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The Challenges of Water Resources Management in Cambodia

Dr Thun Vathana and Chem Phalla discuss some of the main topics concerning water management in Cambodia at the recent WRMRCDP launching workshop.*

Owing to its geographical location and tropical rainfall, Cambodia has an abundance of water for transport, industry, agriculture, aquaculture and domestic purposes. There are, however, concerns about the management and development of water resources for the promotion of agricultural production and poverty reduction. Agriculture is one of the important elements contributing to poverty reduction as stated in both the government's Rectangular Strategy and National Strategic Development Plan 2006-2010 (NSDP). Irrigation is vital for increasing agricultural production and productivity. Irrigation development also increases land values and provides indirect benefits, such as improved nutrition throughout the year, a more active rural labour market resulting in reduced out-migration, and reduced agricultural pressure on marginal land.

Irrigated rice fields in Trapaing Trabek, Kompong Chhnang Province

In 2005, agricultural production increased by 16.6 percent, while crop production increased by 28.0 percent. According to the Ministry of Agriculture, Forestry and Fisheries (MAFF), one reason for this increase was the expansion of irrigation facilities. Despite the important role that it plays in agriculture, irrigation still gets little investment from either the state or the private sector. The World Bank's 2006 Cambodia Poverty Assessment emphasises the important role of improved infrastructure in increasing productivity, and argues that more pubic investment is needed in order to strengthen water management.

Recognising the important role that irrigation and sustainable water resource management plays in development, CDRI, in collaboration with the University of Sydney (UoS) and the Royal University of Phnom Penh (RUPP), has developed a Water Resource Management Research Capacity Development Programme (WRMRCDP) with support from AusAID.[1] The project, focusing on research capacity development over a five year period from July 2006, was officially launched in early December 2006. At the launching workshop, a number of important issues pertaining to water resource management in Cambodia were identified. These

In This Issue

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included scale of irrigation system and related financial issues, water governance including Farmer Water User Community (FWUC) and issues related to catchment area and river basin management. This article discusses some of the main points relating to these issues.

Irrigation scale

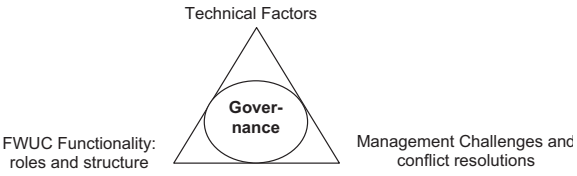
Irrigation schemes in Cambodia are classified according to scale as small, medium or large and in three major agro-ecological areas – flood, lowland and highland. The scale of an irrigation scheme is defined by its command area as follows: up to 200ha is considered small; from 200ha to 5,000ha medium; and above 5,000ha large . The most common irrigation techniques used in Cambodia include traditional lifting, mobile pumping stations, gravity or a combination of these methods. Some small scale irrigation systems, and most medium and large scale irrigation systems, have reservoirs to store water and irrigation distribution canal systems. Currently, MOWRAM estimates that there are more than 2,000 irrigation schemes (1,415 small, 955 medium and 33 large), which can potentially irrigate more than one million hectares, approximately 40 percent of the total paddy land area.

During the 1980s and early 1990s, most irrigation development focused on small scale schemes. Following the establishment of MOWRAM in 1999, the focus shifted to medium and large scale projects due to a greater availability of funds from both the government and donors. At the launching workshop, participants discussed the suitability, efficiency and effectiveness of the different sized schemes in terms of management and economic viability, both of which depend largely on governance. The answer is likely to vary depending on different circumstances, and this article does not judge which scale is most suitable for investment. Rather, the article aims to identify some factual considerations and questions for future research identified at the launch.

The table below suggests that both small and large scale irrigation projects each have their own comparative advantages and disadvantages. There are discussions on the advantages and disadvantages of small versus large scale irrigation projects in terms of water governance.

Comparison of irrigation categories – small and large[2]

Item	Small scale irrigation	Large scale irrigation
Investment cost	Low	High
Command area	Small	Large
O&M costs	Low	High
Water distribution	Simple	Complex
Beneficiaries	Less	More
Fisheries	Less	More
Management	Community / FWUC	provincial / national
Conflicts and solutions	Within community	Across communities
Technical know-how	Simple	Complex / advanced



Water governance

Water governance refers to social, political and economic organizations and institutions that are related to water management and development within and across community boundaries who share the same water source. Governance is concerned with how institutions make and enforce rules and regulations that affect the efficient and equitable allocation of water resources.

In irrigation, water governance is generally a function of technical design, management, and institutional arrangements, particularly the performance of the FWUC. A simple model, illustrated above, is introduced for the purpose of analyzing the relationships between the technical design of an irrigation system, the functionality of the FWUC and water management challenges and conflict resolution.

Technical Factors

Crop productivity relies on soil quality and seeds, as well as the amount of water available for a particular crop. Small scale irrigation is technically less complex and cheaper in terms of construction, rehabilitation, and operations and mantenance (O&M), but its coverage and number of beneficiaries is limited. Owing to a better understanding of soil quality due to smaller specific sites and because crop productivity is correlated with water and soil quality, small irrigation may contribute more to improving productivity.

Large scale irrigation, on the other hand, is generally more technically complex and requires a larger amount of investment capital. Since the land coverage is larger there is a greater variation in soil quality, bringing into question the level of contribution of water to productivity increase. This said, there is no doubt there is a larger impact in terms of overall production and the number of people served.

As for technical design, it is important to bear in mind the financial capacity of local communities to meet maintenance costs. If farmers and local communities fail to meet maintenance costs, O&M problems will become the government's responsibility. Moreover, the system design should meet technical standards and be followed by routine maintenance and water supply planning with well scheduled shifts and the involvement of the entire system's user community. Good irrigation system design will contribute to the success of water management.

Poor and incomplete irrigation infrastructure, on the other hand, causes problems in water management for

several reasons: (1) the waste and inequitable distribution of water; (2) increased competition among users for water; (3) low irrigation service collection; and (4) lack of participation. All these issues can cause conflicts within and between communities, which can cause social unrest and adversely affect FWUC functionalities.

Management Challenges and Conflict Resolution

The availability of water through improved irrigation infrastructure alone cannot fully guarantee the efficient use of water as there also exists a need to provide effective water management. For example, one of the most important tasks in water management is operating water gates. Gate operation often gives rise to problems of timing, fair water distribution, and allocation (e.g., timing and amounts of water to be allocated to upstream uses, to downstream uses and fishery management issues). Apart from technical design, gate operators require technical knowledge in order to manage gates in a way that reduces conflicts among water users. Knowledge of technical aspects (e.g. the magnitude of low flow), local community organization and other forms of social operation also play a role in managing conflicts.

Depending on the size of the irrigation scheme, different degrees of capacity are required in order to manage irrigation water effectively and efficiently. Small irrigation projects may be easier to manage for local communities, where social capital enables local people to cooperate on water management. Problems can often be solved by FWUC or at commune level. The management of large scale irrigation is more complicated and may, therefore, be beyond the capacity or mandate of individual communities. This requires more input of institutional capital and financial investment, which often requires interventions and support from outside, at provincial and national levels. Without effective institutional and organizational management, water is neither well managed nor properly allocated, leading to the waste of water and the creation of conflicts. These issues result in low productivity of land and water, casting doubt over the economic viability of the project.

Since there is recognition that irrigation water is provided to farmers with better results when operated by decentralized organizations, the policy of the Royal Government of Cambodia (RGC) is to devolve responsibility for all aspects of irrigation management to FWUC. The policy emphasises community participation via FWUC in order to operate and maintain irrigation facilities. The transfer of responsibility to FWUCs of irrigation project management, including raising and collecting Irrigation Service Fee (ISF), will relieve the Royal Government's administrative burdens. One effect this policy is that the FWUC can influence the quality of the services provided to their members.

FWUC: roles and structures

It has been observed that much water is lost during operation because of poor water management by farmers and poor irrigation facilities. This results in a lack of water, which is one of the causes of conflicts amongst water users. To improve this, the Royal Government is strengthening the national policy on sustainable water management, including FWUCs. These organizations include all farmers who use water from the irrigation project in the irrigated area. The FWUC has its own committee, whose main roles concern day-to-day activities including O&M, ISF collection, water distribution, problem solving and external relations.

The legitimacy of the FWUC, based on the concept of ownership, is recognized by MOWRAM, which standardises FWUC by choosing farmers' representatives through election to form the FWUC committee. The committee, with one chairman, two deputy chairs and several members, is expected to serve the interests of its members and remain free of political corruption, although practically, remaining free of political interference it difficult due to financial constraints and other circumstances. Sustainability of FWUC does not, however, depend on periodic support seen especially before important elections. In fact, it depends more on regular financial support, capacity strengthening of the committee and participation from community members. A properly functioning legislative FWUC also relies on members being freely and fairly elected, the presentation of different parties and popular participation and accountability.

According to Prakas 306, the government budget is supposed to cover O&M costs and then gradually decrease over time by giving more responsibility to the FWUC. Unfortunately, the government budget provides for emergency cases rather than for O&M, with the cost of O&M mainly being met by individuals, politicians, pagodas and a small amount from ISF. In a market economy, cost should be charged to consumers according to the amount consumed. But when it comes to practices in irrigation there are problems with this approach as water is a complicated natural, economic and political resource, and paying ISF is not customary in Cambodia. In order to increase the willingness to pay ISF, there are three aspects to consider: (1) ISF should be set from the start at a realistic level according to locality and gradually increased to the level of operation and maintenance costs; (2) it is important to help farmers understand the link between ISF and O&M; and (3) a simple cost and benefit analysis should be made to help farmers see a reasonable profit. Moreover, there is a need to increase crop productivity by providing support services, including credit, agricultural extension, new technologies

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