Farmer Organisations in Cambodia: Do they Improve Food Security of the Rural Poor?[1]

Introduction

In developing countries a large share of the poor characteristically live in rural areas where the main occupation is small-scale farming. The importance of smallholder agriculture is recognised by both the international donor community and national governments, as demonstrated in their pledges to undertake requisite interventions to enhance and support agricultural development and rural economic growth. The most commonplace intervention policy adopted by developing countries is to promote the creation of rural producer organisations (Bingen *et al.* 2003; Chirwa *et al.* 2005). The main impetus behind this is to provide effective and collective support services to smallholders so as to loosen the major obstacles to productivity improvement, and to enhance self-help and collective power to regulate markets (Barham & Chitemi 2009; Bachke 2010).

In Cambodia, over 90 percent of the poor live in rural areas and rely on agriculture for their primary sources of livelihood. The country's agricultural sector is predominantly characterised by small-scale farming: about 84 percent of rural farmers own less than one hectare of agricultural land (World Bank 2005, 2009). As Cambodia's agriculture holds immense potential where productivity gains could boost sustainable outputs, particularly employment and the incomes of those who are most dependent on agriculture for their livelihoods (Savanti & Sadoulet, 2008; Theng & Koy 2011), promoting small-scale agricultural-based enterprises would improve rural households' welfare and reduce poverty.

In an effort to support smallholders' livelihoods, the Cambodian government has prioritised agricultural development, as stipulated in the Rectangular Strategy (RS), the National Strategic Development Plan (NSDP) and the Strategy for Agriculture and Water (SAW), that recognises and promotes smallholder farming and farmer organisations (FOs) as key to rural economic development and poverty alleviation (Chea 2010).

Although the Cambodian government has articulated FOs as key to rural agricultural and private sector development, there have been few studies on the effect of FOs on rural livelihoods. Further, there is no available research on the extent to which FOs impact on rural smallholders' livelihoods in Cambodia, let alone the differing impacts of the various types of FO. Better understanding of the impact of FO membership on income improvement, identifying the benefits FO members get and the challenges FOs face would build knowledge about the FO sector in Cambodia, help re-shape current policy and identify effective ways that could further improve and address the needs of FOs and better support smallholders for poverty alleviation.

This study assesses the impacts of FOs on the food security of the rural poor. The specific objectives are to: (1) examine FOs' roles, operation and challenges in improving household food security; (2) analyse household characteristics that determine participation in FOs; (3) assess the impact of FOs on food security and livelihoods of the rural poor; and (4) provide specific recommendations for changes in legal and regulatory frameworks associated with FOs.

Methodology

FO types and study location

There are five different types of FO in Cambodia: Farmer Group (FG), Farmer Community (FC), Farmer Association (FA), Agricultural Cooperative (AC) and Farmer Federation (FF). Of these, FGs, FAs and ACs, which focus on agricultural development and improving rural livelihoods, are the most

1 This article is prepared by Theng Vuthy, programme coordinator, Nou Keosothea, senior research fellow, Keo Socheat and Sum Sreymom, research associates and Khiev Pirom, research assistant, of the Poverty, Agriculture and Rural Development Programme (PARD) at CDRI. This article summarises the empirical findings of the study *Impact Assessment of Farmer Organisation on Food Security for Rural Poor,* a project funded by the World Bank.

Table 1: Propensity Score Estimation for FO Participation (logit estimation)

Variables	Pooled	FG	FA	AC
	z	z	z	z
Age of household head	2.58**	0.76	2.50**	2.71**
Square age of household head	-2.40**	-0.59	-2.36**	-2.60**
Number of years of HHH education	0.93	-0.57	1.17	1.59
HHH can read and write (dummy)	1.54	1.52	0.79	1.62
HHH is male (dummy)	-2.96***	-1.22	-3.93***	-0.89
HHH is married (dummy)	1.46	0.59	2.78**	-0.74
HHH is unemployed (dummy)	-3.19***	-3.27***	-1.78**	-0.61
HHH has salary (dummy)	-0.36	-0.82	0.72	-0.04
HHH is a farm worker (dummy)	-0.95	-1.22	0.3	-1.43
Number of years HHH has lived in village	-0.51	-0.15	-1.29	-0.4
Household size	-2.48**	-1.62*	-1.83**	-1.80**
Square of household size	2.40**	1.64*	2.12**	1.14
Dependents ratio (to adult aged 15-65 years)	1.43	0.91	0.62	1.34
Area of cultivated land m^2	-0.47	-0.37	0.4	-1.52
Square of area of cultivated land m^2	0.25	0.4	-0.36	1.25
Agriculture is primary source of HH income (dummy)	0.41	-0.59	1.19	0.48
Household access to loan in last 12 months (dummy)	4.10***	3.50***	2.50**	2.16**
Index of household agricultural assets	1.92**	1.51	0.97	1.74**
Total value of assets	1.87*	0.64	0.11	3.74***
Square of total value of assets	-2.09**	-1.05	0.05	-3.27***
Value of house	1.04	-1.09	1.03	2.08**
Square of house value	-1.11	0.42	-1.31	-1.44
Household cultivated land is irrigated (dummy)	1.11	3.11***	-0.92	-0.95
Svay Rieng province (dummy)	-0.28	2.04**	-1.83**	-2.48**
Kampot province (dummy)	-1.03	-0.38	-0.84	-1.14
Battambang province (dummy)	0.21	0.22	0.05	0.47
Kompong Thom province (dummy)	-	-	-	-
Constant	-2.14	-1.15	-2.73	-3.00
Pseudo R^2	0.079	0.100	0.116	0.221
Number of observations	695	510	470	445

Note: *, **, *** indicate statistically significant difference at 10%, 5% and 1% levels, respectively.

common. Therefore, these three types of FO were selected for case-study. To obtain a geographically representative sample, the four provinces with the highest density of FOs were selected for study, namely: Battambang, Kompong Thom, Svay Rieng and Kampot.

Household sampling

To obtain a good sample and ensure representative and credible results, 54 FOs were selected from the four provinces by simple random sampling and in a ratio proportionate to the total number of each type of selected FO located in each province. The number of FGs, FAs and ACs to be selected was calculated based on the proportion of 50:30:20 percent, respectively, resulting in a sample comprising 29 FGs, 15 FAs and 10 ACs. To estimate the impact of participation in a FO, non-member households were selected and used as a counterfactual group for comparison purposes. A total of 699 households were interviewed; 330 FO member households were randomly selected from 25 communes across the four provinces[2], and 369 non-member households were randomly selected from the same locations.

Estimation of impacts

To measure the impact of FO participation on the food security of the rural poor, household rice and livestock productivities were used as proxies. Total production and production costs of rice and livestock were used to estimate the performance of households benefiting from FO participation. Propensity score matching (PSM) was used to empirically estimate the impact of FO membership

2 See Theng *et al.* (2011) for details of research methodology and sampling procedures.

Table 2: Average Treatment Effects of PSM for Rice Productivity

Variable	Nearest neighbour matching			Kernel matching		
	Difference (ATT)	T-stat	Trt/Cont Obs	Difference (ATT)	T-stat	Trt/Cont Obs
Rice revenue /ha (0000 riels)						
Pooled sample	8.74	0.85	292/313	8.59	0.93	299/313
- Farmer group	-4.00	-0.29	129/313	-1.22	-0.1	132/313
- Farmer association	23.34	1.36	82/313	-0.95	-0.07	91/313
- Agri. cooperative	35.44	1.91**	75/313	32.61	2.07**	74/313
Rice profit /ha (0000 riels)						
Pooled sample	8.23	0.41	292/313	12.94	0.75	299/313
- Farmer group	-13.10	-0.79	129/313	-1.44	-0.07	132/313
- Farmer association	6.07	0.23	82/313	0.37	0.01	91/313
- Agri. cooperative	50.19	2.43**	74/313	52.87	2.41**	74/313

Note: *, **, *** indicate statistically significant difference at 10%, 5% and 1% level, respectively.

on household rice and livestock productivity (Caliendo & Kopeinig 2008).

Results and Discussion[3]

Participation Characteristics in FOs

Empirical analysis of the survey data reveals that the factors affecting FO participation differ between the pooled sample (all FOs) and sub-samples (FGs, FAs, ACs) (Table 1). The age of household head had a positive and significant probability on participation in FOs, but household heads older than 56 were less likely to be a FO member in the pooled sample and FA and AC sub-samples, whereas the household head's age was not a significant determinant of participation in the FG sub-sample. The significant negative relationship between male household heads and participation in FOs suggests that a higher proportion of female-headed households in the pooled sample and FA sub-sample were likely to join FOs, but this was not so for FGs and ACs. Unemployment of household head and size of household had a significant negative impact on FO participation, whereas access to credit was a key positive determinant of the propensity to participate in the pooled sample and sub-samples, findings which are similar to those of Davis et *al.* (2010), Couturier et *al.* (2006) and Chea (2010).

Households with productive agricultural assets were likely to participate in FOs for pooled sample and the AC sub-sample (Bernard & Sphielman 2009). Land size was not a significant indicator of FO participation. Household welfare had a positive relationship with participation in FOs, but this relationship turned to a negative impact on participation when households became rich with total assets worth 13.6 million riels or more. Thus, in the pooled sample and AC sub-sample, farmers with a higher level of productive capital are less likely to become FO members. Education of household head was not a significant determinant of participation for all sub-samples, suggesting that rural households join FOs regardless of the level of human capital (Table 1).

Impact of FO Participation on Livelihoods

The effect of FO participation on revenue and profit from rice and livestock production was empirically estimated for the pooled sample and sub-samples to determine which types of FO significantly impact on members' livelihoods. After balancing covariates of members and non-members using PSM, the empirical results show that in the pooled sample, though FO members have higher revenue and profit than non-members, FO participation (i.e. for FO members) does not exert any significant effect on the value (revenue) and profit of rice production. However, at sub-sample level, the effect of participation in an AC (i.e. for AC members) has a positive and significant impact on rice productivity and profit. AC members' average

3 Both qualitative and quantitative approaches were used to estimate the impacts of FOs on the food security of the rural poor in Cambodia, but only quantitative information is presented in this paper.

Table 3: Average Treatment Effects of PSM for Livestock Productivity

Variable	Nearest neighbour matching			Kernel matching		
	Difference (ATT)	T-stat	Trt/Cont Obs	Difference (ATT)	T-stat	Trt/Cont Obs
Livestock revenue						
Pooled sample	84.30	1.48	275/297	90.33	1.79*	288/297
- Farmer group	-27.86	-0.54	126/297	-30.50	-0.77	125/297
- Farmer association	190.14	1.44	82/297	200.92	1.76*	89/297
- Agri. cooperative	-17.68	-0.17	69/297	150.99	1.72*	70/297
Livestock profit						
Pooled sample	41.79	0.95	275/297	55.59	1.46	288/297
- Farmer group	-12.15	-0.25	123/297	-18.56	-0.51	125/297
- Farmer association	36.80	0.44	86/297	116.56	1.65*	89/297
- Agri. cooperative	-72.51	-0.84	69/297	109.16	1.67*	70/297

Note: *, **, *** indicate statistically significant difference at 10%, 5% and 1% level, respectively.

rice revenue of about 326,100 riels (USD80.32) per ha and rice profit of approximately 528,700 riels (USD130.22) per ha are higher than non-members', implying that AC member households have better technology and are more cost-efficient than non-member households (Table 2)[4]. This finding coincides with the studies of Bratton (1986), Bachke (2010) and Davis *et al.* (2010).

The effects of FO participation on livestock revenue and profit per household are illustrated in Table 3. The estimate indicates that FO participation exerts a positive and statistically significant effect on revenue, but not on profit, from livestock production in the pooled sample. On average, FO members' revenue from livestock production is about 903,300 riels (USD222) per year higher than non-members', and this is statistically significant at 10 percent level. As far as the sub-samples are concerned, there is a positive statistically significant impact on FA and AC members', but not on FG members' revenue and profit from livestock production. The average causal effect of participation in FAs and ACs on livestock revenues is 200,920 riels (USD50) and 150,990 riels (USD37), respectively, higher than that of non-members and statistically significant at 10 percent.

The positive and significant impact of FO participation on the values of rice and livestock production was largely and directly affected by the use of improved agricultural techniques provided by support agencies. This is supported by the survey findings in that FO members had significantly more access to agricultural technical services for improving crop and livestock productivity than non-members. However, the significant impact on rice and livestock productivity cannot be attributed to collective action in terms of access to markets for purchasing inputs or selling outputs. Because collective action by FO members is largely inefficient, the majority of FO members access inputs (76 percent) and sell outputs (81 percent) on an individual basis, thereby paying and attaining similar prices to non-members[5].

Conclusion

The study concludes that farmer organisation is a good rural development vehicle for enhancing rural household food security by improving agricultural productivity. Participation in an AC impacts positively on rural household food security through improved rice productivity and better livestock production, while participation in a FA only has positive impact on livestock production.

4 Discussion of the results is based on the Kernel matching algorithm

5 See Theng *et al.* (2011) for survey results on training service accessibility and sale of produce.

These impacts are basically attributable to training in agricultural techniques provided by support agencies. However, FOs in Cambodia do not enhance members' access to markets because farm inputs are purchased and agricultural products are sold largely on an individual basis which means the prices paid and attained by FO members are similar to those of non-members.

To strengthen FOs as an effective instrument for advancing rural livelihoods in Cambodia, some concerns arising from this study may need to be addressed. Apart from training in improved agricultural practices, which should be continually available to FOs in order to improve productivity, government policy to provide FOs with low interest longer term loans (about 10 percent per annum and repayment terms of at least two years) would help FO members increase investment in agricultural production. In addition, to increase the impact of participation in FOs for promoting rural economic growth and improving rural livelihoods, a set of complementary inputs and better market accessibility should be supported by stakeholders, especially government. Contract farming would be a good mechanism for connecting FOs to lower input costs and secure market prices. To sustain the operations of all types of FO in Cambodia, external support (technical and resources) should be provided with longer term commitment to allow FOs to learn to be effective and efficient before they operate independently.

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