Performance Issues in Irrigation and Drainage Project

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

Introduction

The countries of the Asia Pacific region are undergoing relatively rapid transitions from largely agrarian rural societies to increasingly urbanized communities, with diverse employment opportunities, increasing incomes and changing aspirations. As ADB and other development partners assist countries manage these transitions, rural development investments must adapt to the changing needs of both the rural and urban communities

The good news is that ADB project performance in irrigation and drainage has been steadily improving and, based on the ADB Independent Evaluation Department (IED) 2009 review (ADB, 2009) projects approved in the 1960s had a success rate of 33.3%, improving to about 40% success rate for the 1970 approvals and a further improvement for projects approved in 1980s at 44.7% and 61.5% in the 1990s. However, there is still room for improvement to ensure sustainable food and water security is achieved to support the Asia Pacific region's economic development.

As developing member countries, ADB and other development partners consider future investments which will be needed to ensure food and water security for the population of the Asia Pacific region the lessons from these earlier investments must be adequately considered. This paper will draw key lessons from recent ADB and World Bank (World Bank) evaluations of investment projects in irrigation and drainage.

Key Issues and Challenges

Since ADB started its operations in irrigation and drainage in 1969 with a loan for the Tajum Irrigation system in Indonesia. By 2011, it had extended financing of about 7.3 billion to finance irrigation and drainage (I&D) components of rural development projects amounting to $20.5 billion (Table 1). Irrigation and drainage represents about 25% of the total water projects[1] of $29.5 billion in the period 1969–2011. The ADB (Figure 1) and World Bank (Figure 2) investments in I&D show a broadly similar pattern, with a period of substantial investments in the

1 Comprises of Rural Water – irrigation and drainage and rural water supply and sanitation; Urban Water – urban water supply and sanitation, wastewater management and environmental improvement; Basin Water – integrated water resources management, hydropower facilities, flood management and conservation and management of watersheds, wetlands and ecosystems.

1970s and 1980, and then a rapid decline in the 1990 through to about 2004. The spike in food prices in 2008 and the apparent end of the era of falling food prices, coupled with repeated price spikes, is driving a renewed focus on food security, rural development and irrigation and drainage.

The ADB long term strategic framework (LTSF) 2008–2020, Strategy 2020 (ADB, 2008) focuses on three complementary strategic agenda: (i) inclusive growth, (ii) environmentally sustainable growth, and (iii) regional integration, delivered through five core areas of support. The core areas of support are (i) infrastructure, (ii) environment, (iii) regional cooperation and integration, (iv) finance sector development, and (v) education. Agriculture and rural development is a second tier of operational area to be supported, mainly through infrastructure for rural transport, irrigation and water systems, microfinance, natural resources management, and strengthening regional cooperation and integration. The ADB sustainable food security operational plan (ADB, 2009a) identifies important complementarities between agricultural development and ADB's core operational areas, while the Water Operational Plan (ADB, 2011) commits ADB to investments to improve the use and management of water across all areas of operations.

The 2009 IED study reviewed the performance of 139 ADB financed irrigation and drainage sector projects to identify key lessons to guide future investments. The following sections highlight selected issues that should be taken into account as I&D agencies and development partners design and implement projects to support water and food security in the coming decades.

Project Design and Implementation

Design The majority of ADB financed projects are developed in consultation with the proposed executing and implementing agency with the support of project preparation technical assistance consultants. However the need to reformulate projects during implementation due to inadequate preparation resulting from a range of causes, including inadequate data is too frequent.

Costs The actual implementation costs for almost 75% of the evaluated were lower than the appraisal estimates, by up to 74% as a result of (i) changed project scope, (ii) devaluation of the local currency against the, (iii) cancellation or replacement of components with those costing less, (iv) lower consultancy costs and lower contract rates for civil works, and (v) high allowances in contingencies due to projected changes in currency rates and international inflation. Cost overruns on projects were up to 162%, due to repeated natural disasters requiring reconstruction and large increases in the cost of civil works, consulting services, land acquisition, and administration charges.

Project Implementation Project duration was in the range from 4 to 17 years. None were completed within the agreed implementation period with time overruns of more than 3 years on 50% of projects, delaying the start of benefit streams. The projects had different degrees of organizational and management. Unsatisfactory project management and organization was characterized by: (i) lack of government guidance; (ii) slow decision making in the hiring of consultants, evaluating contract bids, and awarding contracts; (iii) overcomplicated organizational setup at appraisal; (iv) project office far from sites; (v) high turnover of project staff; (vi) changes in government structures; (vii) lack of authority of the coordinating director; and (viii) ADB's inadequate assessment of the capacity of the government agencies to be involved in the project. The need for improved quality at entry reviews and regular supervision during implementation is evident in many projects.

Monitoring and Evaluation – In the same way that poor access to data was found to adversely impact the design of some investments, a common failing is the absence of an effective benefit monitoring and evaluation (BME) system. IED recorded that "It is noteworthy that BME was planned for several projects but was not carried out for all, especially the baseline conditions. Thus, the extent of the impacts of project interventions, though generally delivered, could not be quantified."

Project Outcomes

The IED evaluation report confirmed that the investments projects influenced agricultural productivity on over 1.53 million ha, with individual projects covering 2,300 to 500,000 ha.

Crop Production – All the irrigation projects achieved an increase in crop production were irrigation services reached, with 5%–40% increases in yields reported and rice yields of up to 6.0 tons/ha from the combination of irrigation and use of high-yielding varieties. Cropping intensities also improved by 100%–200%.

Participation and water user organizations – Development of water user organizations to be involved in system operations and maintenance is a common project output. However the sustainability of these organizations is dependent on how early in the phase of project development they become involved and were aligned with the concept of becoming the "owners" and primary beneficiaries of the project. A strong sense of ownership was beneficial in getting water users involved in the design, the scope of work, cost of construction, and ultimately O&M costs. Local communities were able to give valuable suggestions to the design consultants based on their local knowledge.

Economic Results The economic internal rates of return (EIRRs) of projects are generally lower than the estimates at appraisal. Common factors leading to the reduced EIRRs include (i) falls in international price of rice at the time of

the evaluation, (ii) increase use of fertilizers, and (iii) reductions in incremental irrigation area and lower incremental rice yields hectare than assumed at appraisal. In addition a range of differences between assumed costs and actual costs and incomplete assessment of relevant costs, such as (i) opportunity costs of water and electric power for other economic uses; (ii) distortions in financial prices against economic values of crops leading to farmers planting more financially attractive crops than the assumed crops with higher economic value; and (iii) inclusion of additional benefits derived from road developments improving access to areas irrigated by the project as against the costs of roads constructed by the project but not within the irrigated areas.

Where development of farm-level infrastructure was included in the project design improved on-farm water management helped realize agricultural productivity targets and increased economic returns. However, long delays in project implementation led to substantial falls in EIRR compared to appraisal estimates. Overoptimistic estimates of incremental production at the time of appraisal, and a substantial reduction in the price of rice was a common cause of reduced EIRR at review.

Socioeconomic Impact – For the majority of I&D projects the positive socioeconomic impacts are increased farm incomes due to increases in agricultural production, improved access to markets and social services. In some cases new sources of nonfarm income were found to have increased.

Sustainability of outcomes – Investments in I&D systems seem to be locked into a "build-neglect-rebuild" cycle which adversely impacts the services provided to the farmers and the economic return to the investment. This cycle frequently seems to be the result of a combination: (i) failure of critical structures, due to poor location or design, damage from extreme events, or poor construction; (ii) inadequate funds for O&M, (iii) lack of beneficiary participation and commitment to pay service fees, and (iv) inadequate routine and periodic maintenance works.

Highly sustainable projects tend to have characteristics including: (i) adequate availability O&M funds (whether from the government, the WUAs or users directly), (ii) well-performing WUAs with a strong sense of ownership of tertiary and farm-level irrigation facilities, and (iii) recognition that financial benefits come from well-maintained irrigation facilities. Owner-operated equipment, such as tubewells and pumps, are generally maintained better than shared facilities.

Operation and maintenance - The World Bank OED evaluation found that common pervasive problems persist in (i) operation and maintenance, (ii) cost recovery, and (iii) with WUAs. Failure of O&M is considered the most important because it directly affects benefits and sustainability. WUA are considered useful because they give members a sense of ownership, while cost recovery is a matter of transfers between governments and irrigators, which may affect incentives to irrigate efficiently. In part the drive for irrigation cost recovery stems from the presumed link between cost recovery and better operation and maintenance.

Recommendations

The recent spikes and sustained increases in food price, increasing recognition of the potential for problems in providing water security for growing populations and economic activities represent new opportunities to revitalize irrigation and drainage services in Asia. However following the well trodden path of repeated rehabilitation of existing irrigation infrastructure, in the absence of effective institutional reform, will not be adequate to meet the demands of increasing population, accelerating loss of lands to other uses, competition for increasing scarce water resources, and climate change.

Irrigation and drainage services must become just that—services to the agricultural production industry. In many locations a continuation of smallholder, almost subsistence agriculture will persist. However to feed the growing cities and the wish for increased diversity of diets will require more flexible and responsive irrigation services than the large scale, largely rice focused, irrigation systems developed in the past 40–50 years. Farming communities are changing—new off-farm employment opportunities are leading to labor shortages and may be expected to accelerate mechanization and calls for land reshaping, if not reform. Temporary migration for work, to cities or abroad, is changing the role of agriculture in rural household incomes in many countries.

The changes required to address the changing environment in which irrigated agriculture operates highlight the need for increased involvement of service providers and users in the design and implementation of investments in the I&D sector. Furthermore, the need for effective support services is evident if farming communities are going to adapt and respond to the needs of society. Government and private sector operators will need to find ways to deliver these services.

Table

ADB Investments in Water and Food 1969–2011

Sub Sector	Investment $ billions
Agricultural Production and Market	5.28
Agriculture and Rural Sector Development	2.44
Forestry, Fisheries and livestock	2.67
Irrigation, Drainage, and Flood Protection	6.39
Natural Resources (Land and water)	3.68
TOTAL	20.47

Figures

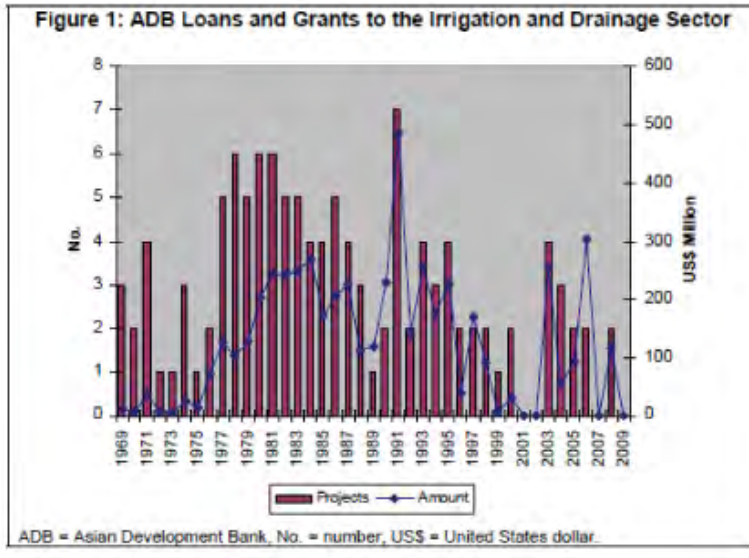

Figure 1 ADB investments in Irrigation and Drainage 1969–2009

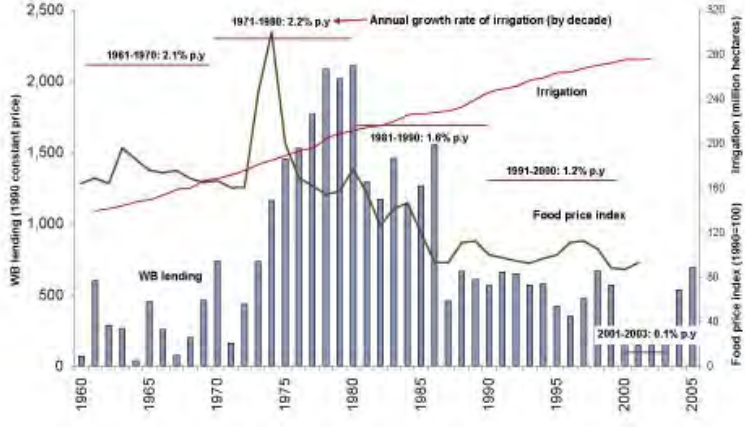

Figure 2 World Bank Investments on Irrigation and Drainage 1960–2005

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