policy and Management

1.10 IMPLEMENTATION MECHANISMS

IIMI will implement its strategy through a medium term plan coupled with a series of annual plans. Implementation will require core and complementary programs, effective regulatory arrangements, enhanced collaboration with numerous partners, and a strengthened monitoring and evaluation system.

Note: The Chapter 1 has been almost extracted as such from the following sources:

(a) IIMI's strategy for the 1990's (1992).
(b) The Strategy of the International Irrigation Management Institute (1989).
(c) Managing Irrigation in the 1990's (1989).

CHAPTER 2

Strategy for Sudan Field Operations of the International Irrigation Management Institute (IIMI-Sudan) (1992)

2.1 CONTEXT

More than three-fourths of about 27 million population of Sudan lives in rural areas and is primarily dependant on agriculture for its livelihood. The total agricultural area in the country is 123 million ha. Presently, however, there are eleven million hectares under cultivation of which only 1.9 million hectares (17%) are in the irrigated sector.

The irrigated sector is immensely important to the economy of Sudan. It is an assured source of food supply especially in the drought periods. It is also a major source for foreign exchange earnings. Moreover, the irrigated sector produces country's all of the wheat and sugarcane, almost all of cotton (90%) and horticultural crops and a substantial amount of sorghum and food legumes. To achieve self-sufficiency in food and exporting capacity of agricultural commodities, the vast potentials of irrigated agriculture must be exploited.

In this context, IIMI initiated its work in Sudan by signing a Memorandum of Agreement (MOA) with its government on February 2, 1989. By the middle of that year, the Institute recruited an international staff who established IIMI's office in Sudan. In October 1989, a national policy workshop was organized in Wad Medani to identify some important irrigation management issues for IIMI's collaborative work.

A consultative committee was established in early 1990. The seven members of the committee represent various disciplines and agencies responsible for the management of the irrigated sector. This mechanism is to ensure local participation and assistance in selection and carrying out of annual work plans.

With all local arrangements and IIMI's overall strategy for 1990s in place and field operations initiated, it is essential to layout a broad & general approach that IIMI-Sudan will use during the next three years (1992-1995). So, this paper stipulates a strategy for the field office of the International Irrigation Management Institute in Sudan. It should be noted that the proposed duration is in line with the duration of funding commitment from the Ford Foundation and Research Division of IIMI.

In developing a strategy for a unit of an organization, an approach suggested by Mayo-Smith and Ruther (1986) is adapted. Also, terminology used in the following text is from the referred source.

2.2 KEY RESULT AREAS

2.2.1 Definition of Key Result Areas

Key result areas being those areas in which high performance is essential if the organization is to carry out its mission effectively.

2.2.2 IIMI-Sudan's Key Result Area

IIMI's overall key result area can be stated as *promotion of an effective irrigation management in developing countries.* IIMI's country programs being field laboratories, each unit has to perform well to contribute its share towards the identified key result area. Even the overall result area is same for each field unit, sub-areas of focus within its domain will change from country to country. In line with the statement, IIMI-Sudan has used following criteria for selecting some components of the key result area:

1. IIMI's Strategy for the 1990s: Improving the Performance of Irrigated Agriculture.
2. Recommendations of the National Policy Workshop held in 1989.
3. Priorities outlined by IIMI-Sudan's Consultative Committee.
4. Understanding with donor agencies.
5. Funding, staff, logistics, and other external factors.

Guided by these criteria, IIMI-Sudan has classified key components of the result area into following three categories: (i) key components of result area under category 1 (1992-95), (ii) key components of result area under category 2 (1995 onward), and (iii) key components of result area under category 3 (technical guidance / assistance only). Under each category, the key sub-areas of result are:

Key Component of Result Area under Category 1.

1. Performance of Irrigated Agriculture
2. Appropriateness of Local Management of Irrigation systems and turnover
3. Advancement in Institution Building for Research, management and Policy-making.

Key Components of Result Area under Category 2.

1. Quality Management of Irrigated Agriculture at Sector-level.
2. Effectiveness of Public Irrigation Organizations

Key Components of Result Area under Category 3.

* Quality of Operational Management of Water Delivery and Disposal.

2.2.3 *Focus of IIMI-Sudan during 1992-95*

IIMI-Sudan during 1992-95 plans to focus on the key components of the main result area given under Category 1. However, this does not mean that other components will be ignored completely. Rather many task performed under Category 1 will have spin-off effects on the key components of result area under other categories. Moreover, if the Government of Sudan requests assistance for policy matters concerning the irrigated sector (Category 2), IIMI will like to respond positively subject to the availability of financial and other needed resources. The sub-area of result under Category 3 will need some attention from time to time. However, IIMI-Sudan plans not to invest too much of its time and efforts in this sub-area of result.

2.3 KEY ACTIVITIES

2.3.1 *Definition of Key Activities*

Key activities are described to be the tasks that must be performed effectively in order to ensure impact in the key result area.

2.3.2 *Key Activities for the Sub-areas of Focus during 1992-95 (Category 1)*

Following are key activities associated with different sub-areas of result:

Sub-area of Result: Performance of Irrigated Agriculture

(a) Assessing the existing irrigation performance of a selected scheme.
(b) Developing appropriate indices of performance in the context of Sudan.
(c) Evaluating potential irrigation performance of a selected scheme.
(d) Suggesting methodology for bridging gap between actual and potential performance.

Sub-area of Result: Appropriateness of Local Management of Irrigation Systems and Turnover

(a) Comparing and evaluating different management modes which are being introduced in a selected pump irrigation scheme of Sudan.
(b) Developing future studies about local management of irrigation system and management turnover.

Sub-area of Result: Advancement of Institution Building for Research, Management and Policy-making

(a) Developing research programs in collaboration with relevant national agencies responsible for research, management or policy-making.

(b) Imparting training and other related institutional development activities.

(c) Establishing mechanisms for information exchange and networking.

(d) Facilitating dialogue and consultation on policies and management.

2.4 ORGANIZATION'S GOALS

2.4.1 Definition of Goals

Goals are defined as a set of specific intentions that an organization wishes to undertake for the attainment of its mission. Each unit of such an organization should have its own goals which relate to its key area of result and contribute to the fulfillment of organization's overall mission.

2.4.2 IIMI-Sudan's Goals

Obviously, IIMI's key area of result is *irrigation management*. Its units, country programs / country field operations, identify their own key sub-areas of result in the context of local priority needs. Similarly, all such country programs has their own goals which relate to their identified key sub-areas of result. As the key sub-areas of results of different country programs are components of IIMI's key result area, goals of the units also serve as the building-blocks for the fulfillment of the Institute's overall mission. In this context IIMI-Sudan defines its goals as follows:

Key Sub-area of Result: Performance of Irrigated Agriculture

Goal: To assess the existing irrigation performance and suggest measures for improvements.

Key Sub-area of Result: Appropriateness of Local Management of Irrigation systems and turnover

Goal: To generate information about local management of irrigation systems and turnover for policy-making and management organizations.

Key Sub-area of Result: Advancement of Institution Building for Research, Management and Policy-making.

Goal: To apply various ways and means for strengthening national capacity for research, management and policy-making.

2.5 Performance Indicators

2.5.1 Definition of Performance Indicator

Performance indicators are often measures of progress in terms of *quantity, quality, time or cost* for accomplishing set goals.

2.5.2 Performance Indicators for IIMI-Sudan

For each goal, following are suggested performance indicators for IIMI-Sudan:

Goal: To assess the existing irrigation performance and suggest measures for improvements

* Number of reports, manuals or research papers about irrigation performance in a selected irrigated scheme of Sudan.

Goal: To generate information about Local Management of irrigation systems and turnover

* Number of reports, theses or research paper prepared or published.
* Number of workshops / seminar proceedings produced.

Goal: To apply various ways and means for strengthening national capacity for research, management and policy-making

* Number of workshops / seminars organized.
* Number of university students helped in conducting their field research work.
* Number of irrigation management network established.
* Number of collaborative field research activities undertaken.
* Number of overseas visits for the Sudanese either organized or facilitated.
* Number of overseas training programs arranged.
* Number of local training programs either supported or organized.
* Number of important irrigation management and Sudan related papers reprinted.
* Number of Sudanese helped in securing admissions abroad for improving academic qualifications.
* Number of Sudanese professional helped to publish their papers.
* Number of news letters issued.
* Requested or otherwise, information exchange related count.

2.6 OBJECTIVES

2.6.1 Definition of Objectives

The objectives are very specific expressions of intention for actions required to achieve specific goals. The statement of objectives provides following information (Mayo-Smith & Ruther, 1986):

(a) What is to be achieved;
(b) How much is to be achieved;
(c) By when it is to be achieved; and
(d) By Whom it is to be achieved.

2.6.2 IIMI-Sudan's Objectives

Within a specified period of three years, September 1992 -September 1995, IIMI-Sudan intends to accomplish the following objectives:

Goal: To assess the existing irrigation performance and suggest measures for improvements

(a) To collect & analyze data and report findings pertaining to the existing canal and agricultural performance of the Rahad Irrigation Scheme.
(b) To determine potential performance parameters for equity, adequacy, tail-water runoff, accuracy of indents, operational efficiencies of managing agencies, canal productivity / profitability of irrigation water use, etc.
(c) To recommend measures for bridging the gap between actual and potential performance levels of the Rahad Irrigation Scheme.

Responsibility: HRS (MOI), RAC, IIMI-HQ and IIMI-Sudan

Goal: To generate information about local management of irrigation systems and turnover for policy-making and management organizations

(a) To undertake comparative evaluation of three management modes, existing para-statal agency management, private company management and farmer self management assessed for the wheat cultivation season (1992-1993) in selected White Nile Pumping Schemes.
(b) To provide information about different management turnover options being opted in the different parts and levels of irrigation schemes of Sudan by holding a workshop during 1993 / 1994.
(c) To prepare a project document leading towards a larger study on the transition to privatization of irrigation pump schemes along the White Nile.

Responsibility: IIMI-Sudan, IIMI-HQ, MOI, The Agricultural Ministry of the Central State of Sudan and perhaps Planning Department of Federal Ministry of Agriculture.

Goal: To apply various ways and means for strengthening national capacity for research, management and policy-making.

(a) To hold one workshop / seminar each year in collaboration with national agencies for management and / policy-making.
(b) To conduct research in close collaboration with local research organizations to strengthen the national capacity in research.
(c) To establish a network on irrigation management for the Sudanese professionals.
(d) To help at least one university student each year for field research about irrigation management in Sudan.
(e) To organize or facilitate at least 2 training programs, one local and other overseas, to improve operational skills of the agencies responsible for irrigation management.
(f) To support / facilitate one study tour each year to countries where IIMI is involved.
(g) To provide assistance to the Sudanese professional in information exchange and its proper dissemination.

2.7 FAVORABLE AND UNFAVORABLE FACTORS

2.7.1 Definition of Favorable and Unfavorable Factors

(a) *Favorable Factors:* Helpful elements in the pursuit of goals and objectives.
(b) *Unfavorable Factors:* Inhibiting elements which hold back progress towards attaining goals and objectives.

2.7.2 IIMI-Sudan's Favorable and Unfavorable Factors:

Goal: To assess the existing irrigation performance and suggest measures for improvements

Favorable Factors for Conducting Study in the Rahad Scheme:

(a) Many irrigation control structures of a one major canal system are calibrated for monitoring irrigation supplies in response to indents-placed.
(b) A good amount of data have been collected by IIMI and its collaborators under former financial arrangements.
(c) There are large amounts of secondary data available with the Rahad Agricultural Corporation and the Directorate of Irrigation Operations for Rahad (MOI) which could be used to draw many initial opinions about the canal and agronomic performance of the Scheme.

(d) Both the management of the Rahad Agricultural Corporation (RAC) and MOI appear to have good working relationships developed which provide conducive environment for joint efforts with local partners.
(e) IIMI has established its credibility with agencies responsible for the management of scheme.

Unfavorable Factors for Conducting Research in the Rahad Scheme:

(a) Neither MOI nor RAC are mandated to conduct research or monitor irrigation performance.
(b) Lack of training of personnel in the choice field.
(c) Communication system either does not exist or inappropriate for effective operations of the Scheme.
(d) Lack of encouragement or discouragement (incentives or otherwise) for better irrigation performance i.e., there is no built-in accountability mechanism.

Goal: To generate information about local management of irrigation

Favorable Factors for Local Management of Irrigation Systems and Turnover

(a) The White Nile Pump Schemes are first where management turnover is being tried and many other schemes will follow the suit.
(b) There is no arrangement in place at this time to monitor the transition and evaluate different management modes being tried. IIMI's contribution in this field will be favorably looked at.
(c) There is no agency mandated to combine the experiences of different management turnover models being introduced in the different regions / part of Sudan. This gap suits IIMI best to bridge it.
(d) Sudan offers an excellent example to monitor the experiment of local management for a large scale irrigation system. Documentation of this unique happening will help both the Government and international community to learn useful lessons.

Unfavorable Factors for Local Management of Irrigation Systems and Turnover

(a) The pace of the management turnover did not allow planning for alternative institutional arrangements to put in place
(b) There is no well defined feedback mechanism to know how well the management turnover was functioning in the context of different schemes.
(c) No other organization has considered to conduct research in this specialized field.
(d) Difficulties associated with logistics for such far-flung schemes.
(e) Management related changes are occurring at such a speed that it is difficult to keep pace with them.
(f) Funding problems for such research.

Goal: To apply various ways and means for strengthening national capacity for research, management and policy-making.

Favorable Factors:

(a) IIMI has already undertaken many activities concerning research and policy-making in cooperation or collaboration with responsible national agencies.
(b) IIMI has also conducted some training programs to improve operations (selected aspects) of relevant management agencies of two large schemes.
(c) There is enough expressed interest from some agencies to play even more active role with IIMI in conducting irrigation management research.
(d) The idea of irrigation management network has been received by the Sudanese professional favorably.
(e) IIMI has already organized / facilitated many overseas training programs as well as study tours for the Sudanese professional.
(f) IIMI's support for the field research for the university students has been acknowledged.

Unfavorable Factors:

(a) There is no research organization with mandate to conduct multi-disciplinary research in the field of irrigation management.
(b) Lack of training facilities for the staff of management agencies.
(c) Low moral of agency-staff due financial problems.
(d) Funding difficulties to organize workshops and seminars.
(e) Difficulties in disseminating valuable local research conducted by the Sudanese professionals.
(f) Almost absence of needed support for university students to conduct field oriented research.
(g) Not enough access to relevant latest international literature concerning irrigation management research, management and policy-making.
(h) Lack of opportunities to observe international management practices conducive for positive change.

2.8 STRATEGY

2.8.1 Definition of Strategy

Strategy refers to intentions and means describing how to accomplish objectives and goals. A strategy is a broad, general description of intentions to be used for achieving targets and it does not include specific detailed steps like in case of work plans.

2.8.2 *IIMI-Sudan's Strategy*

IIMI's strategy in Sudan will be to make best use of favorable factors and reduce negative impact of unfavorable factors in a way that enables the Institute to attain its objectives and goals. Following are potential options which will be considered while preparing detailed annual work plans during a period of three years:

Goal: To assess the existing irrigation performance and suggest measures for improvement

(a) Review of existing knowledge and literature about the irrigation system performance.
(b) Adoption of methodology and irrigation system performance indicators suitable for local conditions.
(c) Development of a scheme to assess existing level of irrigation system performance.
(d) Assessment of potential levels related to irrigation system performance.
(e) Documentation and dissemination of possible options to bridge the gap between the existing and potential level of irrigation performance.

Goal: To generate information about local management of irrigation systems and turnover

(a) Monitoring and evaluation of selected irrigation management modes introduced in Sudan.
(b) Preparation of menu for future research to be conducted in the field of irrigation management turnover.
(c) Deliberation and dissemination of information regarding various options of irrigation management turnover.

Goal: To apply various ways and means for strengthening national capacity for research, management and policy-making.

(a) Development of collaborative research activities with relevant local organizations.
(b) Preparation of training packages and generation of knowledge relevant to management performance.
(c) Assistance in organizing workshops, seminars and brainstorming sessions to focus on policy related issues in the sector of irrigated agriculture.
(d) Arrangement for professional development packages which may include following:

    (1) Study tours.
    (2) Needed field support for university students to conduct irrigation management oriented research.
    (3) Help in publishing selected work of local professionals.

(e) Establishment of dissemination mechanisms of relevant information on irrigation management aspects.