FACTORS AFFECTING PADDY FARMERS TO PROCURE FARM INPUTS IN DEBT

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ABSTRACT

The aim of this study deals with reasons that almost paddy farmers in Mekong River Delta have to procure farm inputs in debt. With 216 households interviewed by questionnaires in An Giang province and using regression model, the study has found that the lack of capital for rice production and the cost of farm inputs are key elements to impact positively on paddy farmers who procure inputs in debt. Furthermore, householder's paddy growing experience, rice selling price, residential area, and value of the property affect negatively inputs procurement in debt of rice farmers. In addition, household size, farm size, and interest of purchase of inputs in debt influence positively on rice farmers when they purchase inputs on credit.

1. INTRODUCTION

Vietnam is one of the largest countries in exporting agriculture products in the world, especially rice with the quality and value achieved 6.88 million tons and 3.23 billion USD in the year of 2010, it is the second largest exporter in the world. 90% of rice exported quantity comes from Mekong River Delta (MRD), and food per capita in this zone account for 2.3 times in compared with the whole country. At present, population in MRD is about 20 million people and 60% of these are farmers. However, the farmer's life in this region is too low with 900USD of GDP per capita against 1,200USD nationwide. Poor households which have income lower than 4.8 million VND per year in Mekong River Delta are 12.60%, higher than Red River Delta (8.3%) and South East (2.3%) regions (General Statistic Office of Vietnam, 2010). The poverty always makes them in debt, debt for daily living and especially for input procurement. It is a vicious circle of farmers between poverty and indebtedness. This thing is an absurdity because nowadays with many progress of scientific techniques in agricultural sector, particularly in paddy production for Vietnamese farmers, it can be seen that there are many new varieties with advantages of high yield, disease prevention, and fallen against strong winds, etc. In addition, there are many kinds of fertilizers, pesticides, growing stimulation substances that are helpful for farmers to prevent diseases and to improve paddy productivity. Moreover, the elements of weather and soil conditions in the MRD are quite favorable for paddy cultivation as comparison to Central and Northern areas of Vietnam. So why is the paddy farmer still poor and falling into indebtedness chronically? According to Vo Tong Xuan (Thesaigontimes, 2011), the farmer, particularly the paddy farmer has to pay high price of inputs and spend too much for cultivation that increase cost

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of goods while rice selling price is not directly proportional. In the other hand, the rice farmer has to procure inputs in debt with usurious interest rate and therefore they have to sell rice immediately after harvesting at prices lower than market prices in order to pay back debt. Do these main factors lead rice farmers falling into indebtedness and purchase of inputs indebt spirally? Therefore, this paper would like to find out what factors affecting inputs procurement indebt of paddy farmers in Mekong River Delta, especially in An Giang province.

2. LITERATURE REVIEW

2.1. Theories of poverty

According to Ted (2006), there are five theories of poverty in contemporary literature, including: (1) Poverty caused by individual deficiencies; (2) Poverty caused by cultural belief systems that support subcultures of poverty; (3) Poverty caused by economic, political, and social distortions or discrimination; (4) Poverty caused by geographical disparities; and (5) Poverty caused by cumulative and cyclical interdependencies. According to Blank (2003), cited in Michael (2006), there are six major theoretical approaches that describe the fundamental causes of poverty including: The economy is underdeveloped or inefficient, poor people lack skills and abilities, capitalism causes poverty, social and political force cause poverty, poor people make choices, social welfare programs cause poverty.

According to Waheed (1996), Dominique and Dileni (2000), Bales (2001), Wan and Cratty (2007), and World Bank (2007), cited in Nguyen Minh Ha and Nguyen Huu Tinh (2010), there are some elements effecting on poverty as follows: i) Career: The employee working in the agricultural sector often has lower income than workers in the industrial or trade and service sectors because they bear many risks such as natural disasters, pestilent insects, low selling price of outputs, unstable price of inputs, etc. ii) Education: In rural areas, most of people have low education and they are often a lack of understanding and lack of ability to acquire knowledge in service of production to generate income to feed themselves and their families. So they often fail in agricultural production and it leads them to low income and poverty as well as lack of capital reproduction. iii) Household size: The higher number of household members has the lower spending per capita is, and the proportion of dependents increases and it leads to the poverty worst. iv) Farm size: lack of farm land or no land will lead farmers to low income and they will have no enough food to feed their families and fall in poverty. v) Accessibility to formal credit: Formal credit sources play an important role for production and business. It helps to increase income for household and is a key factor to eradicate poverty. If household could not access to formal credit, households would lack capital for production and this may lead crops to low productivity. In other case, households must borrow from informal sources for their investment and this may lead them to higher costs because of exorbitant interest rates from informal money lenders.

2.2. Reasons for households purchase goods in debt or on credit

Purchase of goods (either for consumption or household investment) on credit or in debt is real needs of households and when purchase of goods in debt or using of credit transaction takes place, the household may avoid using cash in advance. Of course, it is also costly in that case but they have no alternative choices as facing with daily necessities or needs of production. Purchase of goods

in debt or on credit depends on many different factors of the economy as well as conditions of the households such as life cycle, disposable income, savings, poverty, unemployment status, inflation, recession, interest rates, etc. All cash transactions are subject to cash in advance constrains while credit transaction can be financed by current income or expected income in future (Lucas and Stokey, 1987). Isabelle et al., (2011) illustrated that households are borrowing on a daily basis at slack financial times to make ends meet. Coles (1992), cited in John et al. (2004) explained that income shocks and unemployment could reach 25% of arrears and typically could be prone to self employed consumer. In addition, poverty is main cause of purchase of goods on credit (Pujari, 2011). This can be understood that consumer credit reflects the transfer of household consumption from the period of high income to the period of low income. Household uses credit to bridge temporary drops in income and they use it to address specific needs. The demand for credit of household will be ultimately derived from the underlying plan for consumption and its deviation from income and expenditures (Gantinah, 2007) defined. According to life-cycle model, the demand for credit would arise wherever current income and spending possibilities fall short of consumption wishes. In other words, within this model, credit is simply used to transfer consumption from periods where household income is high to periods where household income is low (Albert and Franco, 1963). As well, Bridges and Disney (2004) suggested that individuals will spend some parts of their life in debt whilst saving and declining assets in others of the life-cycle. Ariyapruchya. et al (2004), cited in Ke and Mali (2008) found that low income, low age, low education, and occupations such as farm operator or low-skilled laborer tend to be associated with greater demand for loan. Whereas, Arvai and Toth, (2001), cited in Ke and Mali (2008) argued that the education level of the head of household, household income, future income expectations and past borrowing experience have positive effect on the propensity to borrow.

Once the financial situation of households is negative that lead households in debt as procurement on credit. The study of Barnes and Young (2003) proved that shocks to real interest rates and income growth expectations, combined with demographic changes explain the growth of household debt

The rise in household indebtedness has largely reflected a growing tendency of households to extract equity from the value of their house to finance consumption (Barba and Pivetti, 2008). They also argued that household would tend to borrow to fund current consumption in periods when income is low, relative to average income over their lifetime, with a view to then repaying the loans in periods when income will be high, relative to average lifetime income. Another aspect, Norhana and Toh (2009) asserted that the low inflation rate and low interest rate have reduced the cost of borrowing and increased the incentive for households to borrow to smooth their desired path of consumption over the life cycle.

2.3. Reviewing previous studies

Pujari (2011) indicated the main cause of the indebtedness of the farmers is their poverty. The farmer has to borrow for various purposes, as he has no past saving of his own. Some times, the crops fail because of the failure of seasonal reversing winds, or because of floods, etc., when he has to make some improvement on his land as building, construction of well, etc, or when he has to buy costly facilities, he is forced to borrow. Pujari (2011) also pointed poverty forces farmer to borrow,

and if the crop fails or low yield that will forces him to have so little for paying off his debt. Having the same viewpoint with Pujari (2011), Rosanna (2004) and Amrit (2010) recognized that there was an increasing resort to credit, usually at usurious interest rates. The farmers were forced to borrow to sustain their living as well as to pay for medical care. As a result, some farmers found themselves constantly in debt for part or all of the year. Paying off last year‘s borrowing leaves them unable to buy food or seed this year, so they have to borrow again. Once, vicious spiral happens to the poor farmers.

Ke and Mali (2008) found that individuals, in their 20-30s prefer to borrow more as their age increases. Support to this argument, Rweyemanu et al., (2003) also discussed in their study that more than 80 percent of borrowers were aged between 18 and 45 years, with a bias toward older farmers.

Demand for rural credit (in cash or in kind) could be determined by household head, household size, household income, input expenditure, farmer’s experience in farming, etc. When income is very low, the marginal utility of consumption is very high. This can be understood strong demand of debt is in inverse proportion to households’ income. Once income is higher, individuals can spend it to consume and need to borrow less (Ke and Mali, 2008). So, the poor farm households find themselves in chronic debt to finance daily consumption and production needs. Their study is also significant in household head as proved that the head of household tends to have higher probability of participation, be less credit constrained than other members and demand higher amount of debt. Meanwhile, farmers with high input expenditures tend to borrow more. The same applies to farmers with great farming experience and those with high incomes, was found by Rweyemanu et al. (2003).

The growing of rice is dependent much on climate changes. Natural calamities are usually unforeseen such as droughts, heavy rain or unexpected floods can make repeated crop failures. Lean season has been caused by pestilent insects force farmers to the difficulties in livelihood and production. Debt is a growing problem for farmers, in many cases, indebtedness are a direct or indirect consequence of drought and floods. Bad weather has meant greater expenses and poor harvests, and as a result, many farmers are now in debt (Rosanna, 2004).

According to Helena et al. (2003), there are many scientists agree that monocultures and overuse of agrochemicals have increased outbreaks of disease. Pesticide also kills so called “friendly insects”- crucial predators on pests or disease vectors – and fertilizers too can have a very harmful effect on vital soil organisms. The massive use of pesticides helped resistance to develop rapidly among pests. Smita (2011) considered that many of farmers are actually consuming much pesticide that they went into debt to purchase. This may worsen the farmers as they cannot escape the cycle of debt.

Narayanamoorthy (2006), cited in Singh (2008) pointed the net income of farm households after deducting costs/ expenditures from their earnings has dramatically declined in Indian. Supporting for this point of view, Prabhakar (2007) indicated with the parallel increase in the cost of farm inputs under the liberalized trade regime, incomes have declined, leading to loses, debts and bankruptcies and eventually to loss of land.

Le Thanh Loan et al. (2006) pointed that farmers themselves feel compelled to deal with the traders who have previous funded their needs or working capital in production such as fertilizers, pesticide and gasoline. As a result, the farmers sell

their product without strong enforcement. In this case, the traders play 2 roles: one side is a capital provider (in cash or in kinds) and other side is a paddy buyer.

Rosanna (2004) and Singh (2008) employed the root cause of the indebtedness was also the informal money lender (also called IT). It is important to note that the lenders provide credit to borrowers easily, but charge exorbitant rate of interest if the farmer does not earn enough to repay on schedule, beginning a spiral into continually increasing indebtedness.

In reality, it is widely known that agriculture highly depends on nature and is operating under high degree of uncertainty. In the case of crop failure, unemployment, disease and death, the borrowers may not have simply enough money at the time of payment. This kind of default is quite common and leads to indebtedness of the lenders. A cumbersome procedure of loan issue, which also requires time and transaction cost, discourages the borrowers in approaching to the formal financial institutions for credit (Singh and Lakhwinder, 2008).

2.4. Hypothesis

Through theories and previous studies, hypotheses that rice farmers purchase inputs in debt are given as:

H1: Lack of capital for rice cultivation and low income have positively influence on debt when rice farmers procure farm inputs.

H2: Householder‘s characteristics affect positively purchase of inputs in debt.

H3: Householders‘ expenditure has a positive impact on inputs procurement in debt.

H4: Farm size and asset of farmers affect positively purchase of inputs in debt.

H5: Natural calamities and pestilent insects influence on debt when rice farmers procure inputs.

H6: Consuming much farm inputs for crops affects positively purchase of inputs in debt.

H7: High input cost impacts positively on debt when rice farmers purchase inputs.

H8: Dependence upon input traders has a positively influence on purchase of inputs in debt.

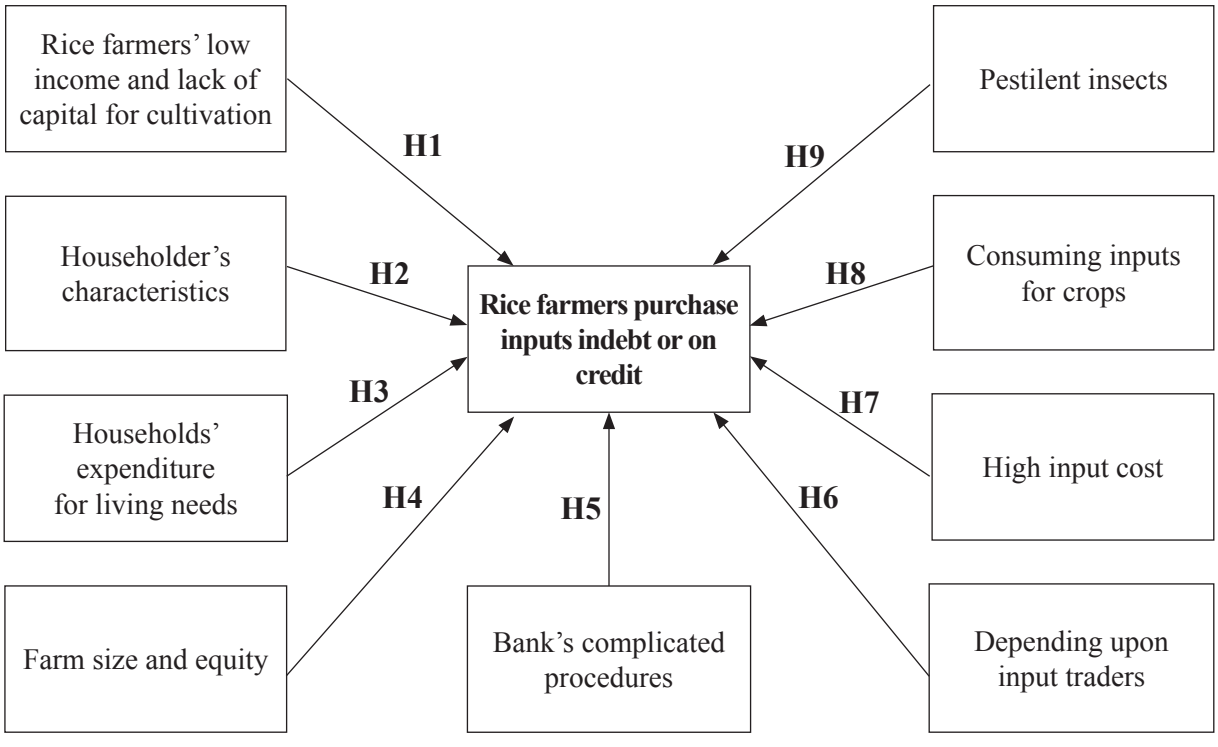
H9: Bank‘s complicated procedures affect positively purchase of inputs in debt.

3. RESEARCH METHODOLOGY

3.1. Research model

Based on conceptual framework and factors driving rice farmers purchase of inputs in debt. A research model is proposed in figure 1 with nine groups of variables: poverty, householder’s characteristics, household’s expenditure, household’s farm size and equity, calamity and pestilent insect, habit of consuming inputs, high cost and low income, depending on input providers, and banks’ complicated procedures.

Figure 1: Proposed research model



The econometric model is as follows:

Y (TDT) = f (HHA, HHG, HHE, HHR, HHD, RPD, RSP, TCT, RSA, RGL, TVA, YLC, YPT, IUW, IDE, UWH, TIR, NIT, LAT, CDT, NMP, CSE09, CSE10)

Where: Dependent variable is total debt from trader (TDT)

Independent variables: HHA: householder's age; HHG: householder's gender; HHE: householder's education; HHR: householder's rice growing experience; HHD: number of members in household: RPD: rice productivity 2010; RSP: rice selling price 2010; TCT: total cost per hectare per year; RSA: residential area 2010; RGL: rice growing area 2010; TVA: total value of other assets; YLC: living cost; YPT: pests 2010; IUW: input using way; IDE: input dosage; UWH: using way habit; TIR: interest of purchase of inputs in debt; NIT: number of traders, LAT: loan amount from official lender: CDT: cumbersome documents; NMP: ability in making loan plan, CSE09: cash shortage 2009; CSE10: cash shortage 2010).

3.2. Study data

Householders in five communes at Tinh Bien district, An Giang province were selected. Data were collected by directly interviewing at the house or at the field when they arranged to be willing to answer the questionnaire or at the suitable point for the interviewer to present, explain and support for rice farmers completed the questionnaire. In 250 respondents collected from rice farmers, there were 216 valid respondents were encoded and inputted after filter.

4. EMPIRICAL RESULTS

4.1. Descriptive statistics

In total 216 valid responses, sample characteristics are shown in table 1, figure 2, 3, 4 and 5. The age of rice householder is relatively high with mean and medium of 45. The youngest is 25 years and the oldest is 69 years. The majority of households are from three to five members, accounting for 82.9% and up to 179 cases, of which 82 households with 4 members, equivalent 38% of total responses. It is easy to find

that the education of rice farmers in interviewed areas is rather low. This is in line with recent warnings about education in the MRD that is lower than the national average. According to the result of this survey, mean and median of householder's education is respectively 5.7 and 5.5. This may lead to limitations in the application of scientific techniques, the use of inputs (both the way and dosage), in identifying pests as well as in considering costs of rice production, interest rate as purchase of inputs in debt, and efficiency of investment in paddy growing, etc. Once the level of education is low, rice farmers base on their experience for the decisions relating to the cultivation of rice. In the responses, the average of experience year is 18 and there are 50% of total responses that had over 16 years.

Figure 2. Householders' age

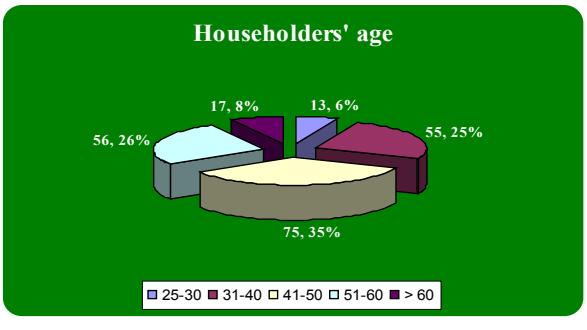


Figure 3. Householders' education

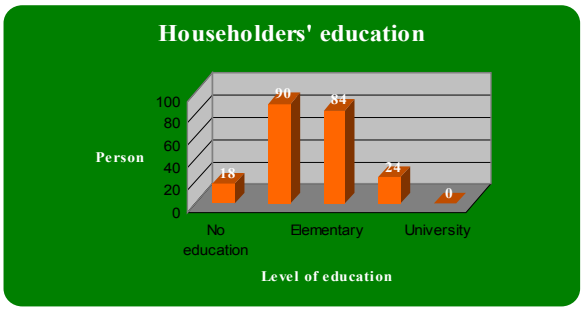


Figure 4. Householders' size

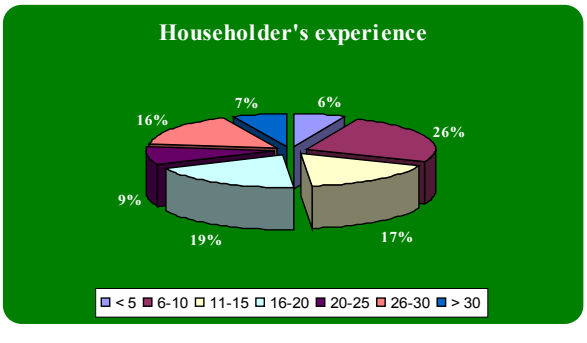
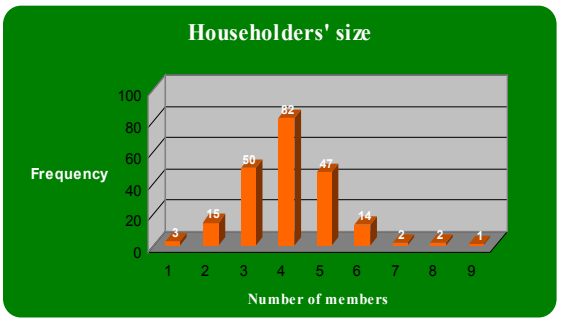


Figure 3. Householders' education



Rice productivity and rice selling price are two essential elements to rice farmers. In case of production costs are stable, productivity and selling price will bring farmer rich harvest. The surplus due to better productivity and price will increase capacity to repay debt for the rice farmer. Therefore, if rice productivity and selling price are high, it is hoped that rice farmer's debt will be declined. Cost of rice production is key factor that is the primary concern of the rice farmer. Why is it so? Because most small rice farmers in MRD are faced with abject poverty. They always face to challenges and constraints when they try to improve their status in rice production. From the result of survey, mean of cost of rice production variable was 50.59. The more cost of rice production increases, the more debt burdens the paddy farmer. Cost of living is also expected to impact on purchase of inputs in debt to paddy farmers because the cost of living is increasing day by day with high inflation rate in Vietnam such foods, dresses, health care, education, festivals, etc that will consume most available cash in the household. This may lead rice farmers have no more money for rice production, especially those with large household demographics or large spending.

Table 1. Result of descriptive statistics

Item code	Variables	N	Mean	Medium	Minimum	Maximum	Std. Deviation
HHA	Householder's age	216	46.051	45	25	69	10.184
HHG	Householder's gender	216	0.963	1	0	1	0.189
HHE	Householder's education	216	5.731	5.5	0	12	3.221
HHR	Householder rice growing experience	216	18.079	16	1	50	9.597
HHD	Number of members in household	216	4.023	4	1	9	1.210
RPD	Rice productivity 2010	216	12.388	12.5	7	19	2.105
RSP	Rice selling price 2010	216	5.189	5	3.7	6.5	0.680
TCT	Total cost per ha per year	216	50.590	49.225	30.4	70.9	8.142
RSA	Residential area 2010	216	0.012	0.01	0	0.07	0.014
RGL	Rice growing area 2010	216	1.286	1	0	5	0.894
TVA	Total value of assets 2010	216	58.501	36.5	0	330	67.524
YLC	Yearly living cost	216	42.706	37.2	12	96	17.474
YPT	Yearly pests 2010	216	0.875	1	0	1	0.331
IUW	Inputs using way	216	0.574	1	0	1	0.496
IDE	Inputs dosage	216	0.394	0	0	1	0.490
UWH	Using way habit	216	0.782	1	0	1	0.414
TIR	Interest of purchase of inputs in debt	216	2.560	2	2	5	0.706
NIT	Number of trader	216	4.227	4	1	6	1.336
LAT	Loan amount from bank	216	23.840	7	0	300	48.301
CDT	Cumbersome documents	216	0.130	0	0	1	0.337
NMP	Not make the loan plan	216	0.380	0	0	1	0.486
CSE09	Cash shortage 2009	216	0.912	1	0	1	0.284
CSE10	Cash shortage 2010	216	0.917	1	0	1	0.277
TDT	Total debt from trader	216	15.594	13	0	60	11.596

4.2. Correlation analysis

Multi co-linearity test: The correlation between two variables CSE09 (cash shortage 2009) and CSE10 (cash shortage 2010) is high 0.97. The rest of variables are less than 0.6. So, this problem is solved in the models.

Autocorrelation test: When the Durbin–Watson = 2 that indicates no autocorrelation. However, if the Durbin–Watson statistic is substantial at interval of 1 to 3, there is no evidence of autocorrelation (Pham Tri Cao and Vu Minh Chau, 2010; and Nguyen Trong Hoai et al, 2009). Null hypothesis is rejected when Durbin-Watson comes to 0 or 4. In the research, the Durbin-Watson of the two models is respectively 1.435 and 1.467 (table 2). The null hypothesis of no autocorrelation is accepted.

4.3. Empirical results

Results from multiple regression models are presented in table 2.

Table 2. Result of multiple regression analyses

	Model 1				Model 2			
Variables	Un-standardized Coefficients		Standardized Coefficients		Un-standardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	Sig.	B	Std. Error	Beta	Sig.
(Constant)	-34.015***	9.676		0.001	-33.335***	9.655		0.001
HHA	0.057	0.074	0.05	0.439	0.051	0.074	0.045	0.49
HHG	4.147	3.117	0.068	0.185	4.021	3.114	0.066	0.198
HHE	-0.007	0.199	-0.002	0.971	-0.02	0.198	-0.006	0.92
HHR	-0.141	0.085	-0.117	0.101	-0.153*	0.085	-0.127	0.074
HHD	1.189**	0.525	0.124	0.025	0.943*	0.526	0.098	0.075
RPD	0.368	0.368	0.067	0.318	0.388	0.367	0.07	0.292
RSP	-2.764***	1.027	-0.162	0.008	-2.734***	1.026	-0.16	0.008
TCT	0.602***	0.09	0.423	0	0.593***	0.09	0.417	0
RSA	-95.601**	48.387	-0.118	0.05	-93.307*	48.33	-0.115	0.055
RGL	1.975**	0.879	0.152	0.026	2.118**	0.882	0.163	0.017
TVA	-0.017*	0.01	-0.102	0.095	-0.019*	0.01	-0.11	0.07
YLC	-0.06	0.043	-0.091	0.163	-0.05	0.043	-0.075	0.244
YPT	-1.701	1.825	-0.049	0.353	-1.719	1.824	-0.049	0.347
IUW	0.741	1.488	0.032	0.619	0.806	1.487	0.034	0.588
IDE	1.329	1.416	0.056	0.349	1.323	1.414	0.056	0.351
UWH	1.263	1.914	0.045	0.51	1.258	1.912	0.045	0.511

TIR	3.626***	1.051	0.221	0.001	3.611***	1.05	0.22	0.001
NIT	-0.171	0.7	-0.02	0.807	-0.149	0.699	-0.017	0.831
LAT	0.011	0.015	0.046	0.456	0.011	0.015	0.046	0.457
CDT	2.853	1.915	0.083	0.138	3.049	1.913	0.089	0.113
NMP	0.726	1.49	0.03	0.627	0.667	1.489	0.028	0.655
CSE09	13.661***	2.156	0.334	0				
CSE10					14.031***	2.203	0.335	0
Valid N	216							
R	0.739				0.740			
R square	0.546				0.547			
R adjusted	0.494				0.495			
Durbin-Watson	1.435				1.467			

Note: (***): Coefficient is significant at the 0.01 level; (**):Coefficient is significant at the 0.05 level; (*):Coefficient is significant at the 0.10 level

Householder's rice growing experience (HHR): This variable has inversely propensity relationship to purchase of input in debt with significance of 10%. As comparison to the research's initial expectation, this result also has inversely proportional to TDT, negative correlation. It means that if householder has much more experience in rice planting, his debt will be increasing because of benefits from his experience. In reality, when the rice farmer who has much more experience in growing paddy, he is prone to apply the scientific and technical progress in selecting right seeds, utilizing sowing machine, using of fertilizers and plant protection products right dose at the right time, etc.

Number of members in household (HHD): HHD variable is directly proportional to Total debt from trader (TDT) with 90% level of confidence. This reflects the view of Waheed (1996), Dominique and Dileni (2000), Bales (2001), Wan and Cratty (2007), and World Bank (2007) that the bigger household size will lead the worst poverty and when they lack of capital for production they have to procure inputs in debt. To this variable, its result accompanies to the research expectation as mentioned above. In fact, once the number of members in household augments, they may spend much more money in advance for education, health care, and other living cost. So the rice household will be shortage of cash and has to procure inputs in debt for rice production.

Rice selling price 2010 (RSP): RSP has inversely positive relation to purchase of input indebt when the un-standardized coefficient of RSP is negative with sig. 0.008 and contributes to the explanation of the level of Total debt from trader. This result has the same direction in descriptive statistics as well as initial expectation. In practice, it is easy to recognize that once the rice farmers have good crops and good prices, they will pay back debt and have

a surplus capital which can be invested in coming crops. Then, they are less dependent on input trader in procurement. Ke and Mali (2008) also pointed that once income is higher, individuals can spend it for consumption on their own money is less because of a surplus source.

Total cost per hectare per year (TCS): This result has the same expectation as aforementioned and previous studies. Prabhakar (2007) indicated with the parallel increase in the cost of farm inputs under the liberalized trade regime, earnings have declined, leading to loses, debts and bankruptcies and eventually to loss of land. It is easy to realize that total cost has tight relationship with Total debt from trader through the un-standardized coefficient is positively with the level of confidence up to 99%. This means that TCS impacts directly on and is positively proportional relationship to TDT. When the cost tents to increase, especially costs related to the purchases of seeds, fertilizes, or plan protection products, rice farmer may extend their debt to the procurement of inputs for rice production. Therefore, rice farmers facing to high input cost and low income are in reality. If the cost of input is high but the disposable income is low that push rice farmers indebtedness from buying inputs in debt and vice versa.

Residential area 2010 (RSA): RSA is negatively, significantly related to Total debt from trader as forecasted in previous part. In order to explain this variable, it can be said that when rice farmers possess many more residential areas, they may be seen as "the rich farmer" and tent to decline debt from purchase of inputs because they may have enough cash in hand for rice production.

Total value of other assets 2010 (TVA): Similarly to RSA, paddy farmers who own more other assets such as warehouse, bicycle, cattle, etc may reduce their debt from purchase of inputs because they may have other incomes from different sources besides rice growing income. Also their spending on facilities may be less because parts of them are equipped already. Variable TVA is inversely prone to Total debt from trader as its sign expectation.

Rice growing area 2010 (RGL): This independent variable is positively proportional relationship to TDT. It means that when householder holds a hectare greater of land area for planting, they have to incur debt more. It does match with the research expectation as predicted Shamika (2003) proved that most loans for purchase of inputs and machinery rise with farm size.

Interest of purchase of inputs in debt (TIR): TIR variable has positively propensity relation to TDT, on the contrary to the research expectation. This independent variable also contributed that when interest of purchase of inputs in debt increases, debt from buying of inputs will follow as well. Theoretically, that thing seems irrational to the same direction between interest rate and debt. Singh (2008) employed the root cause of the indebtedness was the informal lender (also called Input Trader). The Input Trader provides credit to farm households easily, but charges exorbitant rate of interest then the farmer does not earn enough to pay back on schedule, beginning a spiral into continually increasing indebtedness. In reality, when rice farmer had an overdue debt, the input trader may raise interest rate on new credit purchase because of risky provision if rice farmer could not pay back. Once there, though rice farmer could repay due debt, they must continue to purchase inputs in debt with exorbitant rate from traders for the new crop investment.

Cash shortage 2010 (CSE10): This variable plays key role impacting on rice farmer's purchase of input in debt. It indicates that when paddy farmers lack of

cash, they will certainly purchase inputs in debt. Andrew (2001) showed that many small farmers are in near permanent indebtedness, usually to pay off debts, only to then fall into new debt in order to pay for agricultural inputs. This result is different from enterprise using financial leverage to up their return on equity (ROE). Whereas the enterprise wants to know how much profit generated with the money shareholders have invested through financial leverage, the rice farmer is forced to purchase inputs in debt because of cash shortage chronically.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

Multiple regression analysis has presented shortage of cash chronically, cost of production and rice selling price have strong impact on paddy farmers when they procure inputs in debt. When paddy farmer have no cash in hand, they will certainly buy inputs in debt because they have no choice to invest new crop and hope for high income from rice production to pay back debt which arose from previous crops and from initial season. Similarly, cost of production is always constant factor in production process. Once there are an augment of costs such as seeds, fertilizer, pesticide, or harvest cost, the rice farmer needs more capital to invest to the crop and they are forced to be falling in debt for those expenses. Therefore, when the cost tends to increase, rice farmers may be on credit purchase and pay more for rice production, and if the cost of input is high but the disposable income is low and vice versa. The result also presents that rice selling price inversely positive relation to purchase of inputs in debt. When crop failure or rice selling price's decline, the rice farmer could not pay back debt and fell into indebtedness. In addition, other factors such as householder's rice growing experience, household size, farm size, level of property, and trader's interest rate have certain implications to rice farmers who purchase inputs in debt or on credit.

5.2. Recommendations

The rice householder should pay attention to the following implications to avoid the dependence on debt chronically when purchase of inputs for rice crop investment:

Production costs are a very important component in the structure of production costs. Rice production costs include varieties, fertilizers, pesticides, rental land, land preparation, tending rice, irrigation, harvest, and after harvest. Only one of these costs increase, it makes costs of production to go up. Therefore, the rice farmer has to use costs listed above by the most effective way. For cost of variety, depending on soil conditions of each region, economic conditions as well as other relevant conditions, the paddy farmer should select varieties which are the most suitable. Particularly, they must comply with the official recommendations from Department of Agriculture and Rural Department in their location, besides the rice farmer should only procure certified varieties at trust sources. The right selection of variety will help the rice farmer having good plans for whole crop. For fertilizer and pesticide costs, the rice farmer should comply with dosage level in products' label or with technicians' recommendations. Besides, there are many kinds of fertilizer and pesticide products but having the same active ingredient, concentration, and treatment, etc so the rice farmer should only choose certified products and avoid using expensive products that increase cost of production unnecessarily. For harvest and after-harvest costs, these costs incurred by losing in the process of harvesting, collecting,

threshing, drying, storage, transportation, and milling, etc. These processes lead big loss, low quality, and bad image and certainly, rice selling price will be low or under expectation. In addition, most of rice farmers don't have warehouse, drying ground, and transportation means as well, so they may sell rice at farm or they will dry rice on the road and store outside their houses. These practices lose quantity and quality of rice. In order to detach those, the paddy farmer should associate together to enhance agricultural mechanization in rice production as well as to build warehouse, drying ground, and transportation means for aiming loss reduction target.

The rice householder should avoid depending on experience to make decisions impulsively related to rice cultivation techniques such as soil conditions, seed treatment, fertilizer and pesticide dosage, etc. These issues need to be consulted carefully from the technicians of Plant Protection Companies, especially the official recommendations from Department of Agriculture and Rural Development, Plant Protection Department, Centre of Agriculture Extension, etc.

When the paddy farmer follows official instructions of agricultural institutions in synchronization, they may have a good consequence with expectation price of rice from right collection of varieties, complying strictly with official recommendations as well as executing mechanization for whole production process.

The government should pay much attention to fix gaps in "rice value chain". The government should put more control over inputs distribution to ensure inputs' origin, quality, and price, especially in the policy of price or low interest supports when rice farmers procure inputs in debt. In addition, the government should release policies which can keep competitive price for both paddy farmers and dealers. In the other hand, the government should encourage enterprises to invest in building warehouses, drying grounds as well as means that can help paddy farmers to decrease harvest and after-harvest costs.

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