CDRI – Cambodia's leading independent development policy research institute

Policy brief

2011, No. 07

What Limits Agricultural Intensification in Cambodia? The Role of Emigration, Agricultural Extension Services and Credit Constraints[1]

TONG Kimsun[2], HEM Socheth[2] and Paulo SANTOS[3]

Key Messages

- Availability of water and agricultural land are the key determinants of rice double-cropping.
- Rice double-cropping and emigration decisions are not closely inter-related.
- Households which rely on animal draught power for agricultural production are unlikely to engage in rice double-cropping.
- Loans and agricultural extension services have no significant impact on rice double-cropping. Further research is needed to understand why.

The Problem

The construction of irrigation schemes, funded by the Cambodian government, NGOs, and international development agencies such as the Japan International Cooperation Agency, the World Bank and the Asian Development Bank, has been increasingly prioritised since the 1980s.[4] Investment in irrigation has risen as the government has recognised the importance of water management to promoting the country's rice production. In 2004 the government adopted the Rectangular Strategy as the blueprint to guide its national development planning. One cornerstone of this strategy is the promotion of agricultural production, with particular emphasis on expanding the area of irrigated land. The expectation is that irrigation will make farmers less reliant on rainfall, allowing them to cultivate more crops with more certainty and predictability, resulting in higher productivity and improved livelihoods.

However, irrigation alone does not automatically increase agricultural production. Collaborative study by the Cambodia Development Resource Institute (CDRI), the Royal University of Phnom Penh (RUPP), the University of Sydney (USYD), the Ministry of Water Resources and Meteorology (MOWRAM) and the Ministry of Agriculture, Forestry and Fisheries (MAFF), that entailed a social assessment of selected irrigation schemes in six provinces around the Tonle Sap Lake, found that farmers do not grow dry season rice due to the following factors: irrigation

1 This policy brief is based on the CDRI working paper by Tong Kimsun, Hem Socheth and Paulo Santos (forthcoming): What Limits Agricultural Intensification in Cambodia? The Role of Emigration, Agricultural Extension Services and Credit Constraints. The working paper presents the results of the economic component of the Water Resources Management Research Capacity Development Programme (WRMRCDP), a five-year project funded by AusAID, aimed at improving the use and governance of water resources to increase agricultural production and the sustainable use of natural resources in Cambodia.

2 Economic, Trade and Regional Cooperation Programme, CDRI

3 Faculty of Agriculture, Food and Natural Resources, University of Sydney

4 See Nang *et al.* (forthcoming) for detailed list of donors.

schemes are usually located in lowland areas; the high cost of pumping water from the main canal to the rice fields; dry season rice is more likely to be harmed by insects and/or free-roaming livestock; and water availability is often insufficient (CDRI 2010). The study also found that soil type (e.g. sandy soil does not hold water well) is another factor influencing dry season rice adoption (*ibid*). Nonetheless, the effect of emigration, credit and agricultural extension services on rice double-cropping decisions in Cambodia has never been empirically studied. For example, emigration may reduce the amount of labour available for agricultural production which could be a constraint to rice-double cropping. Conversely, rice-double cropping is expected to have a negative effect on emigration because it may reduce the need for household members to move away to seek off-season work. This policy brief therefore aims to explore: (1) whether emigration and rice double-cropping decisions influence each other; and (2) the role of credit and agricultural extension services in agricultural intensification decisions, namely rice double-cropping.

The Case Study

This paper presents some of the key findings of household surveys conducted in 2008 and 2009 by CDRI-WRMRCDP in 10 irrigation schemes located in three provinces (Kampong Chhnang, Kampong Thom and Pursat) in the Tonle Sap Basin. Thirty households from each scheme (a total of 300 households) were randomly selected for baseline interviewing to capture information on household characteristics, household enterprise, residential and agricultural land characteristics, livestock and other capital assets. In the follow up surveys, 235 households were interviewed during the 2008 and 2009 wet seasons, while only 220 households were interviewed in the 2008 and 2009 dry seasons. Given that a rice double-cropping household was defined as that which cultivates rice in both wet and dry seasons on the same plot[5], the wet season and dry season data were merged, consequently reducing the total number of households to 233 for each year.

Key Findings

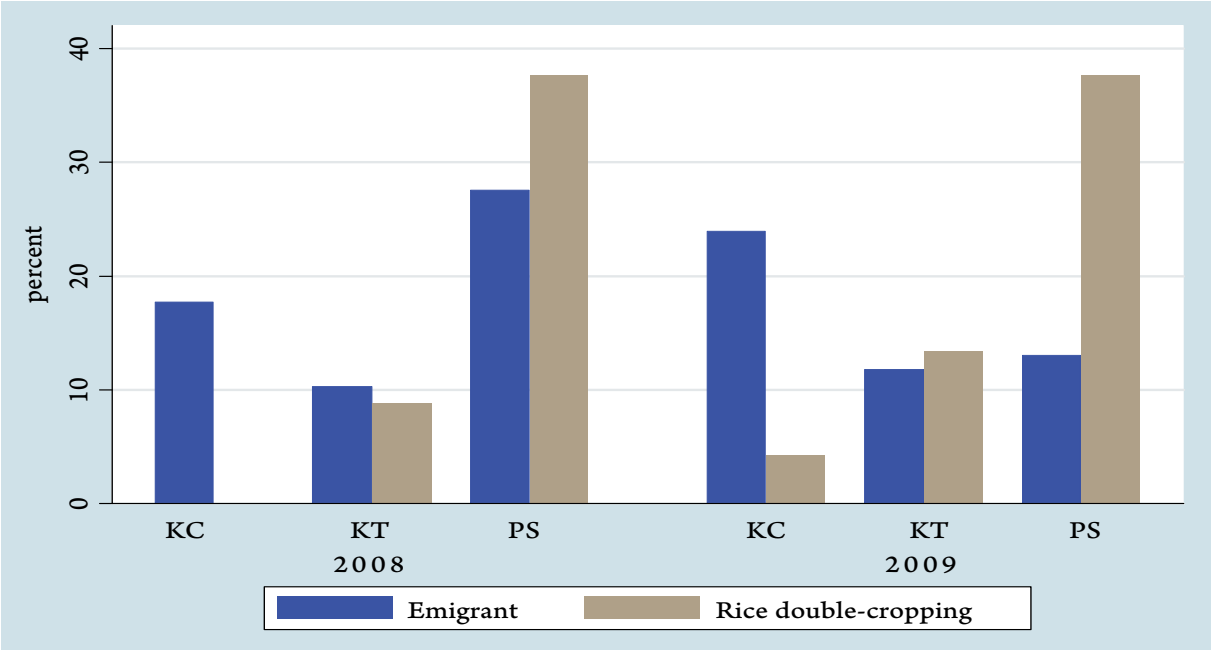
Analysis of the two rounds of household survey data reveals that of the sample households, 14 percent engaged in rice double-cropping in 2008 and 17 percent in 2009. Only 9-10 percent of the households received agricultural extension services in either survey year. The average number of pull and/or draught animals per household was 1.75 in 2008, dropping significantly to 1.28 in 2009. Conversely, the average farm equipment index[6] increased from 0.01 in 2008 to 0.07 in 2009, which implies that rural households are adopting more modern farming practices. The proportion of indebted households increased from 32 percent in 2008 to 40 percent in 2009. About 38 percent of the households in Pursat engaged in rice double-cropping in both years. In Kampong Thom, rice double-cropping households accounted for 13 percent in 2009 – 4 percentage points higher than in 2008. No households engaged in rice double-cropping in Kampong Chhnang in 2008 while only 4 percent did in 2009. Approximately 28 percent of the households in Pursat province participated in emigration[7] in 2008 compared to only 18 percent in Kampong Chhnang and 10 percent in Kampong Thom. But in 2009, the overall participation in emigration was 24

5 This definition was determined through discussion with farmers, Farmer Water User Community members and other local partners at three provincial consultation workshops conducted in Kampong Thom, Kampong Chhnang and Pursat.

6 Farm equipment index was estimated using the Principal Component Analysis Method.

7 Emigration was defined as having at least one household member absent for more than two consecutive months from the household.

Figure 1: Rice Double Cropping and Emigration 2008-2009



Note: KC- Kampong Chhnang; KT- Kampong Thnom; PS - Pursat
Source: CDRI survey data (2008-2009)

percent in Kampong Chhnang, 13 percent in Pursat and 12 percent in Kampong Thom.

As illustrated in Figure 1, the proportion of sample households in Pursat province engaging in rice double-cropping in 2008 was higher than in Kampong Thom and Kampong Chhnang provinces. During the same period, the share of emigrant households in Pursat province was also higher compared to the other two provinces. In 2009, the proportion of sample households involved in rice double-cropping was essentially the same as in 2008 despite the fact that the number of emigrant households in Pursat province had decreased significantly while that in Kampong Chhnang province had increased. This evidence reveals that there may not be a strong correlation between rice double-cropping and emigration, and that the determinants of rice double-cropping may not necessarily be related to the number of emigrants. This could be because the large majority of the rural labour force in Cambodia is underemployed.

In addition to examining the relationship between rice double-cropping and emigration, we also attempted to identify other factors that limit farmer capacity to cultivate rice on the same plot twice per year i.e. double-cropping. Descriptive information on farm equipment, pull and/or draught animals and loans are among the key potential determining variables of the practice of double-cropping. Double-cropping households were more likely to possess farming equipment than mono-cropping households (Table 1). At the same time, double-cropping households were strongly associated with higher borrowing. The differences among provinces were also found to be significant. This implies that farm equipment index, pull and/or draught animals, and access to credit could serve as strong potential determining indicators of double-cropping. In contrast, rice double-cropping is unlikely to correlate with agricultural extension services given that mono-cropping households accessed agricultural extension services more than double-cropping households.

Holding other factors constant, taking the possible correlation between rice double-cropping and emigration decisions as well as

CDRI – Cambodia's leading independent development policy research institute
56 Street 315, Tuol Kork
PO Box 622, Phnom Penh, Cambodia
(855-23) 881-384/881-701/881-916/883-603/012 867-278
(855-23) 880-734
E-mail: cdri@cdri.org.kh
Website: http://www.cdri.org.kh

Table 1: Key Potential Determining Variables of Rice Double-cropping (mean)

Variables	2008		2009	
	Mono cropping	Double-cropping	Mono cropping	Double-cropping
Farm equipment index	-0.19	1.25	-0.07	0.83
Pull/draught animals	1.89	0.84	1.34	1.03
Emigrant (1=yes)	0.17	0.25	0.18	0.13
Loan (1=yes)	0.29	0.50	0.38	0.51
Agricultural extension service (1=yes)	0.11	0.06	0.10	0.03

Source: CDRI survey data (2008-2009)

unobserved heterogeneity among farmers into account, we can conclude that:

- Rice double-cropping and emigration decisions are not closely inter-related;
- Availability of water and agricultural land are the key determinants of rice double-cropping;
- Households reliant on animal draught power for agricultural production are unlikely to engage in rice double-cropping; and
- Loans and agricultural extension services have no significant impact on rice double-cropping.

Policy Implications

The key policy implications arising from the study are that:

- Policies aimed at increasing irrigation and providing socioeconomic land concessions in rural areas may play a critical role in improving agricultural production.
- Strengthening and expanding agricultural extension services are also key strategies to boosting agricultural productivity.

References

Cambodia Development Resource Institute (2010), *Empirical Evidence of Irrigation Management in the Tonle Sap Basin: Issues and Challenges*, Working Paper No. 48 (Phnom Penh: CDRI)

Nang Phirun, Khiev Daravy, Isabelle Whitehead & Philip Hirsch (forthcoming), *Improving the Govenance of Water Resources in Cambodia: A Stakeholder Analysis,* CDRI Working Paper (Phnom Penh: CDRI)

Tong Kimsun, Hem Socheth and Paulo Santos (forthcoming), *What Limits Agricultural Intensification in Cambodia? The Role of Emigration, Agricultural Extension Services and Credit Constraints*, CDRI Working Paper (Phnom Penh: CDRI)

Wokker Christopher, Paulo Santos, Ros Bansok and Kate Griffiths (forthcoming), *Irrigation Water Productivity in Cambodian Rice Systems*, CDRI Working Paper (Phnom Penh: CDRI)