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IRRIGATION WATER MANAGEMENT ASSESSMENT AND PRIORITIES FOR IRAQ

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IRRIGATION WATER MANAGEMENT ASSESSMENT AND RECOMMENDATIONS FOR IRAQ

Key Issues

- Over 10,000 years of irrigation in Iraq has created serious waterlogging and salinity problems in irrigated soils.
- Neglect of irrigated agriculture for more than two decades (during Saddam's reign) has resulted in serious deficiencies and degradation.
 - Maintenance and rehabilitation of irrigation systems infrastructure have been neglected
 - There have been no recent inventories of irrigation conditions in Iraq – studies providing the basis for planning are more than 20 to 40-years old.
 - Salinity has degraded 75 percent of the older irrigated areas, with 20 to 30 percent of the most seriously affected areas no longer farmed.
 - Iraqi professionals believe that the country is more than 20 years behind in modernization of irrigation systems based on more than two decades of isolation.
 - National strategies for farm water management, salinity control, and participatory irrigation management programs for irrigated agriculture are seriously deficient.
 - No ministry in the Iraqi government has accepted responsibility for farm water management, which has resulted in program deficiencies.
- Water quantity is becoming increasingly limited in Iraq and water quality is degrading.
- Water lifting for both irrigation and drainage consumes large amounts of energy that is in short supply.
- Waterlogging and salinity problems must be addressed urgently if agricultural productivity is to be maintained or increased.
- Officials in both the ministries of agriculture and water resources believe that farm water management is an urgent priority for irrigated agriculture because of the needs to:
 - Improve effectiveness of water supplies
 - Reduce energy consumption
 - Address soil waterlogging and salinity problems
 - Increase irrigation efficiency through laser leveling fields while controlling farm drainage and soil salinity
 - Greatly increase agricultural production through improved water management and effective agricultural extension.
- Improving farm water management would directly and measurably support components of ARDI including:
 - addressing rehabilitation priorities, soil waterlogging, and salinity problems,
 - creating mechanisms for direct farmer participation,
 - revitalizing agricultural production,
 - generating income and employment opportunities through agro-enterprise and market development, and
 - providing rural financial services.

Current priorities

- Iraqi officials believe that some ARDI emergency activities in the water resources sector are of lesser priority considering the planned investments of over \$2 billion.
- Officials from both the ministries of agriculture and of water resources believe that increasing farm efficiencies through improved water management is an urgent priority.

Recommendations

- ARDI supports the formation of a Farm Water Management Unit to be administered jointly by both the ministries of Agriculture and Water Resources, but housed in the Ministry of Water Resources.



- The Farm Water Management Unit assumes responsibility for addressing issues of drainage, salinity, land leveling, and improved agricultural production at farm and irrigation command areas, and establishes and supports water user associations.
- Technical support is urgently needed for the creation and initiation of the farm water management organizational unit.
- Moderate levels of support are needed initially, with rehabilitation funds becoming available to continue the farm water management organizational unit in accordance with the Ministry of Water Resources.
- The Ministry of Water Resources has committed to cooperatively found the farm water management organizational unit with the Ministry of Agriculture.
- The Ministry of Water Resources has capable leadership that was involved with farm programs in drainage, salinity management and laser land leveling during the early 1980s.
 - The Ministry has a vision of the potential impact of effective water management presently and is now articulating that vision.
 - Organizational development support is seen by the Ministry as a way to accomplish all the changes required by both ministries.
- Improved farm water management is urgently required to support and to effectively use the millions of dollars of planned investments in the water sector of Iraq.
- Iraq's isolation and neglect for more than two decades perhaps offers a unique opportunity, which does not exist in other countries of the region, for substantial and urgently needed improvements in water resources management.

Summary

- Immediate technical support is needed for continuing the creation of farm water management unit and for operational start-up of the organizational unit.
- Funding for the startup equipment and facilities should be provided by ARDI or sought from other sources.



IRRIGATION WATER MANAGEMENT ASSESSMENT AND PRIORITIES FOR IRAQ

Introduction

Historical evidence of irrigation in Iraq exceeds 7,000 years. Irrigation likely has been practiced in Iraq for more than 10,000 years (Clyma, 2003). This long period of irrigation has created the nemeses of soil waterlogging and salinity. FAO country estimates suggest that 75% the irrigated area in Iraq is at least moderately saline, with as much as 20 to 30% of the irrigated area not farmed because of salinity. No current, accurate assessment is available because of neglect in the irrigation sector over the past two decades.¹

The Russians conducted a comprehensive assessment of water resources including irrigation and drainage in Iraq in the early 1980s. No adequate data are available for an assessment of the current (2004) status since the Russian studies, according to the Corp of Engineers comprehensive survey. Thus, Iraqi personnel I have consulted consistently referred to the earlier data, which inadequately characterizes the current status. Therefore, I believe that irrigated agriculture in Iraq urgently needs immediate, effective attention to rehabilitate systems, improve water management, and increase productivity.

In the past, Iraq policy has emphasized improving irrigation and drainage. For a period, irrigation and agriculture were under one ministry. During this period, field drains (perforated pipe), collector drains, and lateral and main drains as open ditches were constructed as a part of rehabilitation efforts. Salinity reclamation and laser land leveling previously were part of an active field program, but these were discontinued in the early 1980s when war priorities closed down most development efforts. Thus, senior professionals have experience in improving irrigation water management, but all such efforts were discontinued about 20 years ago.

Discussions between the Ministry of Water Resources (MoWR) and Ministry of Agriculture (MoA) have not been able to start up programs emphasizing field drainage, laser land leveling, and other farm water management practices because neither ministry has been willing to accept responsibility for all or a part of the program. Each ministry suggests that the other ministry is more appropriately responsible for water management issues at the farm level. Thus, in Iraq at present, there are no programs that focus on support for farmers, and no political organizations with program responsibilities for farm water management.

Extension support in the immediate past was mostly political in nature. Thus, there is no extension program in Iraq at present. Informal discussions with senior personnel in both ministries suggest that effective improvements at the farm level, such as improved farm water management, appropriate inputs and services, and extension support should double or triple current yields. Without such farm level support, investments in structural facilities in irrigation and drainage will result in limited benefits with no or little impact at the farm level. The basic problems limiting effective water management, salinity control, and productivity at the farm level will not be addressed by improving structural facilities alone.

Current Priorities in Irrigated Agriculture

The ARDI project proposal emphasizes the poor water management practices in Iraq with the resulting salinization, nutrient depletion, and waterlogging extending over much of the irrigated area. The ARDI project is expected emphasize resource conservation and management for sustainable land use. Irrigation systems are expected to deteriorate due to poor management and lack of maintenance. Thus, a major focus should be system rehabilitation with an emphasis on improved water management. Key needs and emphases in irrigation system rehabilitation should be on providing recommendations to the USAID infrastructure reconstruction contractor and USAID mission on where irrigation and drainage system repairs should be undertaken. Similarly, another emphasis should be on strategies for effective irrigation and drainage system rehabilitation.

Because of lack of maintenance, an initial emphasis should be on identifying emergency repairs to pumps, power generation repairs for pumping, reclaiming of drainage systems with pressure treatments, assessment and repair of center pivot systems in many potential locations, canal and canal structures needing repair, drainage facilities needing repair, and many other emergency needs. An early emphasis also should be placed on improvements that will have an immediate, major impact.

The concept of the ARDI project was to focus on the urgent emergency interventions and medium term needs in agriculture and irrigation. For many activities, especially in agriculture and the private sector this appears to be true. However, for interventions in the water sector the priorities were less clear. First, as discussed there is no primary agency with the responsibilities and a program supporting water management at the farm level.



Second, a large investment program in water including irrigation and drainage is projected at up to \$2 billion in the MoWR.

Lack of interest in emergency repairs by the MoWR initially was not understood. Subsequent discussions suggested that the MoWR had invested much effort in creating plans for initial investments of \$500 million in irrigation and drainage, which is expected to increase to \$2 billion dollars in the immediate future. Therefore, they felt that diverting their focus to small emergency repairs was not appropriate. As suggested in the next section, the MoWR is focused on long-term rehabilitation and construction. Improving on-farm efficiencies also was a high priority emphasis for this rehabilitation effort. In subsequent discussions with the MoA it was suggested that they agreed farm water management is a high priority and want to develop a strategy of improving on-farm efficiencies.

Water Management Strategies of the Ministries

A summary of priority needs by the Ministry of Agriculture suggests that "Significant savings in water use and avoidance of salinity problems can be made through adoption of drip and under tree sprinkler techniques. . . ." In discussions with two different Deputy Ministers in the MoWR, they suggested also that improving irrigation efficiencies were a priority, and that the only way to accomplish such an improvement was through the use of center pivot and trickle irrigation systems. My responses to the two MoWR personnel and the MoA personnel were that the topography, soils and other conditions suggested that laser leveled basins were appropriate for much of Iraq. Laser leveled, level basins could achieve higher efficiencies in Iraq's climate than center pivot systems and could approach the efficiencies of trickle irrigation systems. Both MoWR and MoA responses were that they wanted to start a laser land leveling program in Iraq immediately.

Laser land leveling programs have been successfully implemented in at least three other countries/locations around the world with conditions very similar to those in Iraq. These countries include:

Pakistan - Laser land leveling for level basins is an active and growing program in Pakistan that is spreading rapidly². The level basins are combined with watercourse improvement and improved productivity emphases. Farmers valued the water saved and appreciated the increased productivity achieved through an effective program.

Egypt - Egypt has a similar ongoing program³ in Meskia (watercourse) improvement, creation of Water Users Associations, laser land leveling, and improved water delivery with farmer participation⁴.

Arizona - The success of laser leveled, level basins for cotton, alfalfa, and other crops with water savings and increased yields also were documented through work experience in Arizona (Clyma and Clemmens, 2000).

Ministry of Water Resource personnel and subsequently Ministry of Agriculture personnel agreed that a laser land leveling program with improved farm water management was an urgent priority for Iraq. A seminar at the College of Engineering, Baghdad University outlined the experiences of other countries with farm water management improvement programs. A strategy that included improved farm and irrigation water management with joint participation of the MoWR and MoA was presented and later accepted in discussions. Organizational development strategies to create a working partnership between agencies and farmers were included in the strategy (Dedrick et al, 2000). The improved water management strategy provides a significant step toward achieving sustainable irrigated agriculture for the river valleys in Iraq after more than 10,000 years of deterioration (Clyma and Shafique, 2001; Clyma, 2002).

Some field assessments and discussions with numerous Iraqi professionals provided a limited basis for understanding needs in Iraq. The field visits were to a rehabilitated irrigation project, but repeated discussions were held concerning conditions of other rehabilitated as well as unrehabilitated irrigation projects. Among the observations are those drainage systems needing improvements despite rehabilitation projects for those systems. Most lateral and main drainage channels were choked with weeds. Some farm drainage systems apparently are clogged with encrustations and need to be rehabilitated or replaced. Fields are usually small, not level, and have poor delivery channels to supply water. On most canal systems farmers take water by siphoning or pumping at unauthorized locations, with the result that farmers at the head receive too much water and farmers at the tail are short. Some farmer organizations exist and some farm channels are maintained by farmers -- a very positive development. Soil salinity and waterlogging were prevalent in the areas visited, but the magnitude and impact were not assessed. Improvements to water delivery are needed because water measurements for equitable water delivery were not made.



A key concern in Iraq is the reduced flows and increased salinity of the rivers from Iraq and Iran. Water already is short in Iraq. Thus, further reduction in available water supplies will have a serious impact. Improving on-farm efficiencies from the low current levels, assumed to be 30 to 40% but likely nearer 20% or less, to a much more appropriate level would have positive impacts on the water supply. Increased salinity makes the return flow unsuitable for re-use in most areas without large amounts of dilution. Because the water from the river that recovers drainage water must be lifted, along with water from many of the irrigation canals, water lifting consumes a major proportion of energy in an energy-limited country. Thus, programs to improve on-farm efficiency have a high priority for Iraq professionals because the country could realize potential benefits in both water supply and energy.

Organizational and Program Strategy

Both MoA and MoWR personnel thought that a joint unit was necessary for an effective water management program. Experiences in other countries suggest that a joint program is most effective because coordination is required for a successful program. The Deputy Ministry of Agriculture agreed that a research station emphasis could be appropriate, but he wanted to start immediately a service program for farmers with appropriate personnel stationed in six governorates. Through initial discussions, the decision was that the unit would be housed in the MoWR but MoA has not agreed formally to such an arrangement. Dr. Amir has been designated to be the leader of the unit based on his past experience at heading up multidisciplinary units, including his present position involving those kinds of personnel. Mr. Waleed agreed that a focus had to be on making it worthwhile for personnel to transfer to the unit with appropriate administrative support.

All personnel agreed that the integrated unit must be capable of addressing farm drainage, salinity rehabilitation, laser land leveling with appropriately designed level basins for effective management of water application by the farmers, farmer organizations, and an agricultural extension program to support appropriate inputs and necessary services for the farmers. Farmer organizations will be formed to help manage and maintain the irrigation and drainage systems and to ensure other appropriate services. Organizational development support will be necessary to support establishing working relationships between the unit and farmers, but also between the other government units such as water delivery and agricultural extension services (Dedrick et al, 2000).

These changes are not small. Not only should a currently nonexistent governmental unit be created, but also effective training and support personnel for the field units will be necessary. Why, in a three-week period, would government personnel agree to such major changes? I believe that the long period of isolation has created the understanding that change is urgently needed. The neglect of irrigated agriculture for the last two decades also has reinforced the understanding that needs for changes are urgent. Thus, in Iraq none of the resistance to change that I have encountered in other countries during discussions about new water management programs was evident. Therefore, changes that have taken years to be accepted in other countries have been endorsed in an unbelievably short time in Iraq.

Conclusion and Summary

I believe it is critical that this present time period of opportunity for change in Iraq should not be lost. Technical Assistance should be provided immediately to continue the planning, creation and initiation of a water management unit in the MoWR with participation from the MoA. An urgent effort and immediate action are needed to develop an operational unit for support of farm water management programs in conjunction with the major irrigation and drainage rehabilitation investments which soon will be underway in Iraq.

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(Footnotes)

¹ Corp of Engineers advisors made a comprehensive inventory of literature on water resources in Iraq and concluded that programs and planning in water resources was based upon studies by the Russians, or earlier studies in Iraq, since current data are not available.

² Private communication, Mushtaq Ahmed Gill, Director General, Water Management, Punjab, Lahore, Pakistan.

³ Dr. Jane Gleason provided updated insights on the laser leveling program in Egypt with increased yields and water savings in sugar cane.

⁴Private communication, Dr. Mona El-Kady, Director, Water Center, Ministry of Water Resources, Government of Egypt, Cairo, Egypt.

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