



Challenges of Dry Season Rice Production under Irrigation Scheme of Tapeing Thmor Water Reservoir

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Abstract This paper examines the barrier of dry season rice intensification of community's irrigator under Irrigation scheme of Tapeing Thmor Water Reservoir. In total, 61 water using households and water use committees were selected for interviewing. The representatives of FWUC argue the irrigation is functioning quite well but smallholder farmers complain to have no access to irrigation water, supposedly due to inappropriate design and functioning of the canal systems. Some also argue that water management at the community level is not well organized, which leaves part of the smallholders farmers with no opportunities for dry season rice production. Field work also reveals that agricultural extension services are not entirely efficient and not evenly spread out through the community of water using farmers. In addition, the capital and labour needed for smallholder farmers to be engaged in dry season rice production with high purchasing of agricultural inputs usually leads farmers to contract loans from local moneylenders who charge a high interest rate. The paper discusses that further development for dry season rice production under Tapeing Thmor's irrigation scheme should focus on improving agricultural extension services and the provision of affordable access to credit in order to maximize its outreach.

Keywords dry season rice intensification, community irrigator

INTRODUCTION

Rice-based farming systems are the backbone of Cambodia's agricultural sector, which is the main agricultural produce as well as staple food of the country. Rice production contributed a quarter of the agricultural GDP in 2006 and 40.7% of agriculture growth between 2003 and 2006. Most of the agricultural land was dominated by rice cultivation. In 2004, 84.4% of cultivated land was devoted to rice fields. Rice production was estimated at 4.3 million tonnes, with yields averaging slightly more than 2 tones/ha (Bingxin Yu, 2009). Hin Sarith (2003) stated that total cultivation area is 2, 189, 923 ha and for wet season cultivation area around 1,926,004 ha and dry season cultivation area about 259, 919 ha.

The Northwest Irrigation Sector Project placed an irrigation system project to deal with rural poverty by improving agricultural productivities among poorer farmers. The farmers in these project areas will be organized into farmer water user associations and trained on sustainable operations and maintenance of the new irrigation schemes. The project will also train current

agricultural extension workers and place a new group of irrigation extension personnel to help the farmers improve rice production, diversify crops, and integrate livestock and fisheries. It will also help establish rural credit to households (ADB, 2006).

Rice cultivation at dry season usually produces higher yields, but there is a confounding effect with increased fertilizer use. Dry season rice production under an irrigation scheme of Tapieng Thmor Water Reservoir is favorable to intensify rice cultivation in the dry season since water is available. However, the farmer is reluctant to intensify because community water management remains to be the critical issue and it sometimes creates chronic conflict among downstream and upstream water users (David. F et al, 2009).

METHODOLOGY

The universal inquiry of research study has designed both qualitative and quantitative research by collecting information from peasant households, who are the members of irrigation communities. The most qualitative method used was to gather information in water management from the Farmer Water Use Community. Questionnaires were used to conduct interviews with target peasant households and the check-list was designed for collecting information from members of FWUC's committee, staff of NGOs and agricultural officers. Sample selection used a 'Snowball' technique for selecting irrigation members. The size of the sample (n) was determined by using Yamane Taro (1967) formula to restrict the number of peasant households for each community. The total number of cultivator for each community at dry season represented for population (N) and accuracy level (e) was 15%. Two communities were selected among five communities of FWUC of Tapeing Thmor Wate Reservoir. In total, 61 peasant households were selected using the Yamane Taro formula for conducting interview.

$$\text{Yamane Taro Formula (1967), Equation: } n = \frac{N}{1 + N \cdot e^2} \quad (1)$$

The main variable in socio-economic and technical practice was assigned into forms of semi-structure and structure interview for collecting the information from peasant households. For information related to the functional irrigation scheme and management of water distribution, non-structure interviews were used to gather information from the committee of water distribution (FWUC). For the rest of actors in agricultural intervention issue as well as the design of non-structure interviews for the district department of agriculture and ECOSORN. Otherwise, the regulatory framework of water management committees was collected as the document from FWUC to verify the performance of the community in water distribution. Collected data was classified into two kinds of data called quantitative data and qualitative data. Qualitative data analysis has been carried out by synthesis in three dimensions of a theoretical model, a framework design of FWUC, and an application of water distribution to evaluate the performance of community water in water management. The portion of quantitative data has been analysed in SPSS program, and the output has been discussed by using tabulation and cross-tabulation of variables with percentage values and p-values in descriptive statistics.

RESULTS

Labor of family member occupied on cultivated land area

Involvement of labor by family members in their rice cultivation is important for their productions. Normally in rice production of Cambodian peasants, they could intensify a labor into their production depend on amount of labor in their family, so possibility of rice production in a family was determined by a number of labor in their family. Table 1 shows results on peasant households who cultivated on surface area less than 2 ha. The number of working family members involved is significantly rather than the peasant households who has land cultivated area larger than 2 ha. For example: the peasant households who has small scale of land cultivation (<.50 ha) and family

member around 2-3 people, it indicated around 11.9%, so it suggest that small cultivation area, but a labor of family member involved more that the peasant households who have the large scale of land cultivation (3.50 ha) and family member about 2-3 people was revealed only 2.4%. Actually, peasant household who have large scale of land cultivation hired extra labor or machinery to work instead of human labor because they preferred to save time and human labor to do other works.

Table 1 Labor of family member and cultivated land area

		Land Cultivation (ha)				Total
		<.50	.50 - 1.99	2.00 - 3.49	3.50+	
Family Member (labor)	<2	20.0%	80.0%	0.0%	0.0%	100%
	2 - 3	11.9%	71.4%	14.3%	2.4%	100%
	4+	0.0%	66.7%	33.3%	0.0%	100%
Total		11.5%	72.1%	14.8%	1.6%	100%

Intensified labor in cultivated land area

Adoption of high technology in rice cultivation has reduced the need for human labor. However, additional labor force has remained necessary for some peasants who had a large scale farm and faced labor shortage in their family. Regarding this research study, K.Helmert (1997) stated in his report that most of the research found evidence that peasant household frequently experienced labor shortage and they usually hired labor during peak demand. During dry season, labor shortage was not a significant problem during cultivation because the scale of land cultivation area was not too large in comparison to labor in the region. The result of study showed that 33.3 % of small scale farm (less than 0.50 ha) hired additional labor, and large scale farm (more than 3.50 ha), hired 100% additional labor to assist their cultivation. On the contrary, Chi-square analysis of these interviews demonstrated that the scale of cultivated land area with hiring of additional labor is not significant. Consequently, hiring of additional labor did not depend on the farm scale or cultivated land area.

Peasant's experience of dry season rice cultivation and agricultural intervention

Dry season rice production under Tapeing Thomor irrigation scheme has appeared a couple of years ago, since Democratic Kampuchea regime toppled. The investment by the government in irrigation systems accompanied by the adoption of green revolution ensured food security and doubled rice export as the core policy of Cambodia's government. Tapieng Thomor irrigation scheme has opened access to peasants in intensifying rice production at dry season. Lack of experience in dry season rice production was the problem which peasants faced in their production. An empirical result indicated that (Fig 1) about 35% of a peasant irrigators has never been engaged in dry season rice cultivation. There were 62% of a peasant irrigators has been engaged experience from 1-2 times and only 3% of a peasant irrigators involved in dry season rice cultivation from 3-4 times. Temporarily, all the experiences that they had at dry season were so little to lead the peasant to overcome the challenges they faced. Agricultural extension service offers limited access to the peasants at the community level.

In order to accompany the rehabilitated irrigation scheme, there were many NGOs and government officers involved to provide the agricultural service package for building capacity of peasants. According to the obtained result indicated in Fig 1, 48% of peasants do not have agricultural intervention from the rest. They practiced their cultivation by carrying out an experience at the previous time in wet season or an experience which shared from their neighbour. The peasants who regard agricultural intervention about 52% were target group of NGOs. They regarded agricultural package either service or material such technical support, fertilizer and seeds, but those peasants were not significant to intensify their productions compare to the peasant without intervention, so it's consistent with evolution of the district agricultural department stated