

DETERMINANT RATE OF TECHNOLOGY ADOPTION IN THE PRODUCTION OF RICE IN CUULONG DELTA

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ABTRACT

Vietnam with 9.3 million ha of agricultural land; about 4.3 million ha are for rice plantation. Rice productivity estimated about 35.85 million tons in 2007. Extensions made a great contribution to rapid increase of rice production in VN by some training course such as: IPM, sowing machine, three reductions – three gains, high yield varieties, dry machine, and harvesting machine. All of technological above helped increase yield, and rice production. However, farmers adopted or fully enjoyed technological was low rate Cantho (23%), Angiang (22%), Tiengiang (24%). More than 75% of farmers are non-adoption, partial adoption or inappropriate of the improved technologies. The main reason of that is not enough the number of traing course and not popular for all of farmers. Each of farmers participate 0.17 to 0.25 times technological training course on average, it meaning, 10 farmers only 1 to 2.5 farmers had been participated training course. Another reasons farmer's non-adoption is education, area of rice cultivative... With expect farmers fully enjoyed and adoptable technological, Extension organization should be intensifying technological training course for farmers, ensure that each farmer participate at least one times technological training course in rice production.

INTRODUCTION

Rice is the main agricultural commodity of Vietnam with 9.3 million ha of agricultural land; about 4.3 million ha are for rice plantation (accounting for 46%). Rice productivity is 4.2 tons/ha, rice output grows at rather high level, to 35.85 million tons in 2007. Extensions made a great contribution to rapid increase of rice production in VN, some training course such as: IPM, drum seeder using (sa hang), three reductions – three gains (3 giam, 3 tang), high yield varieties, mechanical dryer, and harvester had been teaching for the farmers. However, technological advancement has not been fully enjoyed in Cuulong Delta due to non-adoption, partial adoption or inappropriate adoption of the improved technologies. This paper investigates the

determinants of technology adoption in the production of rice. Random sampling methods were used to select the study areas and production of rice in Cuulong Delta. It is necessary for determinants of technology adoption in the production of rice in Cuulong Delta.

RESEARCH DESIGN AND METHODOLOGY

The sample was obtained from the farmer who was production of rice. The sample data was distributed as follows; CanTho (60), AnGiang (73) and TienGiang (40) with implemented by Dept. Economic-Society (CLRRI, 2007). A multiple regression equation was estimated by use of the omnibus logistic function under the SPSS software.

Table 1. Summary of expected signs of the independent variables.

Variable	Definition	Expected sign of its coefficient
X ₁	Educational Level (Edu)	Positive (+)
X ₂	Age of head household (Age)	Negative (-)
X ₃	Experiment of head household in cultivation (Exp)	Positive (+)
X ₄	Total area rice cultivate (Area)	Positive (+)
X ₅	Membership in family (Member)	Negative (-)
X ₆	The times participate technology training course (Tipart)	Positive (+)

Source: Own computation

Econometrics model is use

$$P_i = F(Z_i) = F(a+bX_i) = 1/(1+ e^{-Z_i}) = 1/(1+ e^{-(a+bX_i)}) \dots\dots\dots (1)$$

Where: Z_i = f (Edu, Age, Exp, Area, Member, Tipart).

Z_i = Probability of technology adoption (1 if adopted, otherwise 0)

Edu: Educational Level

Age: Age of head household

Exp: Experiment of head household in cultivation

Area: Total area rice cultivate

Member: Membership in family

Tipart: The times participation technology training course

RESULTS AND DISCUSSION

Table 2: Result of data analysis

	B	S.E.	Wald	Sig.	Exp(B)
EDU	0.0548	0.0330	2.7639	0.0964	1.0563
AGE	-0.0267	0.0122	4.7720	0.0289	0.9736
EXP	0.0153	0.0126	1.4727	0.2249	1.0155
AREA	0.0455	0.0365	1.5524	0.2128	1.0465
MEMBER	-0.0096	0.0471	0.0412	0.8392	0.9905
TIPART	2.7579	0.2110	170.8579	0.0000	15.7663
Constant	-1.2262	0.4292	8.1631	0.0043	0.2934

Taking technology adoption, Z_i, to be Ln P(x)/(1-P(x)) as the dependent variable in the logit model, the resulting multiple regression equation becomes;

$$Z_i = -1.2262 + 0.0548X_1 - 0.0267X_2 + 0.0153X_3 + 0.0455X_4 - 0.0096X_5 + 2.7579X_6 \quad (2)$$

Based on the definitions of the variables as indicated earlier, the equation is presented as:

$$\text{Technology Adoption (Z}_i) = -1.2262 + 0.0548(\text{Edu}) - 0.0267(\text{Age}) + 0.0153(\text{Exp}) + 0.0455(\text{Area}) - 0.0096(\text{Member}) + 2.7579(\text{Tipart}) \quad (3)$$

The interpretation and discussion of each independent variable, as it relates to the dependent variable is explained. *Education:* This variable

took a positive sign (+0.0548) implying that highly educated farmers are better adopters of improved technologies than less educated ones. This positive correlation shows the influence education has on technology adoption. Educated producers have exposure to new technologies and innovations, are more receptive to new ideas and are more willing to adopt, hence the positive correlation between education and technology adoption. *Age of head household:* Knowledge, changing attitude, adopt new technology of the older farmers difficult than younger farmer. Hence, this variable took a negative sign (-0.0267) as expected. *Experiment of head household in cultivation:* This variable had a positive coefficient of 0.0153 as hypothesized. The positive coefficient implied a positive correlation between technology adoptions. Producers who had

experiment in better placed to adopt new technologies than those who did not have. *Total area rice cultivate*: The rice cultivate on land was expected to take too positively (+0.0455) influence technology adoption. Because farmers have large area which will be easily for adopt new technological. Farmers will be not implementing new technological when they have small area. *Membership in family*: this variable took a negative sign (- 0.0096) as expected. All of decision making in the rice production which was implementation by head household. The families

have large memberships as small memberships, both of dependent about the decision making of head household. *The times participate in technological training course*: This variable took a positive sign (+ 2.7579). This coefficient bigger than other constrains, the times participate in technological training course showed the influence of it to farmers adopt technology. This coefficient very important for extension organization which help answer question “why farmer didn’t entire adopt new technological”

Table 3: Average samples in three provinces

	CanTho	AnGiang	TienGiang
Educational Level	5.52	6.48	7.68
Age of head household	45.23	43.66	48.70
Experiment of head household in cultivation	26.87	25.59	22.88
Total area rice cultivate	1.67	2.51	0.48
Membership in family	4.95	4.86	4.31
The times participate technology training course	0.17	0.11	0.23

Source: Dept. Economic- society, CLMRI

From the table 3 we could be found coefficient Z per provinces. From the function (3) we know that the times participate in technological training course which is the most effective to farmers adopt new technological (coefficient relationship between adoption technology and times participate technology training course is 2.76). However, in the Cantho each of farmer participate 0.17 times technological training course on average (Angiang is 0.11 and Tiengiang is 0.23). It is the reason

indicate why farmers didn’t already for adopt new technological? Result in the table 4 showed probabilities that a farmers adopt new technological. We were found out (Cantho is 0.23, Angiang is 0.22 and Tiengiang is 0.24). It means that, only 23% farmers in Cantho willing to adopt new technological in rice production and 77% non-adoption, partial adoption or inappropriate adoption of the improved technologies.

Table 4: Probability and Odds Ratio

	Can Tho	An Giang	Tien Giang
Z	-1.23	-1.28	-1.14
e^z	0.29	0.28	0.32
$1+ e^z$	1.29	1.28	1.32
P	0.23	0.22	0.24
1-P	0.77	0.78	0.76
P/1-P	0.29	0.28	0.32

Only 23% farmers applied new technological is the rate not expected. An extension organization expects farmers adopt with rate higher than. From constrains we know that Edu, Age, Exp, Area, Member cannot change immediately. If we like to change probability adopt new technology of farmers only a way which is change Tipart. Assume each farmer participate 1 times technological training course, probability adopt new technology of farmers in Cantho is 74% (Angiang is 76% and Tiengiang is 72%).

CONCLUSION

Probabilities farmers adopt new technology in the production of rice in Cuulong Delta is lowly. Because, the times participate technology training course on average per farmer is lowly. If we want to achieve probability farmers full enjoyed and adopt new technology in rice production; extension organization must be intensifying technological training courses for farmer. Each farmer participate at least one times technological

training course. Training course organization should be attend to farmers have high education, younger farmers and farmers have large area cultivate. Because all of them have enough condition for adopt new technological.

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Việt Nam có khoảng 9.3 triệu ha đất nông nghiệp, trong đó 4.3 triệu ha là diện tích trồng lúa. Sản lượng lúa năm 2007 ước đạt 35.85 triệu tấn. Sản lượng lúa của Việt Nam tăng lên nhanh chóng có sự đóng góp lớn của công tác khuyến nông tuyên truyền, huấn luyện bằng các lớp tập huấn tiên bộ kỹ thuật trong sản xuất lúa như: IPM, sạ hàng, 3 giảm 3 tăng... Các TBKT trên giúp nâng cao năng suất, sản lượng lúa, tuy nhiên tỷ lệ nông dân ĐBSCL hoàn toàn sẵn sàng cho việc áp dụng TBKT là rất thấp (Cần Thơ 23%, An Giang 22%, Tiền Giang 24%), còn hơn 75% nông dân chưa sẵn sàng áp dụng TBKT, áp dụng TBKT chưa phù hợp, hoặc mới chỉ áp dụng từng phần các TBKT. Nguyên nhân chủ yếu là số lượng các lớp tập huấn TBKT chưa nhiều, chưa rộng khắp. Bình quân mỗi hộ nông dân được tham gia từ 0.1 đến 0.25 lớp tập huấn cũng có nghĩa 10 hộ nông dân chỉ có từ 1 đến 2.5 hộ được tập huấn. Ngoài ra còn một số nguyên nhân khác như: trình độ của chủ hộ (người được tập huấn), diện tích canh tác lúa... Để tỷ lệ nông dân áp dụng TBKT cao hơn, tổ chức khuyến nông cần phải tăng cường thêm các lớp tập huấn và cần đảm bảo mỗi hộ nông dân ít nhất được tham gia từ 1 đến 2 lớp tập huấn TBKT trong sản xuất lúa.