Tropentag 2016, Vienna

IMPACTS OF RICE CONTRACT FARMING SYSTEM ON SMALLHOLDERS IN MYANMAR

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INTRODUCTION

Myanmar government encouraged the private sector participation along the rice value chain in order to address the market and institutional failures. Private rice specialization companies (RSCs) introduced contract farming business model in major rice production regions of Myanmar since 2008 monsoon season. Since rice contract farming system is still a new phenomenon along with very limited studies in Myanmar, this study contributes to the understanding of the impact of rice contract farming system on livelihoods of smallholders at farm household level.

OBJECTIVE

The research was conducted in July to November, 2014 to determine the factors influencing smallholders' decision to contract participation and its impact on their annual farm and household incomes.

STUDY AREAS

Gold Delta RSC, located in Danuphyu Township, Ayeyarwaddy region and Khittayar Hinthar RSC in Pyay Township, Bago (west) Region.

SAMPLE SIZE

Individual interviews with total 220 contract and 183 non-contract smallholders

Map: Location of study areas in Myanmar

CONCEPTUAL FRAMEWORK

Private Public Partnership approach on Myanmar Rice Sector

CONTRACT FARMNG

Private RSCs
Accessibility of certified seeds, fertilizers, capital, Technical support, Purchasing product at agreed price, processing and export

Smallholder Farm Households

Government
Accessibility of capital, certified seeds, Technical support, Dams, irrigation and drainage canals

Smallholder HH context:
Socioeconomic characteristics, Agro-climatic conditions , Technical status of farming, Policies and institutions

Participation decision of smallholder households in contract farming

Impacts of contract participation on annual farm and total household incomes of smallholders

Strategies to improve smallholders' livelihood and Myanmar rice sector

ANALYTICAL TOOL

Full information maximum likelihood estimation of endogenous switching regression model (FIML ESR) by following the procedure of LOKSHIN AND SAJAIA (2004). Coefficients of FIML ESR were used to determine the average treatment and heterogeneity effects of contract farming.

Table 1: Expected conditions, average treatment and heterogeneity effects

Sample	Decision stage: To participate	Decision stage: Not to participate	Treatment effect
Contract smallholders	(a) $E(Y_{1i} \mid I_i = 1, X_{1i})$	(c) $E(Y_{2i} \mid I_i = 1, X_{1i})$	ATT
Non-contract smallholders	(d) $E(Y_{1i} \mid I_i = 0, X_{2i})$	(b) $E(Y_{2i} \mid I_i = 0, X_{2i})$	ATU
Heterogeneity effects	BH_1	BH_2	TH

(a) and (b) = observed expected annual farm and total HH incomes;

(c) and (d) = counterfactual expected annual farm and total HH incomes, of CF and Non-CF smallholders;

I_i = smallholders' contract participation

(I_i =1, if smallholders participated) and (I_i =0 if smallholders did not participate)

Y_i = annual farm and total HH incomes obtained if the smallholders participated (Y_{1i}) and if smallholders did not participate (Y_{2i})

ATT and ATU = the average treatment effects of contract farming on CF and Non-CF smallholders;

BH_i = base heterogeneity effects for CF smallholders (i= 1) and Non-CF smallholders (i=2);

TH = (ATT –ATU) = the transitional heterogeneity.

RESEARCH FINDINGS

Table 2: FIML ESR estimates for participation decision and impact of contract farming system on annual farm and household incomes

Explanatory variable	Participation decision	Farm income (ln)		Household income (ln)	
		CF	Non-CF	CF	Non-CF
Age of HH head (year)	-0.08*** (0.01)	-0.002 (0.00)	0.001(0.00)	-0.005**(0.00)	0.001(0.00)
Gender of HH head (1= Male, 0= Female)	-0.24 (0.40)	0.12 (0.08)	-0.02(0.08)	0.07(0.09)	-0.17**(0.08)
Education of HH head (year)	0.14** (0.05)	0.02**(0.01)	0.01(0.01)	0.02**(0.01)	0.02(0.01)
Agril-labor share in HH (%)	-0.003 (0.01)	0.004**(0.00)	0.002(0.001)	0.001(0.00)	-0.001(0.001)
Dependency ratio (%)	-0.003 (0.01)	-0.002**(0.00)	0.001(0.00)	-0.003(0.00)	-0.001**(0.00)
Farm size (ha)	-0.07 (0.19)	0.33***(0.03)	0.33***(0.04)	0.23***(0.03)	0.21***(0.04)
Asset value (ln)	0.67 (0.48)	0.20**(0.06)	0.15*(0.09)	0.20**(0.07)	0.15(0.09)
Livestock (No.)	-0.04 (0.10)	-0.02(0.02)	0.03*(0.02)	0.04**(0.02)	0.03(0.02)
Cropping intensity (%)	-0.01 (0.01)	0.002**(0.00)	0.004**(0.00)	0.002** (0.00)	0.003**(0.00)
Demo shock s in past 5 years (No.)	-0.04 (0.13)	-0.05**(0.02)	-0.02(0.02)	-0.02(0.03)	-0.01(0.02)
Climate shocks in past 5 years (No.)	0.04 (0.13)	-0.02(0.02)	-0.02(0.02)	-0.001(0.02)	-0.004(0.02)
Production shocks in past 5 years (No.)	-0.27* (0.15)	-0.02(0.02)	-0.01(0.02)	-0.03(0.03)	-0.01(0.03)
Nonfarm income activities (No.)	0.24 (0.24)	-0.03(0.04)	-0.004(0.03)	0.42***(0.05)	0.40(0.04)
Farm organization (1= Participant, 0= otherwise)	2.37*** (0.27)	-0.01(0.06)	-0.35**(0.12)	-0.10(0.08)	-0.10(0.14)
Region (1= Pyay, 0= Danuphyu)	0.76** (0.31)	-0.14**(0.06)	-0.20***(0.05)	-0.08(0.07)	-0.12**(0.05)
Extension access (1= Yes, 0= No)	1.83** (0.59)				
Constant	-1.53 (4.46)	4.75***(0.62)	4.41***(0.90)	5.26***(0.70)	5.16***(0.99)
ln δ_{CF}, ln δ_{NCF}		-1.30***(0.05)	-1.53***(0.05)	-1.18***(0.05)	-1.44***(0.05)
ρ_{CF} , ρ_{NCF}		0.01**(0.23)	0.04(0.21)	0.14**(0.24)	0.08(0.23)
Wald chi-square			59.27***		53.14***
Log pseudo-likelihood			-90.66		-134.56
Likelihood ratio test for independent equations chi-square			4.04**		3.44**

Note: *, **, and *** denotes significance at 10, 5, and 1% levels. Values in parentheses represent robust standard errors.
Source: Own calculation based on parameter estimates in Stata 12.0 15

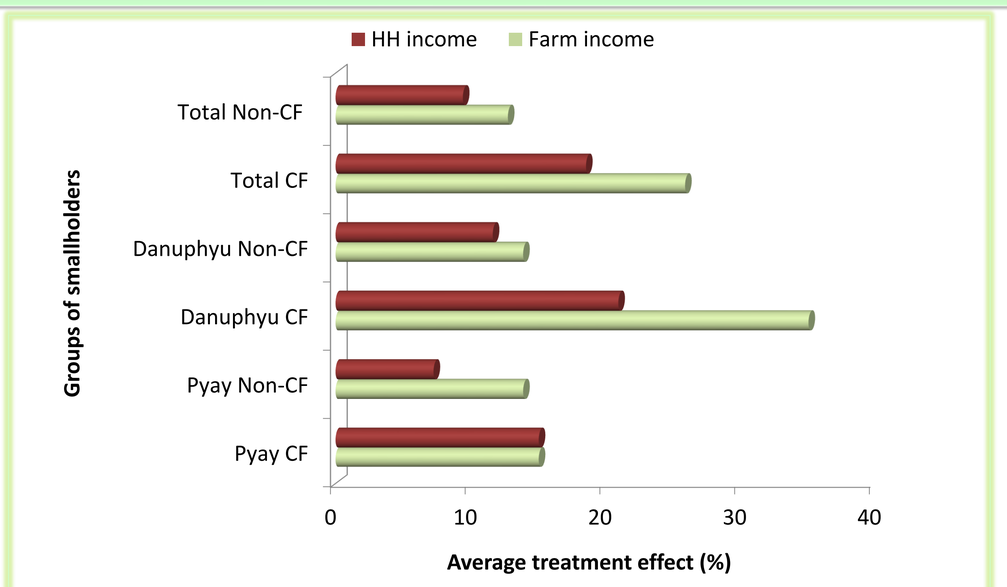

Figure 1: Percentage of average treatment effect (contract participation) on annual farm and HH incomes of smallholders

Source: Own calculation based on parameter estimates in Stata 12.0 15

Table 3: Average expected annual farm income, treatment and heterogeneity effects for smallholders

Sample	Decision stage: To participate	Decision stage: Not to participate	Average Treatment effect
Pyay township			
CF	(a) 7.81 (0.05)	(c)7.67 (0.05)	ATT = 0.14** (0.07)
Non-CF	(d) 7.68 (0.05)	(b) 7.55 (0.05)	ATU = 0.13* (0.02)
Heterogeneity effects	BH_1= 0.13** (0.07)	BH_2= 0.12** (0.07)	TH = 0.01** (0.03)
Danuphyu township			
CF	(a) 8.18 (0.03)	(b)7.88 (0.03)	ATT = 0.30*** (0.05)
Non-CF	(d) 7.90 (0.03)	(b) 7.77 (0.03)	ATU =0.13** (0.04)
Heterogeneity effects	BH_1=0.28*** (0.05)	BH_2= 0.11** (0.05)	TH =0.17*** (0.02)
Pooled sample from both townships			
CF	(a) 8.01 (0.03)	(c) 7.78 (0.03)	ATT = 0.23*** (0.04)
Non-CF	(d)7.79 (0.03)	(b) 7.67 (0.03)	ATU =0.12** (0.04)
Heterogeneity effects	BH_1=0.22*** (0.04)	BH_2=0.11** (0.04)	TH = 0.11*** (0.02)

Table 4: Average expected total household income, treatment and heterogeneity effects for smallholders

Sample	Decision stage: To participate	Decision stage: Not to participate	Average Treatment effect
Pyay township			
CF	(a) 8.13 (0.05)	(c) 7.99 (0.05)	ATT = 0.14** (0.01)
Non-CF	(d) 8.09 (0.05)	(b) 8.02 (0.04)	ATU = 0.07 (0.01)
Heterogeneity effects	BH_1= 0.04 (0.07)	BH_2= -0.03 (0.06)	TH = 0.07*** (0.02)
Danuphyu township			
CF	(a) 8.51 (0.04)	(c) 8.33 (0.04)	ATT = 0.19*** (0.01)
Non-CF	(d) 8.29 (0.04)	(b) 8.18 (0.03)	ATU = 0.11** (0.01)
Heterogeneity effects	BH_1= 0.22*** (0.05)	BH_2=0.14** (0.05)	TH = 0.08*** (0.01)
Pooled sample from both townships			
CF	(a) 8.34 (0.03)	(c) 8.18 (0.03)	ATT = 0.17*** (0.01)
Non-CF	(d) 8.19 (0.03)	(b) 8.10 (0.03)	ATU =0.09** (0.01)
Heterogeneity effects	BH_1=0.15*** (0.05)	BH_2=0.08** (0.04)	TH = 0.08*** (0.01)

Note: *, **, and *** denotes significance at 10, 5, and 1% levels. Values in parentheses represent robust standard errors.
Source: Own calculation based on parameter estimates in Stata 12.0

CONCLUSIONS

- Smallholder households who had young and educated HH head, and less production shocks in monsoon paddy production during past five years, more contact with extension agents and participated in local farmer based organizations as well as regional difference showed significant probabilities on contract participation decision.
- Rice contract farming system had positive and significant impacts on livelihood of smallholders.
- Some important factors skilled the actual contract smallholders even without contracts, and these factors could have also influenced on the contract participation decision.
- Farm production and other income generating activities of non-contract smallholders showed not as good as those of contract smallholders.
- Smallholders via individual contracts with Gold Delta RSC achieved higher impacts compared to those under group contracts with Khittayar Hinthar RSC.

RECOMMENDATIONS

- Supporting sufficient inputs (especially certified seeds and chemical fertilizers with reasonable prices) to reduce production shocks, community relationship via farmer based organizations and extension services should be facilitated by both private and public sectors.
- Informal model should be considered as more efficient contract type to improve smallholders' livelihood.

REFERENCE: LOKSHIN, M. AND Z. SAJAIA (2004). Maximum Likelihood Estimation of Endogenous Switching Regression Models. Stata Journal 4(3):282-289