

# Determinants of Farmers' Perceptions towards the Adoption of New Farming Techniques in Paddy Production in Sri Lanka

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## Abstract

The aim of this study is to identify and analyze the demographic, farming and other characteristics that influencing the perceptions of farmers to adopt new agricultural technologies in paddy sector evidence from Divulapitiya region in Sri Lanka. For this purpose, simple random sampling technique was used to select hundred farmers from three main paddy producing areas in the above region for the period of 2015. Primary data related to farmers' perceptions and the characteristics of demographic, farming and others such as attitudes of the farmers towards risk and availability of market information were collected through a structured questionnaire. Dependent variable is the adoption of farmers' perceptions which has the ranges between zero to one and farmers' age and education, size of cultivated land, ownership of land, farming experience, attitudes of the farmers towards the risk and availability of market information were treated as explanatory variables. The collected data were analyzed using different econometrics techniques such as frequency analysis, chi – square test, Tobit model and marginal effects. Frequency results of farmers' perceptions to adopt new types of technologies indicates that, nearly 6% of the farmers not adopting any type of technologies while, 35% of them adopting any three types of technologies. Only 17% of them was adopting all four types of technologies in paddy cultivation in Divulapitiya area. Empirical results of Tobit model reveal that the farmers' adoption decisions were significantly influenced by all the above characteristics and the marginal effects shows that the farmers who have more educational knowledge interested nearly 15% of more probability to adopt new techniques while the farmers who are prefers to avoid the risk interested almost 7% of less likely to adopt them in their cultivation. Findings of this study highlight the relevance of networks that promote farmer-to-farmer interactions in the circulation of new technologies and also it is important to policy makers to endorse paddy cultivation with expertise knowledge in the applications of new farming techniques in paddy cultivation in the Divulapitiya, Sri Lanka.

**Keywords:** Demographic and farming characteristics, perceptions of farmers, Tobit model, Marginal effects.

## 1. Introduction

Agriculture is one of the major leading sectors of the economy in which paddy contribute a significant share of the output of the agricultural sector in Sri Lanka. In 2015, this sector contributed about 30% of the gross domestic product engaging more than 60% of the labour force of the population in the nation (Central Bank Report, 2014). Nowadays, methods of new production techniques are the main determinants of paddy yield and thus the adoption of new types of technologies and innovations in paddy cultivation provides the opportunities to increase the paddy production and farming income who are cultivating paddy in their cultivation. Unluckily, it is rare that all farmers are able and willing to adopt new technologies and thus they have not much intension to practice them in their field. Because of the many factors that deterrents them to adopt improved technical methods by demographic, various socio - economic, institutional, farming and environmental factors.

In the ancient period, people were engaged in paddy cultivation depending on rainy water and manual production methods and now using new machineries in harvesting and other production process. The agricultural officers who were trained abroad and local universities provide timely instructions and guidelines to farmers to uplift the paddy sector. In the present situation most of the traditional paddy farmers are adopting modern farm technological method such as new paddy seeds, chemical fertilizer, agro-chemicals and new farm machines. As a result, last decades paddy sector has been transformed rapidly from the traditional to commercial status due to the adoption to new methods of cultivation, high yielding varieties, and extensive investment in irrigation. This has resulted in the increase of paddy harvest as well as helped to improve the lives of the community whose mainstay is agriculture. In this background, adoption of new techniques are the important factors to influencing the paddy yield even though the farmers they have reluctant to apply the new farming innovations and the techniques in the cultivation and their attitudes towards to avoid the risk also significant factors to determine their perceptions in this sector in the area.

Divulapitiya region located in Gampaha district in western province in Sri Lanka and the study area has the three main agricultural field blocks namely Marandaghamula, walpita and Badalgama. In this area most of the farmers are cultivating different varieties of paddy, such as BG 358, BG 300, BG 308 and BW 367 and rest of the other farmers are cultivating minor crops likes cinnamon, coffee, ginger, kurakkan, and soya beans.

Objectives of this study is to identify the farmers' perceptions towards the adoption of new technologies

and examine the impact of demographic characteristics, farming and other characteristics related to attitudes of the farmers towards the risk and availability of market information influencing on their awareness to adopt new technologies in paddy cultivation in Divulupitiya region, Sri Lanka.

## 2. Review of Literature

Kebede (1990), conducted a study on adoption of new technologies in Ethiopian agriculture in Tagulet-Bulga district, shoa province and he has found that education level of farmers had positive effect on the adoption of new technologies in their agriculture in Ethiopia. Oladele, O.I (2005), investigated a study on a Tobit analysis of propensity to discontinue adoption of agricultural technology among farmers in South Western Nigeria. From the estimation he has found that extension visits is the significant variable to discontinuance of improved maize and cowpea varieties in Nigeria. Uaiene, Rafael N. (2005) have examined on determinants of agricultural technology adoption in Mozambique and their results indicated that, households with access to agricultural advisory services, those with access to rural credit and members of agricultural associations are more likely to adopt new agricultural technologies in Mozambique.

Olusegun Ayodeji Fadare, Dare Akerele and Begho Toritseju (2009) have assessed the factors influencing adoption decisions of maize farmers in Nigeria and their results suggest that farm size, education level of farmers and access to extension services would significantly influence adoption of improved maize varieties in the study area. Binod Kafle (2010) reviewed a study on determinants of adoption of improved maize varieties in developing countries and the results pointed out a number of socio-economic characteristics, agro-ecological variables, and farmers' perception as important determinants of improved maize varieties in different countries. Among these variables, extension contact, education, farm size, credit availability, use of fertilizer, low land area, yield and profitability are found to be major determinants which have strong positive influences. O. C. Ajewole (2010) analyzed the socio-economic factors influencing on farmers' response to the adoption of commercially available organic fertilizers in Oyo State, Nigeria. Results of the estimated Tobit model showed that number of years spent in acquiring formal education, household size, and number of extension visit received during last cropping season positively influenced on the adoption decisions, while farming experience, farm size, and distance from source of supply of commercial organic fertilizer have negatively influenced on it.

Samuel A. Donkoh and Joseph A. Awuni (2011) evaluated the farmers' perceptions and adoption of improved farming techniques in low-land rice production in Northern Ghana. They have identified that there is a need for more extension work and motivation as well education on the misconception the farmers had about the fact that if they used organic manure in their rice fields they would turn upland. Marc Jim Mariano, Renato Villano and Euan Fleming (2011) have conducted a study on factors influencing farmers' adoption of modern rice production technologies and good management practices in the Philippines. Their results revealed that farmers' education, machinery ownership, access to affordable credit, irrigation water supply, capacity-enhancement activities and profit-oriented behaviour significantly increase the adoption in rice production in Philippines. C.O. Ebojei., T.B.Ayinde and G.O.Akogwu (2012) have examined the socio economic factors influencing the adoption of hybrid maize in Giwa local government area of Kaduna State, Nigeria. Their study suggests there is a need to bring more area under hybrid maize cultivation and also, there is a need for special training, seminars, field demonstrations and technical support for the maize farmers are needed for the farmers to adopt the hybrid maize in their cultivation.

W.A.C.K. Chandrasiri (2013) has examined the farmers' perception and adaption to climate change: A case study in vulnerable areas of Kurunagale district using logistic regression model. The results revealed that lack of knowledge on adaptation methods, unavailability of prior information on climate change, absence of suitable cultivars and lack of funding are the factors hindering adaptation in the study area. Richard Baffoe-Asare, Jones Abrefa Danquah and Festus Annor-Frempong (2013) have examined the socio - economic factors influencing adoption of Codapec and Cocoa high-tech technologies among small holder farmers in Central region of Ghana. The data were analyzed using Tobit multivariate regression model to understand socioeconomic factors influencing farmers' decision to adopt these technologies and the results proved that experience, training, age of household head, household size and social capital as the key variables that positively influence on the decision of farmers to adopt Cocoa pest and disease in the study area. Another study has done by M. A Sarker, Y. Itohara and M .Hoque (2013) to identify the dominants of adoption decisions: The case of organic farming in Bangladesh. For this purpose logit model was used and the results showed that perceptions of organic farming, household access to extension services, number of family laborers and household income were significantly associated with decisions to adopt organic farming in Bangladesh.

## 3. Statements of Hypotheses

The hypothesis were tested with respect to demographic characters such as farmers' age, level of education, farming characters such as ownership of land, experience in farming and other characters such as attitudes of the farmers towards the risk and availability of market information on adopting new technological methods in the

paddy sector.

### 3.1 Demographic characteristics

#### a) *Farmers' age*

Previous researchers have found that farmers' age is significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether farmers' age is statistically significant in influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a negative relationship between farmers' age and their perceptions to adopt new technologies.

H<sub>1</sub>: There is a positive relationship between farmers' age and their perceptions to adopt new technologies.

#### b) *Level of education*

Most of the researchers have found that level of education significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether level of education is statistically significant in influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a negative relationship between level of education and farmers' perceptions to adopt new technologies.

H<sub>1</sub>: There is a positive relationship between levels of education and farmers' perceptions to adopt new technologies.

### 3.2 Farming characteristics

#### a) *Farm size*

Previous research proves that farm size has significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether farm size is statistically significant influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a negative relationship between farm size and farmers' perceptions to adopt new technologies.

H<sub>1</sub>: There is a positive relationship between farm size and farmers' perceptions to adopt new technologies.

#### b) *Ownership of paddy land*

Some research has found that ownership of paddy land sensitively influences on the decision for adoption of new agricultural technology. Here, the hypothesis used to confirm whether cost of technology statistically significant influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a positive relationship between ownership of paddy land and farmers' perceptions to adopt new technologies.

H<sub>1</sub>: There is a negative relationship between ownership of paddy land and farmers' perceptions to adopt new technologies.

#### c) *Farmer's experience*

Previous research has found that farmers' experience is significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether farmers' experience is statistically significant in influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a negative relationship between farmers' experience and their perceptions to adopt new technologies.

H<sub>1</sub>: There is a positive relationship between farmers' experience and their perceptions to adopt new technologies.

### 3.3 Other characteristics

#### a) *Attitudes of the farmers towards the risk*

Previous researchers have found that risk attitudes have significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether risk attitudes have statistically significant influence on the decision for adoption of new agricultural technology.

H<sub>0</sub>: There is a positive relationship between risk attitudes and farmers' perceptions to adopt new technologies.

H<sub>1</sub>: There is a negative relationship between risk attitudes and farmers' perceptions to adopt new technologies.

#### b) *Availability of market information*

Previous empirical studies have proved that availability of market information has significantly influences on the decision to the adoption of new agricultural technologies. In this study, the hypothesis used to confirm whether availability of market information has statistically significant influence on the decision to adopt new agricultural technologies.

H<sub>0</sub>: There is a negative relationship between availability of market information and farmers' perceptions to adopt new techniques.

H<sub>1</sub>: There is a positive relation between availability of market information and farmers' perceptions to adopt new techniques.

## 4. Methods of Data Analysis

This section describes the definition of the variables, methods of data collection, population and selection of

sample size related to the variables which are used in this study. Also, the collected data were analyzed using different econometrics methods that explained under the methods of data analysis in the study.

#### 4.1 Definition of the variables

The definitions and the measurements of the variables used in the study were summarized in the following table.

Table 1: Definitions of the variables used in the empirical model

#### **Dependent variable**

Farmers' perceptions Proportion of the number of new type of technologies adopted by the farmers to the number of possibilities to adopt new type of technologies.

#### **Independent variables**

##### **Demographic characteristics**

Gender 0 for female; 1 for male  
 Age Age of the farmers measured in years  
 Education 1 for no school at all; 0 otherwise  
 1 for primary education; 0 otherwise  
 1 for secondary education; 0 otherwise  
 1 for higher education; 0 otherwise

##### **Farming characteristics**

Farm size in acre Farm size measured in acre  
 Land ownership 0 for own land; 1 for tenant land  
 Experience Years of farmers' experience in paddy farming

##### **Other characteristics**

Attitudes towards the risk 0 for no fear; 1 for fear  
 Availability of market information 0 for not available; 1 for available

#### 4.2 Sampling Procedures

To identify how the farmers' perceptions and adoption of new agricultural technologies is affected by characteristics of demographic, farming and others such as attitudes of the farmers towards the risk and availability of market information, primary data were collected from three main agricultural field blocks which fall under this study area. The population of the study is the number of paddy farmers living in the region which is approximately 8000 and out of this population 150 samples were selected randomly using random table and a set of questionnaires designed and they were issued for the respondents. However, only 100 samples were chosen from 150 which were completed properly by the respondents. To accomplish the objectives of this research, paddy farmers survey was done in main three agricultural field blocks namely Marandagahamula, Walpita and Badalgama. Eighty farmers were selected from Marandagahamula and Walpita and rest of the twenty were selected from Badalgama areas. The questionnaires were developed focusing on farmers' perceptions which was the dependent variable measured by the ratios considering four types of new technologies such as new paddy seeds, chemical fertilizer, agro chemicals and new farm machines. Thus, the dependent variable should be lies the ratios between the values of one and zero refers that whether the farmers are adopting only one or two or three or all four types of techniques. The seven independent variables related to the above three characteristics of farmers, such as farmers' age, education level of farmers, farm size, land ownership, farmers' experience, and attitudes of the farmers towards of risk and information availability on market situations were used by as binary and scale data.

#### 4.3 Research Design

Different methods of econometrics analysis were applied to identify the attitudes of the farmers towards the adoption of improved technological methods in the paddy cultivation.

##### *i) Frequency analysis*

In the beginning frequency analysis was used to describe the basic features of data set and they provide the summaries of the sample.

##### *ii) Chi – square test ( $\chi^2$ )*

Chi – square test with cross tabs was done to identify the association between perceptions of farmers and their demographic, farming and other characteristics in paddy production.

##### *iii) Tobit model*

Because of the nature of limited dependent variable, Tobit model was used to estimate linear relationship between dependent and independent variables when there is an either left or right censoring in the dependent variable. Compared to logit and probit model, Tobit model is more appropriate since the dependent variable has the values in ranges between zero and one while other two models have either zero or one only. Tobit model can

be formulated as below:

$$Y = \beta_0 + \beta_1 \text{ Age} + \beta_2 \text{ Education} + \beta_3 \text{ Land ownership} + \beta_4 \text{ Farm size} + \beta_5 \text{ Experience} + \beta_6 \text{ Farmers' attitudes towards risk} + \beta_7 \text{ Availability of market information} + \epsilon$$

Where

Y = 0 if a farmer failed to adopt any of four types of new technologies.

Y = 0.25 if a farmer adopted any one of the four types of new technologies.

Y = 0.50 if a farmer adopted any two of the four types of new technologies.

Y = 0.75 if a farmer adopted any three of the four types of new technologies and

Y = 1 if a farmer adopted all four types of new technologies.

The dependent variable Y is the farmers' perceptions to adopt new technologies were measured by the ratio considering four types of technical methods which applied in their cultivation as below:

$$Y = \frac{\text{Number of new type of technologies adopted by paddy farmers}}{\text{Number of possibility to adopt new types of technologies}}$$

Number of possibility to adopt new types of technologies

$\beta_0$  is constant and  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  and  $\beta_7$  are represent the respective coefficients of each explanatory variables.

#### iv) Marginal effects

Marginal effects are more useful to interpret the results of Tobit model effectively and this effects show the probabilities of occurring the dependent variable with respect to the changes in explanatory variables. The positive marginal effect of an explanatory variable indicates that the probability of an adoption of new agricultural technologies by paddy farmers that particular ranking increases while a negative marginal effect of the variable indicates that the probability of an adoption of new agricultural technologies by paddy farmers that particular ranking decreases.

## 5. Results and Discussions

In the initial stage, the data were analyzed using frequency statistics of the variables and its results were described as below:

### i) Frequencies of dependent variable

In this section describe the frequencies of dependent variable which is the adoption of farmers' perceptions to adopt new technologies under the different categories.

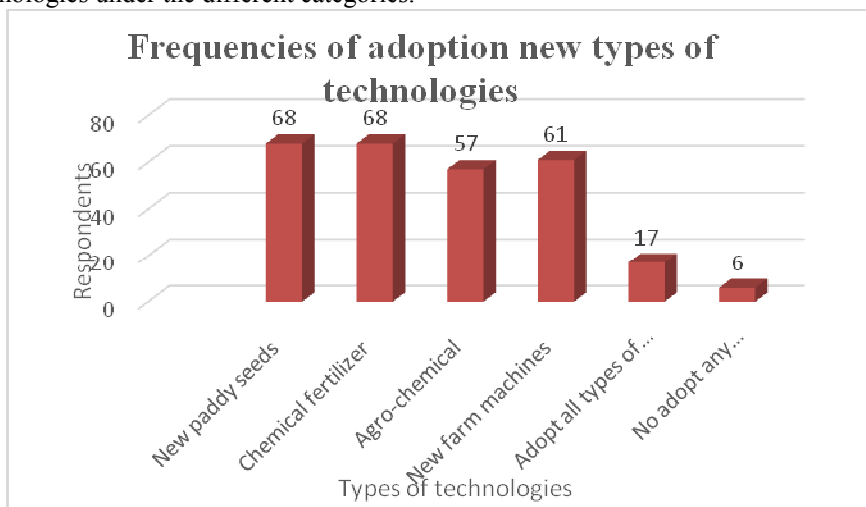


Figure 1. Frequencies of Adoption of New Types of Technologies

The study focused on four types of technologies to measure the farmers' perceptions to adopt new types of technologies in paddy cultivation. The results were indicated in figure 1, out of the hundred farmers, sixty eight farmers used both new paddy seeds and chemical fertilizer while fifty seven farmers adopted agro - chemicals and sixty one farmers were interested in using new farm machineries. On the other hand six farmers not adopting any of these technologies while seventeen farmers are adopted all types of technologies.

Further, the above results indicate that, nearly 6% of the farmers not adopting any type of technologies while, 35% of them adopting any three types of technologies. Only 17% of them was adopting all four types of technologies in paddy cultivation in Divulapitiya area.

### ii) Results of Chi-square test

Chi - square test also used to identify the association between the perceptions of farmers towards the adoption of new technologies and the characteristics of demographic, farming and others.



Table 2: Results of Cross tabs and Chi- square Test for Selected Variables

Variables	perceptions					$\chi^2$	Significant value
	No any	Any one	Any two	Any three	All four		
<b>Sex</b>						1.91	.752
Female	0%	25%	12.5%	37.5%	25%		
Male	6.5%	15.2%	27.2%	34.8%	16.3%		
<b>Land ownership</b>						20.13	.000*
Own	3.5%	14%	22.1%	40.7%	19.8%		
Tenant	21.4%	28.6%	50%	0%	0%		
<b>Education level</b>						36.80	.000*
No school	0%	0%	50%	50%	0%		
Primary	26.3%	36.8%	31.6%	5.3%	0%		
Secondary	1.4%	11.6%	24.6%	43.5%	18.8%		
Higher	0%	10%	20%	30%	40%		
<b>Risk attitudes</b>						12.29	.015**
No	5.6%	12.7%	28.2%	29.6%	23.9%		
Yes	6.9%	6.9%	20.7%	48.3%	0%		
<b>Information availability</b>						11.18	.025**
No	10%	33.3%	16.7%	23.3%	16.7%		
Yes	4.3%	8.6%	30%	40%	17.1%		

\*Data included are the cross tabs within the various categories and \*, and\*\* indicate the significance level at 1% and 5% respectively.

In the above table proves that all variables were statistically significant association with farmers' perceptions in adopting new technologies except gender. 3.5% of the farmers who have own land not adopting any types of technologies while 41% of them adopting any three of new technologies. Nearly 24% of farmers who have the attitudes to accept the risk, adopting all four types of technologies while among the farmers who are not ready to accept the risk no one adopted any of the above all types of technologies in their cultivation process.

iii) Estimation results of Tobit model

Tobit regression analysis was performed on the collected data from the survey to obtain the maximum likelihood estimate of Tobit coefficients and the estimated results were given in the following table.

Table 3: Results of Tobit Model for Demographic Characteristics

Variables	Coefficient	Standard Error	t-value	P>t
Age	.0091525	.0033296	2.75	0.007*
Education	.2680576	.0531607	5.04	0.000*
Constant	-.361315	.2093556	-1.73	0.088

Source: Survey data, 2015

\* indicate the significance level at 1%

Age of the farmer either male or female had strong positively influence on the adoption of innovative technologies in paddy cultivation. Since in the study area most of them are in the middle age farmers and they tend to be more innovative and more apt to adopt new technology due to their longer planning and lower risk aversion characteristics. Coefficient of age has statistically significant support to reject the null hypothesis and accept the alternative one proves that as age increases, the farmers have more likely to adopt new techniques in their cultivation. Similarly, education also statistically significant indicates that null hypothesis is rejected and thus the farmers who have more educated encourage them to adopt new farming techniques in the paddy sector. Because of the higher educated farmers can easily understand the applications of new machines and other inputs like new varieties of seeds, fertilizers and chemicals.

Secondly, farming factors that affect for farmers perception were examined using the model and the results were depicted in table 4.

Table 4: Results of Tobit Model for Farming Characteristics

Variables	Coefficient	Standard Error	t- value	P>t
Land ownership	-.2104669	.0858786	-2.45	0.016**
Cultivating land in acre	.1151813	.0277591	4.15	0.000*
Farmers' experience	.012112	.0034977	3.46	0.001*
Constant	.0954887	.1060266	0.90	0.370

Source: Survey data, 2015

\* and\*\* indicate the significance level at 1%, 5% respectively

The coefficient of land ownership of paddy farmers has negative sign reveals that farmers who were cultivated their paddy in tenant land, they have less probability to adopt new farming practices than who have cultivating the paddy production in their own land. Its coefficient also significant guides to reject the null and accepts the alternative hypotheses support to the above findings in the study.

The coefficient for size of cultivating land has positive sign shows that farmers who were cultivated paddy in more acres they have more interested to adopt new farming techniques and also it is statistically significant at 0.01 level. This finding concludes that the null hypothesis is rejected and accepts the alternative hypothesis.

As expected, the adoption of new technologies and farming experience of paddy was positively and significantly correlated each other indicated that the farmers' getting more and more experience in paddy cultivation, they have more probability to adopt new types of technologies. Because, experienced farmers are less risk averse and willing to adopt an innovative technology that is perceived to come with high financial rewards and improve their lot.

Finally other factors such as attitudes of risk and availability of information affecting on the farmers' perceptions were analyzed using the same model and the result were giving in the table 05.

Table 5: Results of Tobit Model for Other Characteristics

Variables	Coefficient	Standard Error	t-value	P>t
Risk attitudes	-.160829	.0758249	-2.12	0.036**
Information availability	.1563293	.0756057	2.07	0.041**
Constant	.5620533	.0663912	8.47	0.000

Source: Survey data, 2015

\* and \*\* indicate the significance level at 1% and 5% respectively

The coefficient of attitudes towards risk has negative sign and it is statistically significant at 0.05 level, proves that the farmers who are prefers to avoid the risk has less probability to adopt new technologies compared with the farmers who are prefers to taking the risk. The positive sign of the information availability with statistically significant level shows that the farmers who have receiving the information on new technologies have more likely to adopt new technologies than others who have not get the information in time. In both cases, null hypothesis was rejected and alternative hypothesis was accepted.

#### iv) Marginal effects

The results of marginal effects after estimated the Tobit model was able to explain the effect of a change in explanatory variable on the response variable in terms of probability. The estimated results of marginal effects for selected explanatory variables were illustrated in the following table.

Table 6: Results of marginal effects for selected independent variables

Variables	dy /dx	Standard Error	z	P>z
Age	.00114	.00361	0.32	0.752
Land ownership	-.09513	.08171	-1.16	0.244
Cultivating land in acre	.10138	.0256	3.96	0.000
Farmers' experience	.01212	.00428	2.83	0.005
Education level	.15435	.04682	3.30	0.001
Risk attitudes*	-.06992	.05749	-1.22	0.224
Information availability*	.12156	.05558	2.19	0.029

Source: Survey data, 2015

\* refers that dy/dx is for discrete change of dummy variable from 0 to 1

Marginal effects of farmers' age has positive sign shows that as age increases, they have 0.1% of more probability to adopt technologies assuming that other factors are constant. Negative sign of the land ownership depicts that tenant farmers have 9% of less likely to adopt new farming practices that farmers who are cultivated in their own land. In the other hand marginal effect of cultivating paddy land acre has positive sign and it shows that famers cultivating land increases per acre that they have 10% probability to adopt new types of technologies assuming other factors are constant. Similarly marginal effect for farming experience of the farmers have positive sign and it shows that experience of farmers increase in one year that farmers have 12% probability for adopting new types of technologies in farming cultivation process remaining other factors holding constant.

The farmers who have one more year in farming experience, increased the probability to adopt new practices by 1.2% while the farmers who have more education knowledge will encourage them 15% more to apply those new techniques in the production process. Education expands an individual farmer's of inference and up-grade their skills for effective implementation of any novel technology. Also, it will help to enhance the individual farmer's ability to access and process agricultural information, and the application of information in improving on farm activities. Risk attitude of farmers' discourage them by nearly 7% less likely to use new methods adopting new type of technologies but the availability of information has induced them 12% more probability to adopt new farming technologies in this study area.

## 6. Conclusions

This study examines results of an empirical application of maximum likelihood estimate of Tobit model to determine demographic, farming and other characteristics that influencing the perceptions of farmers towards the adoption of new techniques in paddy cultivation. The findings of these empirical analyses proved that two demographic characteristics namely, age of the farmers and education and under the farming characteristics ownership of land, size of cultivated land and farmers' experiences are strongly and significantly influence adoption of new technologies in the study area. Other characters such as attitudes of the framers towards the risk and availability of information also significantly impact on their willingness to adopt the techniques in the cultivation. Frequency analysis showed that adopters of paddy cultivators are slightly middle aged, have more than 30 years farming experience, spent higher number of years in acquiring secondary education, with a large farm size cultivated in owned land by the owner. Out of total farmers 17% of the cultivators are adopting all four technologies such as new paddy seeds, chemical fertilizer, agro – chemicals and new farm machines and only 6% of them not adopting any one type of techniques in paddy cultivation. The results of marginal effects indicate that the farmers who have more size of cultivated land with their higher education level has willing to adapt to new techniques significantly. Conversely, tenant paddy cultivators and the farmers who are not ready to accept the risk has less willing to adopt the new farming techniques for their paddy cultivation in the study area.

Further, this study limited to a certain area considering only paddy is the main production producing in the particular study area. Also, there are many different types of modern production techniques are using for farming in different countries even though this research focusing only four types of them. Therefore, this study may direct to the future researchers to consider the available of all techniques and the farmers' intention to adopt those practices in their farming. Different types of econometrics also could be applied to finding the results which may help to suggests to the farmers who are involving in adoption of new techniques in the cultivation of any agricultural products in the country.

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