Abstract

The need to revitalize Asia's irrigation to support food security in a context of economic transition of the region has been recognized but is complex and will require new perspectives and substantial capacity development in the region, as well as tools and guidelines that better respond to the demand of decision-makers, service providers and water users. A number of countries in the region are embarking in ambitious and forward-looking reform and investment programs to revitalize their irrigation and drainage sectors. FAO, together with a number of regional and global partners and with these countries, has launched an ambitious regional initiative to revitalize irrigation and agricultural water management. Concrete action is starting on a number of fronts and plans are mooted to broader alliances and the field of action. This paper describes the rationale and components of this initiative, its operational components, action already under way as well as future perspectives being developed by the initiative's partners.

Keywords

irrigation modernization, agricultural water management, food security, tools and guidelines, capacity building, policy dialogue, economic transitions

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. 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. 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.

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.

When the food, energy and economic crisis of 2007-2008 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 revived or proposed to revive investment in irrigation systems, which was in a slump, due to changing development priorities and the very success of past development.

There is now a growing consensus in the region that in order to meet these new and more complex challenges, there is a need for the irrigation sector to undergo a significant transformation: there is a need to revitalize the region's irrigation. It is also recognized that new perspectives are required, and that these perspectives will have to embrace the rapid economic and social transitions that the region, and its agriculture, are undergoing. A key question is therefore is how to translate this change agenda into effective action and ensure that present opportunities for investment make this change agenda possible, rather than more difficult. But does this change agenda need to be clarified first so that it is actionable and, when it is, what are critical actions that can be undertaken now, to successful steer the sector into new directions and sustain its evolution?

Key Issues and Challenges

Taking a fresh look at irrigation and drainage systems, the challenges the region is facing and the goal of securing food security, the international community has, in recent years, proposed and agenda for revitalizing Asia's irrigation to sustainably meet the region's food needs (Mukherji, A., T. Facon, J. Burke, C. De Fraiture, J. Faures, B. Fuleki, M. Giordano, D. Molden, and T. Shah. 2009). Key objectives for the sector have been essentially re-defined as improving agricultural water productivity and service to farms and other water users and five key strategies for future interventions have been outlined:

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.

Further analysis by a wide coalition of regional stakeholders has underscored that 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 now required. 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; progress on monitoring of investment and results (FAO-RAP, 2012).

Explicitly addressing a number of 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.

There already exist a number of knowledge and support tools and methodologies 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. Some of these tools developed by FAO such as MASSCOTE are now already in high demand. But are they good enough? Is there a need to improve them to better respond to the demand of decision-makers, service providers and water users?

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. Nevertheless, it has become clearer that changes in governance and policy and, in some countries, fundamental sectoral reforms are needed. In any case, changing practices and results on the ground is needed rapidly and, where the reform process is lagging, can serve as a basis for developing a broad constituency to effect higher level changes. This clearly requires a rapid upscaling of capacity development at all levels and diffusion of ideas and toolboxes. In the long term, revitalizing the sector 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. Mapping the present capacity of the region and gaps to support capacity development, and devising innovative strategies and partnerships to diffuse and generate knowledge is a pressing need.

Nevertheless, certainly, the first thing to do for defining and then supporting an action agenda for revitalizing Asia's irrigation is to recognize that, in fact, there is already very significant movement in the region. A number of countries have already initiated or undergone significant reform or investment that illustrate the decisive, forward-looking and innovative strategies and investments that are advocated. How to further support these innovative initiatives and then build on them to further promote a regional change agenda and boost capacity development in the region is the ambition of a regional initiative launched by FAO and the International Water Management Institute (IWMI) in 2007 and currently under development with a number of governments in the region, as well as local, regional and international partners.

Opportunities

The main reasons that led FAO and IWMI to launch the Regional Initiative for Revitalizing Irrigation and Agricultural Water Governance in Asia Pacific at the 1st Asia Pacific Water Summit (Beppu, Japan, December 2007), at a time when the food crisis of 2007-2008 was unfolding, were two-fold: i/ the lack of attention to the growing challenges of water and food security in the region at the highest levels and: ii/ the lack of traction of irrigation modernization and reform agendas in many countries in the region, in spite of the development of tools and methods, capacity building and advocacy by FAO in the previous 10 years and of the findings of the Comprehensive Assessment on Water of Food led by IWMI. The intention was thus to re-affirm that irrigated agriculture is essential to the achievement of human development and environmental targets in the Asia Pacific. But in transforming economies, the agriculture and irrigation sectors would need to become more innovative, adaptive and forward-looking. In that context capacities were to be continuously updated and irrigation systems regularly assessed and adapted.

The Regional Initiative would build on the existing capacity of the various actors of the agriculture and water sectors in the Asia Pacific region so that it could move towards greater food security, poverty alleviation, environmental sustainability and climate change readiness. Finally, the Regional Initiative would highlight a number of national or river basin initiatives that would show the way forward and inspire the region.

A number of countries in the region (India, Indonesia, Malaysia, the People's Republic of China, Thailand, Viet Nam) agreed to join FAO and IWMI in this regional initiative and its design and development, together with a number of regional and international partners.

By the time FAO was able to mobilize and operationalize resources to support the development of this initiative, in early 2012, the water landscape had substantially changed in the region. As mentioned earlier, the food crisis, combined with a greater concern for water scarcity and climate change had highlighted the need to focus attention again on irrigation at the regional level, in a number of key countries, and among donors including the World Bank and the Asia Development Bank (ADB), which organized the First Asian Irrigation Forum, in Manila, in April 2012, a week after the Regional Inception Workshop of the Regional Initiative in Bangkok. The World Bank, later joined by FAO and ADB, had initiated a regional study on emerging irrigation management modernization concepts in East Asia Pacific. At the regional level, food security

had made an appearance in the proposed political agenda of the 2nd Asia Pacific Water Summit under one of the Summit's focus areas: Economic, Food and Water Security.

More importantly, while, in response to the food crisis of 2008, a number of countries had reacted by increasing investment and short-term support to irrigation following previous templates, other countries had already taken momentous decisions or initiated an agenda of reform. The People's Republic of China had published the 2011 No1 Document on water conservancy and a new water policy in 2012. Indonesia had embraced irrigation modernization and had initiated a process to reform its irrigation policy.

At the Regional Initiative's Inception Workshop, participating countries and regional partners confirmed their interest in joining and developing the Initiative and designed its preliminary contours and regional components. They confirmed key considerations underpin the design of this Initiative:

(1) It is necessary to align objectives and achieve consistency and coherence of interventions at all functional and implementation levels in countries and basins. This ranges from the farmer as the end user of this resource to managers at the basin level, relevant agencies and policy makers as well as other actors and agents of change;

(2) Support for effective practice through the infusion of relevant, updated knowledge, dialogue, capacity building and exchange of experience among decision managers and managers at similar functional levels and other stakeholders and identification of needs for new knowledge and possible sources of appropriate knowledge can be instrumental in achieving the above.

(3) Although they are facing similar challenges and need to address a range of common issues and questions, countries and basins in the region are highly diverse, pursue national development strategies and thus are likely to make different choices and pursue differentiated strategies. Their initiatives however could be supported by exchange experience and developing their capacity on processes and through guidelines, tools, references and communities of practice.

The participants agreed that the initiative should focus on three regional support pillars of activity: 1) Modernization, 2) Capacity building; 3) Policy dialogue (see figure 1 below).

Regional Pillar on Modernization

At the 1996 FAO Regional Expert Consultation Meeting on Modernization of Irrigation Systems, a new definition of modernization of irrigation systems was coined to guide future understanding and efforts, namely "Irrigation modernization is a process of technical and managerial upgrading and water delivery services to farmers", which calls for systematic strategies to address institutional, physical and technical issues coherently through participatory approaches. Since then, FAO has been advocating irrigation modernization in the Asia region and initiatives have been taken by the international community as the World Bank and ADB, regional institutions and governments. In 2005, the International Workshop on the Future of Large Rice-based Irrigation Systems in Southeast Asia (Ho Chi Minh City, Vietnam) reviewed progress, analyzed lessons and experiences and drew a new roadmap to introduce irrigation modernization into both existing systems improvement and new systems development.

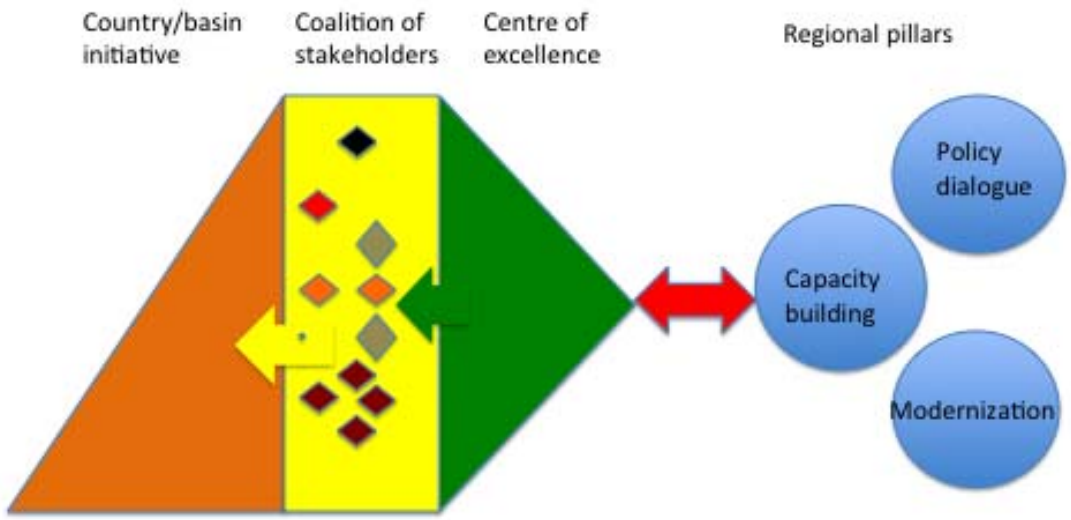

Figure 1 Regional Initiative on revitalizing irrigation and agriculture water governance

Significant recent developments in the thinking on modernization and the transition towards service-oriented management have been the recognition of the Multiple Uses and Services nature of the vast majority of medium and large irrigation and drainage systems, the development of decision-support tools such as the MASSCOTE family of methodologies by FAO. Capacity development activities and analysis of selected irrigation systems were carried out as part of a series of initiatives in the Asia- Pacific and Central Asia region. These countries include China, India, Pakistan, Vietnam, Nepal, Sri Lanka, Thailand, Malaysia, Uzbekistan... The MASSCOTE family of methodologies were applied to demonstrate their usefulness for evaluating performance of irrigation systems, their multiple uses functions and planning for modernization (See figure 2).

At the inception workshop, participants requested FAO to initiate a process of evaluation and improvement of MASSCOTE, with a view to establish a continuing process of demand-driven consortium-based development of the family of MASSCOTE tools. FAO carried out an extensive survey of MASSCOTE users and decision-makers and, at a regional workshop in Nanjing, China, from 28th February to 2 March organized in partnership with the China National Committee on Irrigation and Drainage, reviewed experiences in implementing MASSCOTE methodologies, discussed gaps and improvement needed (components of MASSCOTE 2.0) as well as the need for and potential nature of national guidelines for irrigation modernization.

Workshop participants and partners developed the Terms of Reference for MASSCOTE 2.0 and established a workplan for the development and piloting of MASSCOTE 2.0 in the region in 2013 under the guidance of a steering committee comprising of technical partners and key

clients. MASSCOTE 2.0 will be tested in a number of large-scale irrigation systems in the region, evaluated, and finalized by the end of the year.

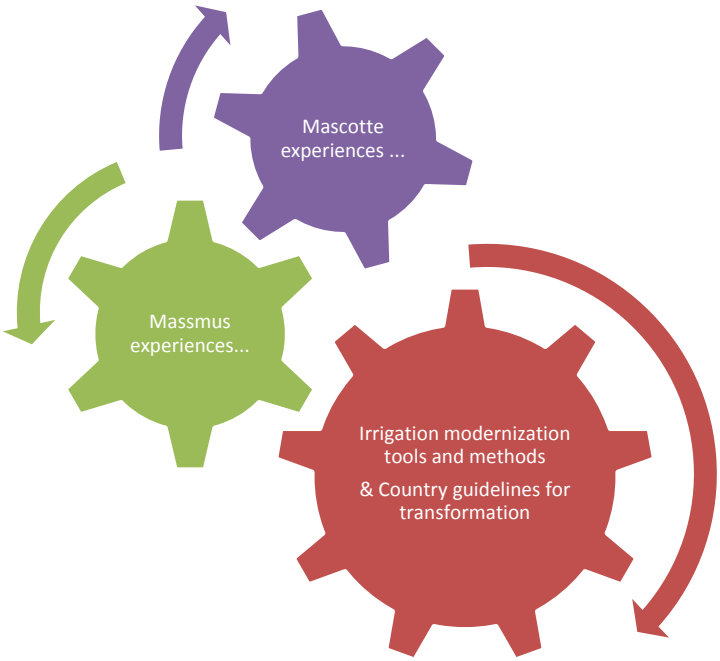

Figure 2- The Regional modernization pillar: building blocks for transforming irrigation

Regional Pillar on Capacity Building

The Asia Pacific region is rich in agricultural and water expertise and innovation. A key objective of the Initiative is to support and highlight existing or new country or basin-level initiatives that address key challenges that the region is facing with forward-looking strategies. Those initiatives can illustrate provide inspiration to other countries and basins. By supporting leaders of change and by sharing their knowledge, methods, experience, practices and results it is possible to trigger a more general movement of transformation for agriculture water management and governance.

To support that movement, it is proposed to set a regional network of centers of excellence attached to country/basin initiatives that will offer capacity building or provide technical inputs on a range of water and irrigation tools and methods**.** They could support the coalitions of stakeholders engaged in irrigation modernization and agriculture water initiatives in the various countries and basins in the region. In addition, they would rely on knowledge centers of references that offer specialized tools and methodologies (see Figure 3).

At a regional workshop from 4 to 6 March 2013 in Nanjing, China, also organized in partnership with the China National Committee on Irrigation and Drainage, FAO, with its country partners as well as regional and international partners, discussed the capacity development needs in the region to support the transformation of the agriculture water management and governance, following an extensive survey to assess the demand for capacity development. The workshop also set the bases and finalized details and modalities for, and reviewed progress in, the establishment of a regional network of centers of excellence and knowledge reference centers,

following an extensive survey to map existing knowledge centers, discussed innovative approaches and structured processes for certification of professionals in new tools, methods and competencies, and developed a road map for capacity development in the region.

It is expected that, by early 2014, centers of excellence owned by national institutions will have been established or recognized and resources mobilized for their capacitation in the following countries: Malaysia, India (Karnataka State), Viet Nam, and the People's Republic of China.

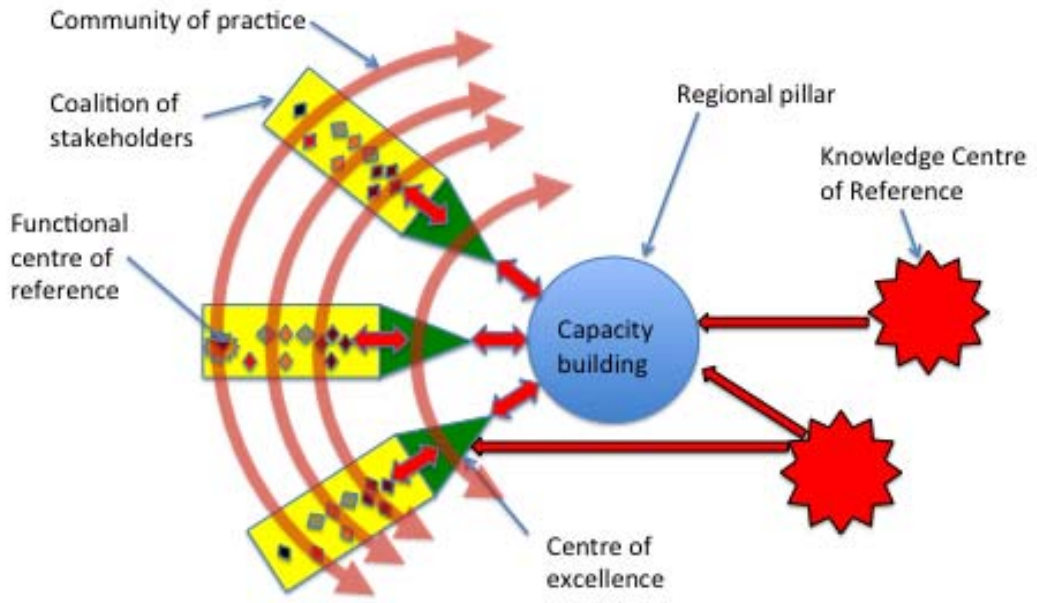

Figure 3: The Regional Capacity Building Pillar: strengthening capacity building for agriculture water management transformation

Regional Pillar on Policy Dialogue

A key consensus has emerged in the region that modernization was linked to the key issue of managing transitions in the countries' overall economies, water and agricultural sectors, to the question of who would be growing the food the region needs in the long terms, and that details of irrigation modernization strategies in each country would be linked to how societal choices and risk management strategies for national food security would be translated into different policy decisions, which would determine important details of modernization. There is a strong demand from countries in the region for cross-country dialogues on irrigation modernization concepts, strategies and tactics and assistance for building their capacity at all levels for implementation of irrigation modernization programmes.

Each country has embarked on different paths to shift to new irrigation modernization concepts, strategies and investments, including institutional reform models, to support improved service to farmers and other users and system performance. Policy dialogues in a number of countries,

with the support of FAO, have revealed key policy dilemmas', trade-offs and difficulties and generated possible options to address these questions. Cross-country dialogue allows countries to share experiences in addressing such dilemmas' and discuss adaptive strategies needed to cope with those in fast changing contexts. FAO has recently supported scenario building in Central Asia. The on-going study East Asia Pacific - Irrigation Management Modernization of the World Bank, FAO and ADB, World Bank has developed a country assessment framework, which is being applied in a number of countries.

At the final regional workshop of the Regional Initiative Development phase, in Manila, on 11th March 2013, participating countries and partners in the initiative will further discuss the contours of the Regional Pillar on Policy dialogue and will develop a road map for its further development.

Recommendations/Findings/Options/Questions

The 1st Asian Irrigation Forum convened by ADB in 2012 has heralded a sea change for the irrigation sector in the region and a number of regional initiatives recently initiated and under way and developments in key countries in the region seem to indicate that an change agenda is gathering increasing ownership, support and momentum in the region.

The Regional Initiative on Revitalizing Irrigation and Agricultural Water Governance launched by FAO and IWMI has been designed to support an action agenda for revitalizing Asia's Irrigation by focusing on tools, methodologies and guidelines for irrigation modernization, capacity building, and policy dialogue.

The Development of this Regional Initiative is clearly a work in progress, even if action is already under way with support from FAO's own resources as well as resources from some partners. Achievements are still modest and prospects for mobilizing substantial resources still uncertain, even if initial response is encouraging. The Regional Initiative for Revitalizing Asia's Irrigation, the ideas and the actions it is proposing, now seems to be meeting a strong demand. In response to this demand, FAO has deliberately switched to a demand-driven approach to the future development of tools, methodologies and guidelines.

What is proposed is a regional support architecture for an action agenda. FAO will direct its (necessarily modest) resources and technical programmes in the region to support and further develop its regional pillars and modalities for dissemination and development of knowledge and capacity development and innovative, as well forward-looking country and river basin initiatives, and is hopeful that these new proposals will be sufficiently attractive to mobilize and accrue resources and partners so that the different components of the initiative can further develop, be sustained, and expand in the region.

References

FAO-RAP, 2012. Economic, Food and Water Security in Asia: Towards a Renewed Framework for Action. Presented at the Eye on Asia Session, World Water Week, Stockholm, August 2012.

Mukherji, A., T. Facon, J. Burke, C. De Fraiture, J. Faures, B. Fuleki, M. Giordano, D. Molden, and T. Shah. 2009. Revitalizing Asia's irrigation: To sustainably meet tomorrow's food needs. IWMI, Colombo, Sri Lanka and Food and Agricultural Organization, Rome, Italy. 39 p.

Small-scale irrigation: Is this the future? Thierry Facon, FAO1 and Aditi Mukherji, IWMI2. Paper presented at the Water Crisis and Choices, ADB and Partners, publications.iwmi.org/pdf/H043372.pdf

Towards A Framework For Action On Water In Green Growth
In Support Of Economic, Food And Water Security In The Asia Pacific, FAO, ESCAP, March 2012 http://asia-water.org