Forty Years of Irrigation and Drainage System Performance

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Session 1: What Have We Learnt About Irrigation and Drainage Performance

Introduction

The last forty-fifty years of irrigation and drainage system performance appear to be a success story. Irrigation development is credited to have provided overall food security, lifted millions out of poverty and hunger, supported agricultural intensification and diversification and rural development as a springboard for economic development. This is because of increased and more secure water supply to farmers. Internal performance problems and environmental impacts were acknowledged but we had "solutions": rehabilitation, participatory irrigation management, canal lining, more efficient irrigation technologies, command area development, water pricing.

When the food, energy and economic crisis hit the region and the challenges of population growth, water scarcity and climate change to food security became clearer, a number of governments and traditional and new donors (sovereign funds, private sector, emerging countries) have proposed to revive investment in irrigation systems, which was in a slump, due to new priorities and the success of past development. Most of these "new" investments consist of essentially "more of the same" solutions applied to existing irrigation systems and more new systems which are not too different from the existing ones.

It is therefore important now, for government decision makers and the donor community, and ultimately to managers, agricultural producers and other water users, to ask the following questions: have the irrigation and drainage systems really performed over the last 40 years and solutions worked as claimed? If not, is it a problem of implementation or do we need to revisit our solutions and our understanding of irrigation and drainage systems? Are traditional performance indicators pertinent in the new context and the set of challenges the region is facing? What are the implications if renewed investment in irrigation and drainage systems is to be effective?

Key Issues and Challenges

Irrigation contributions to food security, poverty and economic development over the last 40 years in Asia are not evident. By 2005, cereal production had tripled, real grain prices had declined by 40% and the production of fruit, vegetables and feed had exploded. The multiplier effect of investment in agriculture and irrigation on rural development and poverty alleviation is documented. Two main

periods in public irrigation evolution can be distinguished: (i) the post-colonial and cold war period where resources were abundant, dominated by engineering and agronomy, aiming at food security, with supply-driven system management, fixed crops, essentially cereals, and (ii) the period since the 90s, focused on improving livelihoods and incomes, with less regulated and more diversified cropping systems, concerned with increased scarcity of resources, farmer-oriented management, deploying multi-disciplinary approaches, with a switch from surface to conjunctive use and pressurized systems, and substantially increased cropping intensity. This does reflect a deliberate shift in public policies and the way irrigation and drainage systems are looked at, but this evolution has frequently happened in spite of or against public irrigation agencies. The region is changing fast. Wealthier city dwellers have new dietary demands requiring shifts in agriculture. Growing a range of crops requires a different irrigation regime than that needed to supply water to large areas planted with one or two cereals. Farmers have taken advantage of improved access to markets to diversify their activities and produce higher-value niche crops.

The large-scale, centrally managed irrigation schemes, but also the traditional farmer-managed irrigation systems, were not designed to be demand-driven or provide the reliable, flexible and equitable year-round water service that modern farming methods require. Beset with problems of poor design and maintenance, salinity and water logging, many schemes are in decline. Efforts to rehabilitate them have, at best, mixed results. With poor service provision and lack of effective management, farmers have taken irrigation into their own hands, pumping water from aquifers, rivers and drain, investing in on-farm storage ponds to augment and better control their water supplies. Privately sourced groundwater now represents the bulk of irrigation in large parts of South, East and Southeast Asia. Unregulated development of this "atomistic irrigation" has boosted economic and efficiency and productivity gains, but has resulted in excessive pressure on the resources. Efforts to reform irrigation schemes by transferring management to farmers have had poor results in terms of improving irrigated agricultural productivity, services to farmers, and the financial resource base for operation, maintenance. These reforms certainly suffered from implementation issues, but many doubt the capacity of irrigation institutions to reform.

As water scarcity is becoming a key issue, pressure on agricultural water use to become more 'efficient' is increasing, but water conservation policies, strategies and investments are often founded on a misunderstanding. Local productivity and efficiency gains do not mean that more production will be possible with less water. Increasing efficiency means that consumption is increased as the service more precisely and uniformly matches water needs. Irrigation losses and inefficiency appear high but most of these losses return to the basin as return flow or aquifer recharge, and can be used downstream or serve environmental or other functions. Irrigation and drainage systems provide water delivery and drainage services to farms and multiple uses, services and functions, including: fish farming,

domestic and industrial water supply, navigation, groundwater recharge, and flood mitigation, support for biodiversity, micro-climate, etc. Reducing water diversions or applications may end up saving no water, increasing water depletion, or merely reallocating water.

Opportunities

To the questions asked in the introduction, we can now give the following answers. Have the irrigation and drainage systems really performed over the last 40 years and solutions worked as claimed? No and no. If the sector has in general delivered expected results and responded to drivers of change and challenges, this has often happened not because of public interventions but because of individual and private initiatives. The traditional set of solutions has largely failed to solve internal problems of the sector or to respond effectively to a rapidly changing strategic landscape. No, the failure is not essentially a problem of implementation and we need to revisit our solutions and our understanding of what irrigation and drainage systems are. Many systems are now a mixture and overlapping of formal and informal irrigation irrespective of their size, and they need to be understood as such. It is no longer adequate to consider them as discrete objects in the river basins. The definition of the systems and their management domains have to consider not only the irrigated command areas but the whole landscape, dependent or affected ecosystems, as well as the multiple uses and functions that they provide. Farmers themselves have changed with diversified livelihoods.

The evolution of the irrigation and drainage systems must recognize that they are much more open than traditionally thought, and have to respond to drivers of change from top and bottom. Certain performance indicators remain pertinent such as economic and financial viability while others need to be revised, combining productivity and efficiency considerations, provision of ecosystem and other services, the quality of service delivery to farmers remaining a core objective. In terms of poverty alleviation and food security performance, weighing different options should consider whether there are better options for farmers than increasing production as the means to achieve food security understood as availability, access, nutrition and stability.

The opportunities lie in the recognition of the dynamics at work and the complex and open nature of the irrigation and drainage systems. The shift from rural to urban living has provided farmers with more options. Some have quit farming for city-based jobs, others have become part-time farmers. Those remaining have taken advantage of improved access to markets to diversify their activities and produce higher-value crops. Far from being passive recipients of official irrigation development and management, they are better educated and have an enormous capacity for innovation, investment and supporting service costs if the service offered is the service they need and irrigation is a profitable proposition.

Recognizing the multiple uses of irrigation and systems may lead to better informed decisions, optimizing the total productivity and uses, improving the financing platform for management, operation and maintenance and upgrading of systems, and changes to operation strategies. Opportunities for the private sector to help improve water delivery exist but are largely untested. Irrigation departments could outsource irrigation services, create public-private partnerships or provide incentives for irrigation officials to act as entrepreneurs in publicly managed operations. Integrated water resources management (IWRM) provides opportunities to recognize the complexity of systems, their links with other sectors and uses and position in the basins and for improved governance and dialogue among users. This will require that approaches and instruments are adapted, where needed, to informal water economies. IWRM and water resource managers must understand agricultural water management and depart from standard recipes for the irrigation sector reforms.

Recommendations/Findings/Options/Questions

Taking a fresh look at irrigation and drainage systems, the challenges the region is facing, the goal of securing food security leads to redefining key objectives as improving agricultural water productivity and service to farms and other water users and proposing five key strategies for future interventions:

1) Modernize yesteryear's schemes for tomorrow's needs;
2) Go with the flow by supporting farmers' initiatives;
3) Look beyond conventional PIM/IMT recipes;
4) Empower all stakeholders through knowledge; and
5) Invest outside the irrigation sector.

Knowledge and support tools and methodologies exist to implement these strategies, transform large-scale irrigation systems and promote various forms of atomistic, small-scale and large-scale irrigation systems, long-term sectoral planning and management and an enabling environment.

Obstacles to changing the outlook of the sector must not be underestimated. Policies and reforms imposed from outside have not lived up to expectations, and the capacity of external development partners to impose them will continue to erode in the region. Capacity building and changing practices and results on the ground can serve as a basis for developing a broad constituency to effect the changes in governance and policy and the fundamental sectoral reforms that are needed. In the long term, this solution will entail overhauling the educational establishments and their curricula, for new generations of decision makers, experts, consultants, managers, and operators and farmers to be equipped with new concepts and knowledge to embrace, support and implement a change agenda. This change agenda needs to be clarified now to ensure that present opportunities for investment make this change agenda possible, rather than more difficult.

Addressing the problems of irrigation and drainage system performance in isolation is no longer possible. A broader strategic framework of economic, food and water security is needed. In order to achieve a coherent, effective and feasible set of policies, strategies and interventions, the following are needed:

- Developing a solid water accounting foundation;
- Improved processes for decision-making and negotiation among stakeholders;
- A focus on the Water, Energy and Food nexus;
- Comprehensive risk management strategies for national food security policies; and
- Progress on monitoring of investments and results.

Lastly, explicitly addressing the following policy dilemmas, trade-offs and difficulties will be critical:

- Managing transitions: supporting resilience or a combination of improvements and exit strategies;
- Managing the informality of the water economies;
- Economic water productivity vs. equity and other strategic goals;
- Resource use efficiency vs. resilience and redundancy;
- National objectives vs. local and river basin objectives;
- Political feasibility: "ideal" vs. second-best options; and
- Realistic financial arrangements for water operators vs. incentives for performance.

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