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Exploring Factors that Influence the Success of Farmer-managed Irrigation Systems: A Case Study in Kompong Speu Province¹

“We cannot decide things without discussion with farmers, or we would end up doing the work alone.”—a farmer water user community leader, Kompong Speu

Introduction

A global trend in resource conservation now sees users' roles as a solution, rather than a problem. This has paved the way for the recent approach of redistributing centralised management authority to community groups in order to achieve sustainable natural resource management (Gibson *et al.* 2000). Such an approach has also been visible in Cambodia. Under the decentralisation reform, after the first election of commune/sangkat councils in 2002, the government transferred a degree of authority to manage irrigation from the Ministry of Water Resources and Meteorology (MoWRAM) to farmer water user communities (FWUCs). The FWUCs take responsibility for routine operation and maintenance of irrigation in their district, although large-scale maintenance is still retained by the government.

FWUCs, however, face implementation challenges, especially in a context of a fairly high poverty rate, poor irrigation infrastructure left from the Pol Pot period (Perera 2006), a weak civil society and decentralisation in process (Kim



Good irrigation, a good crop and a happy farmer in Kompong Speu province

& Öjendal 2007). A case study of an FWUC in Kompong Chhnang, for instance, found that it has failed to promote participation from farmers, build a sense of ownership among members or ensure the leadership's power to manage irrigation (Chea, forthcoming). In Takeo, the failure of FWUCs appears to have stemmed from a lack of financial resources, poor leadership and incentives and a

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¹ This article was prepared by Ros Bandeth, research associate at CDRI. It is based on the author's MAppSc thesis on “Participatory Irrigation Management and the Factors that Influence the Success of Farmer Water User Communities: A Case Study in Cambodia”, 2010.

lack of intervention from commune councils (Thun 2008).

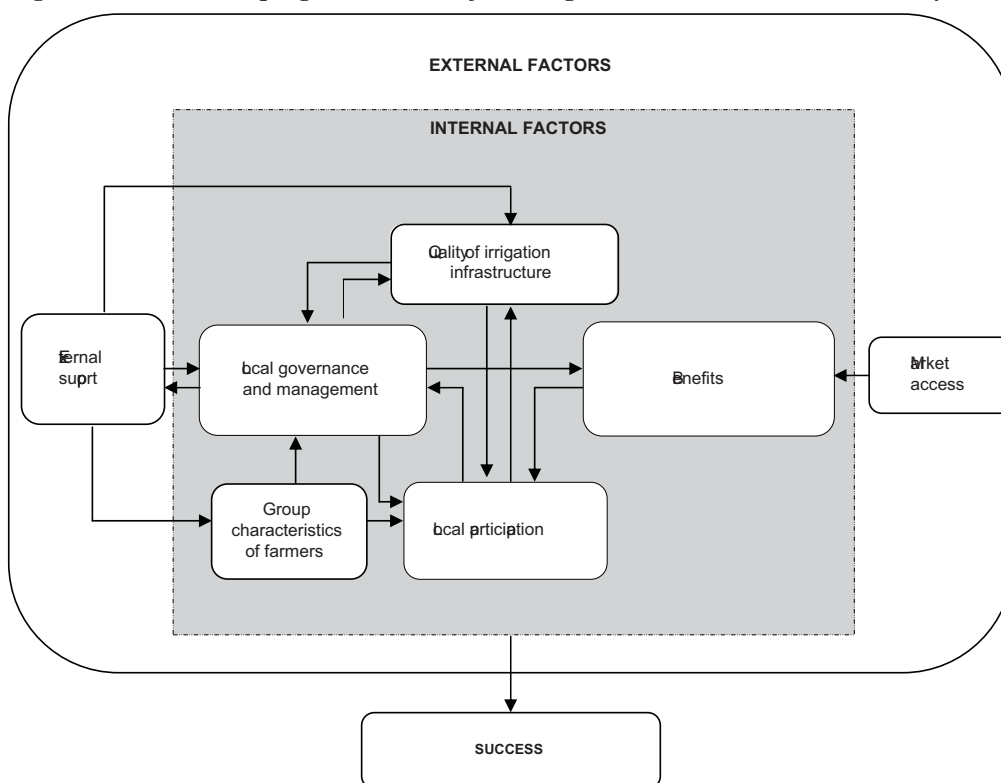
There are a few FWUCs, however, that have been reasonably successful in irrigation management.² This study sought to look into the factors that influence FWUCs' success to supplement previous studies seeking to improve the performance of less successful schemes. Selected as the subject was the O-treng Farmer Water User Community, classified as the most successful scheme in Cambodia by the MoWRAM in 2008. Located in Chongruk and Prey Nheat communes, Kong Pisei district, Kompong Speu province, the community improved farmers' livelihoods and has achieved self-reliance in its everyday operation and irrigation maintenance.

and 5) the group characteristics of the farmer members. The two external factors were external support and market access. Figure 1 illustrates the complex interactions and feedback loops between the seven factors.

Local participation: Farmers' participation in irrigation management was high, ranging from contributions of cash, labour and other resources to sharing decisions. Participation was found in four different modes: payment of irrigation service fees, distribution of water, scheme maintenance and community meetings.

Farmer participation was important because it influenced the quality of the scheme and governance and management by the leaders. Payment of the irrigation service fees ensured the availability of

Figure 1: Factors Shaping the Success of O-treng Farmer Water User Community



Research Findings

Five internal and two external factors underpinned the success of the O-treng FWUC. The five internal factors were: 1) local participation, 2) local governance and management, 3) the benefits from the scheme, 4) the quality of irrigation infrastructure

financial resources for the scheme's operation, which meant less reliance on external support. Participation in water distribution ensured a timely and adequate supply of water to farmers. This implied a reduced input from the leaders, allowing them to remain actively involved. Moreover, when farmers participated in distributing water, the community was less likely to have flooding, overflows and wastage. Local participation in maintenance, including reporting

damage and contributing labour and/or cash, also helped reduce the input required from leaders in monitoring and patrolling and paved the way for better maintenance, thereby contributing to the improved quality of irrigation infrastructure. Finally, local participation in community meetings ensured awareness of irrigation management, a sense of ownership of the decisions, transparency and trust between leaders and farmers, all of which

² Interview with staff of MoWRAM, 3 October 2008.

led to greater participation and effectiveness in management and governance.

Local governance and management: This was also critical because it ensured local participation, the benefits from the scheme, the quality of infrastructure and external support. Elements that come under local governance and management may be usefully separated into decision-making structure, leadership capacity, the formation of the community and the processes to adopt, enforce and adapt rules.

- a. The decision-making structure consists of three layers: the committee, groups and sub-groups. This structure worked well because it made each village and group of villages responsible for the management and maintenance of the infrastructure that supplied them with water. It also meant that the number of farmers in each sub-group was small, making it easy for the leaders to enforce the rules.
- b. Leadership capacity comprised a number of attributes: 1) attitudes, 2) knowledge and skills and 3) authority. Attitudes that the farmers associated with good leadership included a positive work ethic, commitment to the irrigation scheme, honesty and transparency and a willingness to put the interests of the community ahead of their own, work alongside the farmers, accept responsibility and continue to learn in order to improve the performance of the scheme. The farmers also identified their leaders' important skills and knowledge as a thorough understanding of irrigation management, the ability to motivate and lead the community and the ability to solve problems creatively. Leaders also had well-developed organisation, delegation and communication skills. Leaders' authority was defined as responsibility and the power to mobilise farmers and manage the scheme.

Leadership capacity contributes to success by first ensuring trust of farmers based upon leaders' honesty and transparency. Because of the leaders' positive attributes, they were respected by the farmers. This trust and respect made the leaders popular with the farmers, who were then more willing to participate in scheme activities.

The knowledge and skills of irrigation management also led to trust by the farmers and then to participation. With their effective communication skills, the leaders could also ask for external support. Moreover, because the leaders held the authority to manage the irrigation scheme with very limited interference from MoWRAM or local authorities, they could respond promptly to maintenance problems and local requests for improvements. This authority also allowed the leadership to enforce rules and gave both leaders and farmers a sense of ownership of the scheme.

- c. The community was organised on democratic principles, and because of this, farmers could select suitable leaders and design rules for the scheme. This made the farmers more willing to comply with the rules. Leadership capacity was enhanced too by a focus on the selection of suitable leaders: farmers voted for leaders who they thought could govern and manage the scheme effectively.
- d. Rules were adopted covering four areas: water allocation and distribution, scheme maintenance, fee collection and financial management. The decision-making process had six criteria: consensus, inclusiveness, responsiveness, effectiveness, transparency and fairness. This ensured a low level of conflict, a sense of ownership by farmers, compliance with rules, financial resources for operating the scheme, efficient water supply to farmers and, more importantly, a well-founded trust in the leadership.
- e. Enforcement—making sure that the rules are obeyed through the punishment of those who disobey—was frequently applied to water distribution. Only those farmers who filed a request and received committee approval could obtain water, and those who did not follow this rule were denied water. Consistent rule enforcement helped reduce water theft and ensured fairness among members. This then led to greater participation.
- f. Rules were adapted in response to specific situations based on five factors: 1) crop failure, 2) leadership commitments or workload, 3) farmer workload, 4) water availability and 5) the level of water access. The leadership adapted rules in four areas: 1) collection of irrigation fees, 2)

responsibilities of leaders, 3) farmer attendance at community meetings and participation in maintenance and 4) water access. Such adaptation helped promote fairness. This increased farmers' trust in the leadership and their participation.

Benefits: These served as a major incentive for farmers to participate. The scheme provided two benefits: enhanced food security and additional revenue. Farmers relied on rainfall to grow rice during the wet season. Because rainfall was often inadequate, irrigation water ensured high yields. Farmers needed irrigation water to sow seeds and transplant seedlings in some years, while in others they irrigated their land until their rice was ready for harvest.

Most farmers viewed the enhanced wet season rice yields as the most important benefit, because farmers in the community grew wet season rice primarily for own consumption. Wet season rice ensured food security. Some families that did not have other sources of revenue sold a portion of their wet season rice to cover other expenses.

The other benefit was revenue from the sale of dry season crops, such as watermelons, wax gourds or pumpkins. Because there was little rainfall over this period, the farmers relied almost entirely on irrigation water. Importantly, the earnings from these crops were two to four times the total cost of production, including the irrigation fees (Table 1). This meant dry season crops were a good source of revenue.

This revenue was important to farmers since there were few jobs during the dry season, and the farmers lacked the skills to work in other areas. Other farmers said that they could find work during the dry season, but the income from it was not as

much as they could generate from growing crops.

Quality of irrigation infrastructure: An important factor was the quality of irrigation infrastructure. The large reservoir (2,563,750 m³) available to capture rain is well constructed, with little leakage. These characteristics ensured sufficient water storage and hence a low likelihood of crop failure during the wet season, along with surplus water for dry season crops.

The irrigation infrastructure also includes a large number of well-built canals and control gates. This enhanced efficient water allocation. Because the infrastructure provided farmers an adequate and timely water supply, they were willing to pay the fees.

Group characteristics: Four group characteristics emerged as important: 1) size, 2) homogeneity, 3) dependence on cropping and 4) experience with self-organisation in irrigation management. Because the size of farmer groups and sub-groups was small, the leaders could adopt and enforce community rules easily. Small groups also ensured frequent interactions among the members and allowed them to monitor each other's water distribution and scheme maintenance.

Farmers in the community are relatively homogeneous, sharing culture, ethnicity, interests, cultivation practices and a medium level of poverty. The farmers' similar beliefs, views and perceptions facilitated cooperation in managing the scheme.

The farmers' high dependence on cropping convinced them that the irrigation scheme was critical to their livelihoods. Because of this, they participated actively. Also, the farmers were familiar with self-organisation in irrigation management because the community was initially self-organised and then informally organised from

Table 1: Examples of Costs and Revenue of Dry Season Crop Production, 2008

Land size (ha)	Crop	Total costs (USD) (including irrigation fees)	Total revenue (USD)	Total revenue (% of costs)
1.00	Watermelons	75	500	769
0.30	Watermelons	43	160	400
0.10	Watermelons	64	125	198
0.35	Wax gourds	104	250	250
0.20	Wax gourds	152	300	200
0.15	Wax gourds	62	150	250
0.30	Pumpkins	43	150	375

1995 to 2000. This familiarity affected the success of the community in three ways. First, local leaders had pre-existing leadership capacity in irrigation management. Second, local farmers had experience developing suitable rules. Third, the farmers were aware of the importance of their participation.

External support: The O-treng FWUC obtained a high level of support from MoWRAM, district and commune authorities and the World Food Programme, including scheme rehabilitation and development, assistance with formation of the community, training, financial resources as shared expenses in the first two years, consultation and assistance with rule enforcement and conflict resolution.

The external support improved the quality of irrigation infrastructure by rehabilitating the scheme. It strengthened the knowledge and skills of farmers and leaders through training and capacity building. It enhanced governance and management. The support provided by the government and local authorities was ongoing, and tended not to interfere with local autonomy.

Market access: Because the farmers had access to good markets for their produce, they obtained revenue from which they could pay their irrigation service fees and which improved their livelihoods.

Farmers either sold their produce directly at market or sold it to middlemen. The price farmers received at market was normally double what they received at the farm gate. However, most farmers preferred to sell their produce at the farm gate because they could sell it all at once. This was good for their cash flow, and they did not need to worry about storage and losses. The middlemen were also willing to pay for the produce before harvest and cover the farmers' growing costs until harvest. The middlemen would also harvest and transport the produce to market. Farmers who sold their produce at market had to be in regular contact with retailers, and this incurred both time and financial costs that most preferred to avoid.

The majority of middlemen were outsiders, but some were local farmers. The middlemen came to the community because it was close to local markets and to Phnom Penh and the roads were good. Moreover, the community was one of a few places in Kong Pisei district that produced a large crop of watermelons and wax gourds during the dry season.

Conclusions

This research suggests that the successful implementation of a FWUC requires a focus on the seven factors and the relationships between them. These relationships create requisite factors such as trust, fairness, a sense of ownership and compliance that are critical for the functioning of the FWUC.

The success of the FWUC requires farmer participation, which is enhanced when farmers obtain benefits, either food security or revenue from crop sales. Without these benefits, there is little incentive for farmers to engage in the scheme. Access to markets is important to obtain these benefits. It is also critical that the irrigation infrastructure is of high quality to ensure the delivery of an adequate and timely water supply. Local governance is another critical factor, particularly leadership capacity and decision-making processes.

Success requires a level of external support from government, NGOs and district and commune councils. Group characteristics of farmers are also important. Success is enhanced by a community history of self-organisation, relative homogeneity and the members' dependence upon farming for their livelihoods.

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