



2nd Asian Irrigation Forum

Securing Water and Food for the Future

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Thematic Paper

Session 3: Improved Financing: *Delivering Results*

I. Introduction

1. This paper suggests conditions for creating greater financial sustainability for Asia's surface irrigation. This includes: (i) sustaining and enhancing funding for investment from existing sources, principally national governments and international financial institutions (IFI) through viable and more attractive irrigation and drainage (I&D); (ii) diversifying sources of investment finance by creating the conditions for attraction of commercial sources, including private equity; (iii) improving the supply of reliable recurrent funding for management, operation and maintenance (MOM) from water user charges and other sources, while reducing the size of public subsidies; and (iv) integrating investment and recurrent finance by coupling the planning and provision for capital and operation and maintenance (O&M) costs.

2. The financial sustainability of irrigation is inseparable from, and a condition for, making irrigation agencies more efficient and accountable. This includes: (i) creating a sufficient degree of financial and managerial autonomy for the irrigation agency (IA); (ii) improving IA's internal management systems for greater efficiency and financial autonomy, including asset management planning; (iii) ensuring existing infrastructure is adequately maintained and provide satisfactory services to farmers for the design life; and (iv) creating a clear and functional relationship between the IA and water users' associations (WUA), including adequate consultation, participation and delegation of responsibility.

a. The Long Road Ahead

3. Most Asian I&D systems are a long way from this kind of financial sustainability. Reform has proven difficult, challenges are interrelated, and the solution to one set of issues depends on progress in others. A fundamental obstacle to progress is disagreement amongst politicians, officials and professionals about the best approach to reform—should the main thrust of change be managerial, institutional, technocratic, infrastructural, or financial and, how best to include the private sector. Comprehensive and far reaching reforms will take time, but the urgency of the situation forces us to consider more radical options.

b. Possible Workable Options

4. The Report of the High-Level Panel on Financing Infrastructure for a Water-Secure World¹ made the case for water infrastructure becoming more efficient and adapting itself to make it more appealing to both existing and new sources of funding. The remainder of this paper sets out the different options and approaches to place I&D sector onto a more sustainable financial footing. The most useful approach is to identify the following four types of actions which may be applied in combination:

¹ Water-Fit to Finance? World Water Council and the Organization for Economic Cooperation and Development, 2015.

- **Preconditions** – essential before other reforms can be made;
- **Low-Hanging Fruit** - relatively easily and quickly done;
- **No Regret** - undertake irrespective of what is decided about other issues;
- **Option Preserving** - not closing off other potentially suitable options.

II. Current Situation

5. Over the next few decades, Asian I&D faces a huge transformation to meet the needs for food, income and employment of its swelling populations, within tightening land, water and environmental constraints. There is significant opportunity for improving the performance and productivity of surface I&D schemes to release water for other uses. Much of the growth in irrigated agriculture has come from the development of farmer-owned tubewells. With rapid pumping rates in Asia (India consuming over a quarter of total global groundwater consumption), the continuing growth of this source is at risk from declining and contaminated aquifers and unsustainable energy subsidies.

6. Large scale irrigation systems are past their design lives – many were constructed over a century ago. They have become increasingly dysfunctional and need significant new investment for their modernization, improved performance and better services. Management and accountability needs to be improved at all levels of the I&D service chain. O&M of the infrastructure needs to be fully funded and properly executed for optimized service delivery during its design life. Public authorities are keen to share the financial burden of investment with others, and to see water users make a greater contribution to the recurrent costs of O&M. IAs need greater financial autonomy and WUAs require an appropriate degree of responsibility for managing the infrastructure and services.

7. Farmers are at the base of I&D's financial edifice. Crucial to the reforms is for farmers to receive good service and pay for this. To date, irrigation water charges have been low and only a small percentage of farmers pay the fee. In India, many states charge no more than US\$10 per hectare per year; and for surface irrigation schemes in Bangladesh, collection rates are no more than 10 percent of the billed revenue.²

8. Most large public surface irrigation are locked in a vicious cycle of deteriorating infrastructure, poor service, low charges, poor revenue collection, underfunded O&M, delayed essential maintenance, and system failures. These lead to further deterioration of the assets and worsening service delivery. Without reliable supplies, farmers are unwilling to take the risk of planting more productive crops. As a consequence, the irrigated area on many surface irrigation systems has decreased, with the actual area under irrigation less than the designed area.

III. Challenges

9. The macroeconomic impact of the lagging performance of I&D is causing rising concern. In a significant departure, the International Monetary Fund (IMF) has devoted an entire report to water management.³ In a specific reference to Pakistan, the report states that *"The bulk of Pakistan's farmland is irrigated through a canal system, but canal water is vastly under-priced,*

² Water charging in irrigated agriculture. An analysis of international experience, Food and Agriculture Organization (2004).

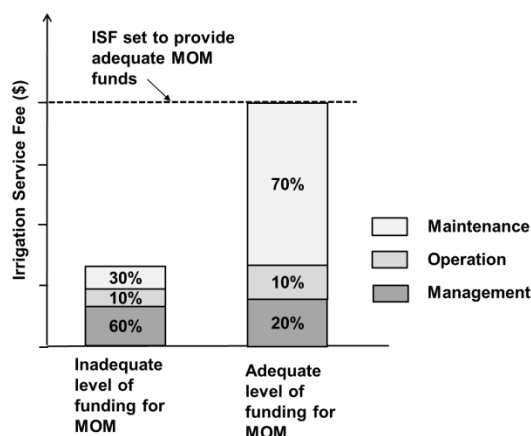
³ Is the Glass Half Empty or Half Full? Issues in Managing Water Challenges and Policy Instruments, International Monetary Fund (2015).

recovering only one-quarter of annual operating and maintenance costs. Meanwhile, agriculture, which consumes almost all annual available surface water, is largely untaxed.”

10. The poor financial and economic performance of I&D is a cause-and-effect of its difficulty in attracting sufficient finance for recurrent O&M and the cost of rehabilitation and modernization. There has been a widespread failure to recover sufficient O&M costs from charges to farmers which has not been fully compensated by transfers from government budgets to IAs. The result has been a decline in the standard of service and progressive deterioration of infrastructure which makes farmers become even more reluctant to pay more for their water. Commercial sources of finance like banks are deterred by the poor cash flows typical of this sector.

11. The MOM analysis indicated that in well-performing and well-maintained gravity-fed I&D systems, the maintenance funding component comprised around 70 percent of the total MOM costs.⁴ The proportion of staffing cost becomes high in systems with insufficient MOM funds; otherwise it remains in a reasonable proportion in systems with sufficient MOM funds (Figure 1).

Figure 1: Irrigation service fee in relation to MOM funds



Source: Irrigation Management: Principles and Practices, Dr. Martin Burton, 2010

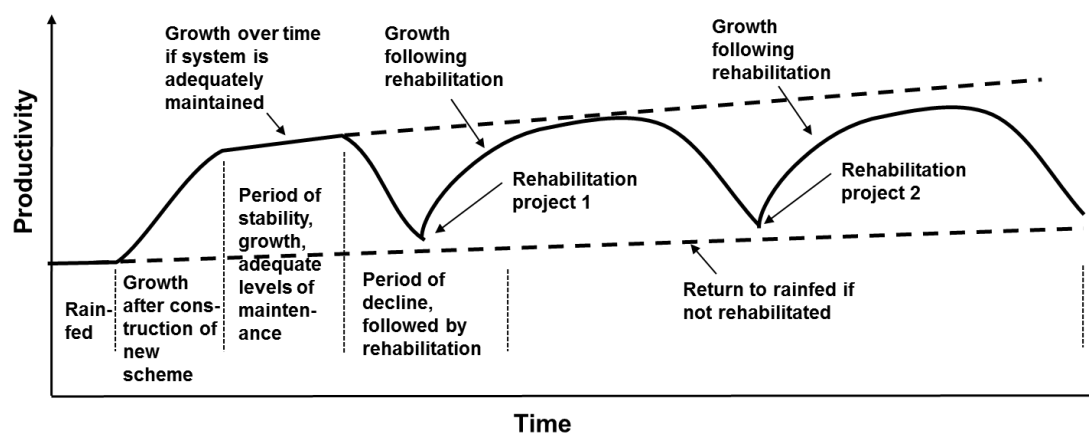
12. The failure to provide adequate funds for maintenance of the I&D system results in the build-neglect-rehabilitate-neglect cycle (Figure 2). In many cases, though physical infrastructure has been rehabilitated, there has often been insufficient change in the way that I&D agencies have functioned or in the level of funds allocated to maintenance. As a consequence, some schemes have been rehabilitated more than once in the last 30 years. Though production on the rehabilitated scheme may improve following rehabilitation, little attention has been paid to the production loss during the period of declining performance of the infrastructure.

13. The total lost production potential is the cumulative seasonal or annual reduction in production caused by the decline in the condition and performance of the irrigation system. The lost production in over 30 years was estimated at Indian Rupee 52.807 billion (US\$880 million equivalent) in the World Bank funded Madhya Pradesh Water Sector Restructuring Project, serving 50,145 ha mainly in the Bhind District, with a rehabilitation cost of US\$13.4 million

⁴ Burton, Martin. 2010. Irrigation Management: Principles and Practices. CABI Publishing, Wallingford, United Kingdom.

equivalent.⁵ The maintenance cost for the same period was estimated at US\$25.1 million.⁶ The lost production over the same period is 35 times greater than the cost of providing adequate annual maintenance.

Figure 2: The depressing cycle of build-neglect-rehabilitate-neglect for irrigation schemes



Source: Burton, 2010

14. Despite the implicit understanding that physical infrastructure requires maintenance, it appears to be missing in the irrigated agriculture with limited and inadequate maintenance budgets resulting in lost production and a requirement for rehabilitation (unless it is accepted that the system can return to rainfed agriculture).⁷

IV. Opportunities, Approaches and Options for Financial Reform

15. Improvements can start with IAs adopting modern management practices.⁸ The essence of these reforms is to follow working practices (such as benchmarking, asset management plans, use of targets, routine monitoring of the state of systems) commonly and successfully used in private companies. A relatively simple option would be to contract external individuals for specialist services like information technology and financial management.

a. Top-down or bottom-up drivers

16. Reform demands strong political will, and when it exists, change can be imposed from the top. The bottom-up viewpoint draws from the experiences of irrigation management transfer (IMT) in Mexico and Kyrgyzstan. In this case, empowered WUAs gradually take over “upstream” activities and responsibilities from the IA.

⁵ Burton, Martin. 2014. Mission Report, Madhya Pradesh Water Sector Restructuring Project, World Bank, June, using data from the project's impact study (WAPCOS. 2013. Impact assessment study of Chambal Irrigation Project under W.R. Division, Gohad, Bhind District. WAPCOS Ltd, Gurgaon, Haryana, India, July).

⁶ At a rate of Rs 1000/ha/year (US\$ 17/ha/year).

⁷ This situation has been accepted for some irrigation systems in Romania where pumped schemes have been found to be uneconomic since collapse of the former Soviet Union.

⁸ The Thematic Paper 1 for this Second Asia Irrigation Forum describes this happening in Madhya Pradesh, India. The Barind project in Bangladesh is another case in point (described in a presentation by Dr Asad Zaman at the World Water Forum, Korea, April 2015).

17. The IFI-supported projects have shown a mixed performance on WUAs. The main reason has been the lack of required changes in the IA. It may be unrealistic to expect serious reforms to happen at lower levels without corresponding changes in the upstream main body of the IA. A comprehensive solution might not be able to attract enough political support to overturn vested interests or should one wait until crisis (e.g. looming food shortage, a spike in food prices, shortage of water in a major irrigation system) before a comprehensive package might be feasible.

b. Status of Irrigation Agency – department, parastatal or full financial autonomy

18. Whilst irrigation remains within the public sector, gains can be had by offloading I&D functions to a separate, semi-autonomous para-state corporation. This would have daily operating flexibility and powers over staffing, managerial and certain financial domains. The benefits to be expected are those from standard management theory – efficiency, accountability, flexibility, visibility, etc.

19. Some early advocates of reform go further and insist on a change in the status of the IA to give it (eventual) full financial autonomy.⁹ A financially autonomous IA would drive financial discipline throughout the whole system, involving repayment of debts and full recovery of costs from farmers. Without this top-down pressure, reforms at lower levels would be incomplete and lack momentum.

i. Vertical restructuring

20. A monolithic vertical structure may be inefficient. According to this view, irrigation management should be clearly broken down into: (i) policy-making (e.g. government ministry has a formal performance contract with the IA); (ii) sufficient managerial autonomy and financial delegation to IA leading to full financial autonomy; (iii) third party operator between IA and farmers for bulk water purchase from IA and supply to farmers (e.g. WUA, commercial company etc.); and (iv) WUAs or their federation have delegated rights and responsibilities of consultation, participation in decision making, lower level managerial roles, irrigation service fees collection, O&M, etc.

21. While this kind of structure would provide accountability and transparency, it could also destroy economies of scale and weaken the professional cadre.

ii. Managerial Reforms

22. In most IAs, there is ample scope for the adoption of modern management like the use of performance targets, life-cycle asset management and costing, coupling of MOM and capital costs, etc. Staff training programmes would be essential (including sending officials on management courses).

23. These internal reforms could be facilitated by co-opting and buying-in private expertise in the forms of: (i) use of external trainers; (ii) co-opting individual specialists to perform specific roles within the IA; (iii) employment of consulting companies as sub-contractors for certain

⁹ Repetto, Robert (1986): Skimming the water: rent seeking and the performance of public irrigation systems. Research Report no. 4, World Resources Institute, Washington DC, December; Small, Leslie E. & Ian Carruthers (1991): Farmer-financed irrigation: the economics of reform. Cambridge University Press, UK.

standalone tasks; and (iv) use of a private company to “shadow” the IA, providing management expertise, technical support and training.

24. The main argument against managerial reforms in isolation of other changes is that the IA would lack any overriding incentive to carry them out. Bureaucratic inertia would be likely to prevail over the spirit of reform.

c. Investing in infrastructure

25. The dilapidated I&D system does not attract WUAs or other organizations because of the requirement for upfront high upgrading cost. IAs need investment in infrastructure improvement. Governments, IFIs and other investors can play an important role in demonstrating evidence of serious reforms prior to committing further financing.

26. At lower levels of irrigation infrastructure - like the tertiary distribution network - there is a case for undertaking investment at a measured pace. This would be in tandem with the empowerment and growth in responsibilities of WUAs, especially where these have fully-delegated powers. Financial resources would be made available in line with the needs identified by the WUAs or other third party agents.

d. Tariff reform

27. From farmers’ perspectives, tariff reforms may not be successful unless there is advance action in ensuring: (i) adequate and reliable irrigation water is supplied to the farm inlets; (ii) a favorable policy environment is provided that results in reasonably good profitability; and (iii) other services to the farmers are adequately provided (seed of improved varieties, marketing access for high value crops, and stable commodity price in line with the input costs). Farmers operate in input and product markets that are highly distorted through taxes, price controls and subsidies. The combined effect is to dilute any incentive effect from irrigation water prices. Whilst farmers may be willing-to-pay, politicians are invariably unwilling-to-charge for their own electoral reasons.⁹

28. Both the economic and environmental roles of irrigation charges depend on farmers’ responding to higher charges by reducing their use of water. If this is not the case, or if sufficiently high tariffs are not feasible, other means may have to be resorted to in order to achieve economic and environmental aims. However, none of this invalidates the use of irrigation charges to defray the financial cost of O&M. Indeed, tariff revenue is the most sustainable source of funding for these costs in the long term.

29. Even if higher irrigation tariffs is the preferred option, there remain a number of issues:

- Do IAs and WUA have enough information on their actual MOM costs as the basis of the tariff. The answer is no in many cases, hence the need for more work on this.
- Should tariff increases precede, or follow, visible improvements in the state of irrigation infrastructure and services.
- What should be the basis and structure of charges, and the mode of assessment and collection.

⁹ Malik, Ravinder P.S., S.A. Prathapar & Madhavi Marvah (2014). Revitalising canal irrigation: towards improving cost recovery. IWMI Working Paper 160, Colombo.

- Who should set the tariff – governments, the IA, or the WUA. The answer would depend on the delegation of responsibilities down the chain. In a vertically monolithic system, the government or IA would set charges; with delegation or IMT. The lower level organisations would set and collect tariffs, while paying a fee for the bulk supply of their water.
- Should farmers pay for the administrative overheads involved in the supply of irrigation water. In the case of IMTs, the administrative overheads of the IA would in theory be covered by the bulk water charges levied by the IA on the WUA. They would cover their own MOM through the ISF they levy on their farmer members. Governments may decide to subsidise the overheads of the IA for wider social and economic reasons, such as food security, flood management, employment generation, etc.
- From the viewpoint of ensuring adequate maintenance, the crucial point is that the ISF payable by farmers should at the minimum cover the needs for maintenance at the level of management for which they are responsible.

e. Contribution of public-private partnerships (PPPs)

30. PPPs can take various forms - management and service contracts, leasing of irrigation assets, concessions for the use of such assets to earn revenues involving some investment, and various kinds of contract for creating new stand-alone assets (build-operate-transfer, build-own-operate-transfer etc.), some of which involve temporary ownership of the asset by the private partner, and its eventual transfer back to the public client. The higher the level of risk to be adopted by the private sector partner, the higher are their expected returns.

31. In Asian irrigation systems, full divestiture of assets from public to private ownership can be dismissed as an unfeasible option. A special case is IMT, in which the ownership as well as management of irrigation assets is transferred from public authorities to local associations of farmers. This is best regarded as divestiture to local collectives rather than “privatization” in its conventional definition.

32. The key feature in all these forms is transfer of risk. There are other ways of engaging private expertise that do not involve significant risk transfer – secondment of personnel, use of consultants, outsourcing of certain specialised functions, etc. Even where genuine risk transfer is involved, it is common to find that the main impact has been through the acquisition of expertise, rather than attraction of major new funding.

33. In considering irrigation reforms, PPP solutions have tended to receive an exaggerated prominence, as compared with more “organic” and internally-generated processes. There are few successful international cases of this that are relevant to Asia, and practically none in Asia itself apart from the Muhuri irrigation project and two other irrigation systems in the ADB investment pipeline in Bangladesh.¹⁰

34. The conditions for a successful PPP involving leasing, concessions or “greenfield” contracts are currently largely absent in most Asian countries.¹¹ There is little political will to cede the required degree of control to private operators.

¹⁰ An exception is the Megech-Seraba project in Ethiopia, sponsored by the World Bank, consisting of an enhanced management contract awarded to BRL

¹¹ A new piece of infrastructure, as opposed to the rehabilitation of an existing one.

35. Among the best-known cases, the Guerdane scheme in Morocco is a concession contract for the creation of new infrastructure for surface irrigation to supply to citrus farmers to reduce their dependence on groundwater. It benefited from generous government co-financing for investment costs, and various forms of public guarantees against hydrological and demand risk. The farmers produce a profitable crop for local and export markets.

36. The West Delta project in Egypt was another concession project, but which has been formally terminated before award of contract.¹² This was for the provision of new surface irrigation infrastructure to existing farmers producing fruit and vegetables for local and export markets. The contract suffered serious delays, caused partly by internal Ministerial changes, aggravated by the international financial crisis, and shortly afterwards the political turmoil in Egypt. In these risky circumstances the project failed to attract competitive bids.

f. Tapping new sources of finance and lending modalities

37. This approach would focus on:

- Efforts to obtain more funds from existing sources (national governments, IFIs, plus partnerships with other relevant agencies). This could include the greater use of new modalities of finance such as Results-Based Finance and Output-Based Aid;
- Concentrating on making irrigation “fitter to finance” by internal managerial and financial reforms in IAs, asset management plans and costing, coupling recurrent and capital costs, greater flexibility between government planning and budgetary categories, etc. All of these would optimise the use of funds, minimise future requirements and improve the sector’s attractiveness to potential funders); and
- Staking a claim on the new climate funds by selecting components of projects that satisfy their funding criteria.

38. There are undoubted opportunities in all these areas. ADB’s recent agreement to merge its concessional funds (Asian Development Fund) and ordinary capital resources would enable a doubling of lending to the water sector (including irrigation) from the current \$2 billion annually to \$3.5 billion - \$4 billion from 2017 onwards.

39. Making a step change in the inflow of finance will depend on serious reforms to the I&D sector which leaves it more efficient and generating greater cash flow through greater revenues and reduced outgoings. Even access to finance at current levels from national governments and IFIs will require a degree of reform and acceptance of new lending modalities (e.g. results based lending) and conditions. Any serious access to commercial finance will be conditional on major changes in the creditworthiness of IAs, which is not in serious prospect. The main elements and options for financial reform are summarised in Figure 4.

¹² There is currently a possibility of it being revived in some form.

Figure 4 Elements of financial reform

Structural & Institutional	Financial	Efficiency
<ul style="list-style-type: none"> • Independent status for IA • Financial autonomy for IA • Vertical restructuring • 3rd party operator • IMT & WUA 	<ul style="list-style-type: none"> • Budgeting for I&D • New investment • Tariffs • New sources & better use of existing ones 	<ul style="list-style-type: none"> • Managerial reforms in IA • External support & capacity building for IAs & WUAs • PPPs

V. Conclusions

40. Financing is more than just finding the money for investment and operations of I&D. The choice of the means of financing, and the efforts involved in getting it, have far-reaching implications for the I&D sector. Securing sustainable finance for irrigation goes hand-in-hand with structural and managerial changes that will be necessary on any future scenario for this sector. Getting a sustainable financing system in place will enable these changes to happen more quickly and easily. In this sense, financing can be a powerful agent of reform. Institutional and policy reforms should be plotted with a strategic aim in view. In the short term, priority could be given to measures that fit the following criteria:

- Are they Preconditions for other essential actions?
- Are they Low Hanging Fruit – providing quick “wins” and relatively easy to implement?
- Are they No Regret actions – worth doing (*robust*) irrespective of whatever scenario is assumed for the future?
- Do they Preserve Options for future decisions, unlike actions that pre-empt and exclude future actions?

41. Some options will score well against all, or a majority, of these criteria. Others will not, but will still be important to do if they are unavoidable to meet the eventual goal. With this reservation, the following options, amongst others, would score well on several of these criteria:

- Less segregation of government budgets between capital investment and annual recurrent spending on MOM; possibility of *virement* between budgetary headings;
- Greater managerial, operational and financial autonomy for IAs;
- Adoption by IDs of modern business practices, particularly asset management planning, costing and financing, and the freedom to make necessary forward provision for maintenance and renewal;
- Selective co-option of private expertise to assist the transformation of IDs;
- Closer estimation and monitoring of actual financial requirements for MOM in specific irrigation areas, to provide a firmer basis for setting cost-recovering irrigation charges;
- Where WUAs have sufficient delegated responsibilities, and capacity to implement these, they should be allowed to retain a share of the proceeds of irrigation charges, earmarked for local expenditures on MOM; and
- More conducive financing mechanisms like policy- or results- based lending.

42. Much can be done within existing organizational structures and institutional arrangements to prepare the ground for the necessary changes and adaptation of infrastructure. These will all make future financing easier. However, more radical measures will be needed to produce a step-change in the volume of funding, whether for recurrent or capital investment purposes. Ensuring adequate funding for maintenance is an absolute priority.