Smallholder Irrigation Impacts on Wetlands Livelihoods and Aquatic Resources: Community-level Study in Laos, Mekong River Basin

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INTRODUCTION

There are few studies on the environmental ramifications of irrigation that take into account the complex nexus between irrigation, natural resources management, and livelihood needs of a local community. The literature has not addressed the issue of managing wetlands and smallholder irrigation as one system to meet a society's short-and long-term needs. These are critical issues in many developing countries now as food prices soar globally.

An irrigation system level assessment was carried out in a remote part of southern Laos (Attapue province) in the Mekong Basin to evaluate the nexus of irrigation-subsistence farming-wetlands livelihoods-poverty alleviation. The field work was done in October 2006.

Irrigation Project Description: Two lift pumps mounted on a floating boat on Xe Kaman River (a tributary of the Mekong River) provide irrigation in Ban Sai Sii village (Fig 4). This scheme was planned for 100 ha, out of which only 30 ha has actually been used for cultivation of dry season paddy by about 50 households. Occasionally they also use the pump irrigation for main season paddy (and for vegetables) when there is a monsoonal dry spell.

Fig 4. Floating pump and field channel for delivery of water

METHODS AND DATA COLLECTION

- Tools and techniques of Participatory Rural Appraisal (PRA) and Participatory Impact Assessment (PIMA) were used to assess households' perceptions and collect feedback on irrigation-induced affects on farm income, employment, food security, and other key aspects of rural livelihoods.
- We analyze both the positive and negative impacts of irrigation on wetlands resources, availability and use of aquatic resources, and fishing efforts.

RESULTS

- As a result of the irrigation scheme, the village which was in acute rice/food deficit just 5-6 years ago has now become a rice surplus community (Table 1).
- Irrigation led to cultivation of a dry season paddy (30 ha/year), increased income and employment, and enhanced food security; all of these factors contributed to increased community well-being (and overall happiness).
- Recently about 20% of the households have started to grow vegetables in the dry season using the pump water –another income induced-change.
- The health and nutrition level of all community members has improved, as the irrigation water is used for multiple purposes (livestock, cleaning and bathing, and household sanitation, occasionally also for drinking).
- The farmers are paying almost the full cost of @ US$50/ha for operating the pumps for irrigation of dry season paddy (5-6 times irrigation in a season). The high irrigation charge has created an incentive to use water prudently.
- Contrary to the literature, the community members, including fishers, do not think that irrigation has had any adverse effects on availability of aquatic resources. The threat to the wetlands and aquatic resources is not caused by subsistence farming, but by external factors such as gold mining upstream, road construction, logging, and lack of health and other basic services.
- Management of both irrigation and aquatic resources is feasible with prudent planning and incentive-based water withdrawal taking into consideration of both timing and quantity.
- The concrete structure of irrigation channel is oversized. With better designed and wider consultation in the community, the scale and size of the scheme could have been reduced, and saved more than half of the construction cost.

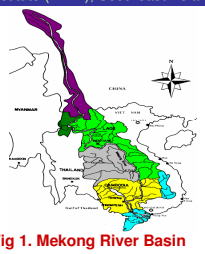

Fig 1. Mekong River Basin

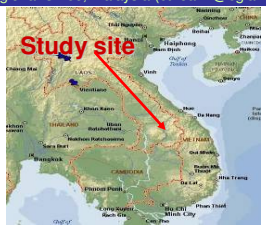

Fig 2. Location of study site in Laos

Fig 3. Land use at study site

OBJECTIVES

The overall objective of the study was to improve our understanding of wetlands livelihoods and subsistence needs of a community in the Mekong Basin by analyzing linkages between smallholder irrigation for subsistence farming, wetland resources use, and other livelihood requirements of the community.

The specific objectives of the case study were:
- to assess cross-sectoral linkages between smallholder irrigation for subsistence farming and functioning of wetlands system;
- to evaluate the agriculture and irrigation acceptability issues in a frontier farming region in the Mekong Basin; and
- to evaluate local community perceptions and attitudes toward irrigation, and impacts of the irrigation on wetlands resources and community livelihoods.

Table 1. Changes in key socioeconomic indicators in the community as brought about by the irrigation scheme over the last 10 years

Factors/Key indicators	% changed (in 10 years)
1 Population (and number of Households in the village)	+50
2 Irrigated dry season paddy area	0 to 30 ha
3 Dry season total crops area in the village	+50
4 Average farm income (per household basis)	+20
5 Wet season paddy cultivation area	+30
6 Total employment level in the village	+50
7 Overall living standard of the village	+30
8 Overall happiness in the village (community)	+70

IMPLICATIONS

- Contrary to the literature, the frontier community has successfully managed both the irrigation and aquatic resources systems. The threat to the wetlands in the study site is coming largely from external forces outside of the community such as large-scale logging upstream, gold mining , etc.
- The study findings suggest that instead of the sectoral approach to management, multipurpose management of smallholder irrigation, wetlands environmental services can enhance livelihoods of local community and also ensure sustainable use of local natural resources.
- This case study findings improve our understanding of the complex interactions among subsistence farming needs, smallholder irrigation management, and wetlands resources use.

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