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Research on the Willingness of Agricultural Technology Utilization and Influence Factors in Arid Areas based on Cloud Computing Data Mining

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Abstract

The article from the perspective of agriculture in arid area, using the micro survey data of rural areas in Xinjiang, with the help of Binary Logistic regression model to explore the willingness for "Resource- Saving & Environment- Friendly Agriculture" technology utilization and its influencing factors analysis. Based on analysis, it shall get several study conclusion as following: (1) most peasant households have the willingness to utilize "Resource- Saving & Environment- Friendly Agriculture" technology, the greater the land scale, the higher the technology Willingness to use technology;(2) The influencing factors on the willingness for "Resource- Saving & Environment- Friendly Agriculture" technology utilization by peasant households are different: the gender, total family income, parergon, production structure perception, environmental perception and perception on economic benefits has significant positive affect; age has significant negative impact on peasant households.

Keywords: *Cloud computing; Farmland scale; Resource-saving; Agriculture technologies; Demand willingness*

1. Introduction

Agriculture in China has made huge contribution for the national industrialization and urbanization in the past few decades, but the achievements are heavily dependent on agricultural resources and large amount of delivery at the expense of pesticides and fertilizers in agriculture resources utilization inefficiency, and serious ecological environment degradation [1]. Especially for the ecological environment is very fragile, land resources are relatively scarce, serious land degradation in arid area of Northwest China. Agriculture as the foundation industry, its development is not only related with security problems about regional economy, society and ecology, but also the relationship between the security of the whole country. For the future of China, the main target of agricultural science and technology is not only the traditional functions of that agriculture shall continue playing the role as guarantee for food safety and national economic development, but also to bear the new historical missions such as relief of energy crisis and providing human with fine environment for survival [2]. Therefore, to get the method that transforming traditional agriculture with resource-saving and environment-friendly new technologies shall be the inevitable choice for accomplishment of agricultural modernization [3]. And the key point for developing the "resource-saving and environment-friendly agriculture" is whether such technologies could be approved,

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accepted and then adopted by the peasant households for the application of their agricultural production practice. Being the main body of agricultural production and operation, the peasant households are both the receiver and the adopter for agricultural technologies [4]. And the peasant households are also the possession and consumption subject of agricultural resources and agricultural environmental resources, they are the most direct passive acceptance subject, and also is the main body of ecological environment governance and construction. For this, more and more scholars started to expand their study surrounding the demand and adoption behavior of peasant household on agricultural technologies.

Up to now, scholars interpreted the behavior that peasant households adopting the agricultural technologies based on different perspective, and formed mass research findings related to the willingness of that peasant households utilizing the agricultural technologies, the embodiment for such willingness are as following five aspects: the first is that by taking the peasant households in different areas and different categories as research perspective, based on their own characteristics and situations the peasant households being with, from the demands on science and technology in aspects of the technical content, main body for providing such technology and the method to provide such technology, they've studied the determinants for the peasant households in China adopting the technology. For example, the ordinary peasant household, peasant household in less developed areas peasant household in poverty, members of rural cooperatives, peasant household in arid area [5-9]. The second is that by taking different types of technologies as research perspective, from the aspects as resource saving & utilizing, been friendly to environment, sustainable development *etc.*, it analyzed the adopting willingness of peasant households for new agricultural technologies and its influencing factors through utilizing the field investigation data and building up relative model. These researched technologies are the technology of "Resource-Saving & Environment-Friendly Agriculture" [10] organic agricultural technologies, the sustainable agricultural technologies and technologies for utilizing straw gasification [11-13]. The third is that by taking the differentiation of peasant households as research perspective, in the aspects of agricultural acreage, education degrees, training for agricultural technologies and profitability of agricultural technologies it performed the research and thought that, the main body of agricultural operators in new type shall actively make the behavior for selection on technologies that suitable for their own development according to the demand characters of their own agricultural technology. And the issue of contract farming, joining into specialized cooperatives shall both have negative influence on the operator of family farms taking behavior for technology selection accordingly. Those are main bodies of operators in new types such as cooperatives of specialized peasant households, family farms, specialized cooperatives and agricultural enterprises [14-15]. The fourth is that by taking income levels as research perspective, from the income level differences and demand preference of peasant households, to study the attitudes, technical preference and investment strength of the peasant households with different off-farm employment level adopting the new agricultural technologies, it thought that off-farm employment shall has negative influence on the utilization of agricultural technologies by peasant households. For example, those research objects are the peasant households in different income levels and peasant households with parergon [16-17].

From above analysis it can be seen that, the research findings of scholars enormously enriched the researches on such field of the willingness for utilizing agricultural technologies, and also provided the foundation for subsequent researches in this field and researches in relative fields. Currently, the agriculture in China has been stepped in such new period of development from traditional agriculture to modern agriculture, and the scale management of agricultural lands shall be the premise and foundation for accomplishment of agriculture modernization, the new historical background also provides the expansible research space for this study. For that reason, in this article it is

based on the perspective of land scale, by utilizing the micro investigation data in rural areas of Xinjiang , studied the demand willingness and the influencing factor of peasant households in different land-scale management & operation for the technology of "Resource-Saving & Environment-Friendly Agriculture" through establishing binary Logistic Model, in order to provide certain reference for enhancing the usage efficiency of agricultural science and technology.

2. Data Mining Technology based on Cloud Computing

Cloud computing is considered to be an Internet based computing, it is to request the mode of software and information resources, will be assigned to computers and other devices, like a public infrastructure. Cloud computing refers to the delivery of the IT infrastructure and usage patterns, by means of the network to the demand, scalable way to get the required resources. Providing a network of resources is called "cloud"". Cloud resources in the user seem to be unlimited expansion, and can be obtained at any time, on-demand use, at any time to expand, according to the use of pay. This kind of characteristic is often referred to as water and electricity using the IT infrastructure. Hadoop is an open source framework for Apache cloud computing, and its upper level implementation uses Map/Reduce mode, so that the computational task is distributed to a large cluster composed of ordinary machines on the parallel before. The underlying distributed file system HDFS has high fault tolerance and high throughput, and the large amount of files are stored on the common machine cluster with low cost. In addition to the Hadoop update rate brought by the fast and wide application of open source has advantages, also has some other distributed cloud computing framework common advantages: highly scalable, economical and practical, high efficiency, high reliability.

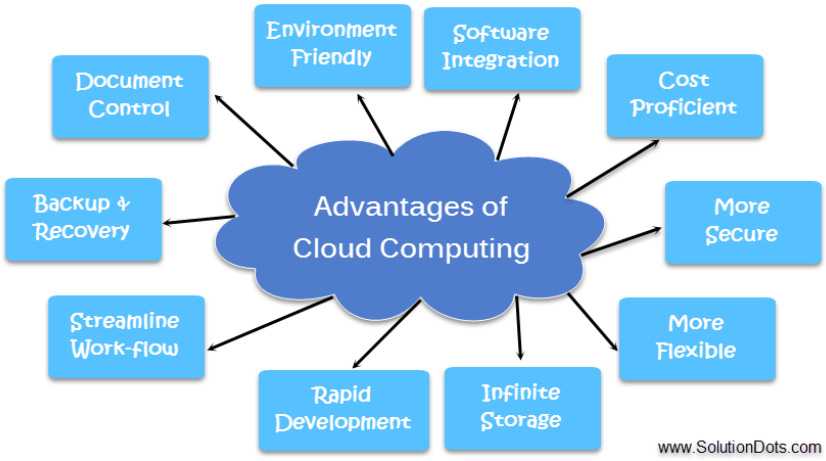

Figure 1. Advantage of cloud computing

Cloud computing has the following characteristics:

1) Server size is huge: Cloud has a considerable size, Google cloud computing has been on a million servers, Amazon, IBM, Microsoft, Yahoo and other cloud has about 500000 servers. Cloud can give users super computing power.

2) Resource virtualization: Cloud Computing supports users in different geographic locations, using a variety of terminal access services. The requested resources are dynamic and intangible. Application in the cloud somewhere in the run, but in fact the user does not have to be related to its specific location.

3) High reliability: In order to use the cloud computing more reliable, "cloud" uses the data multi copy fault tolerance and other measures to protect the high reliability of the service.

4) Strong commonality: Due to the "cloud" can be constructed with the support of the ever-changing applications, so the cloud computing for the application of change, and for different applications can be run by the same cloud support.

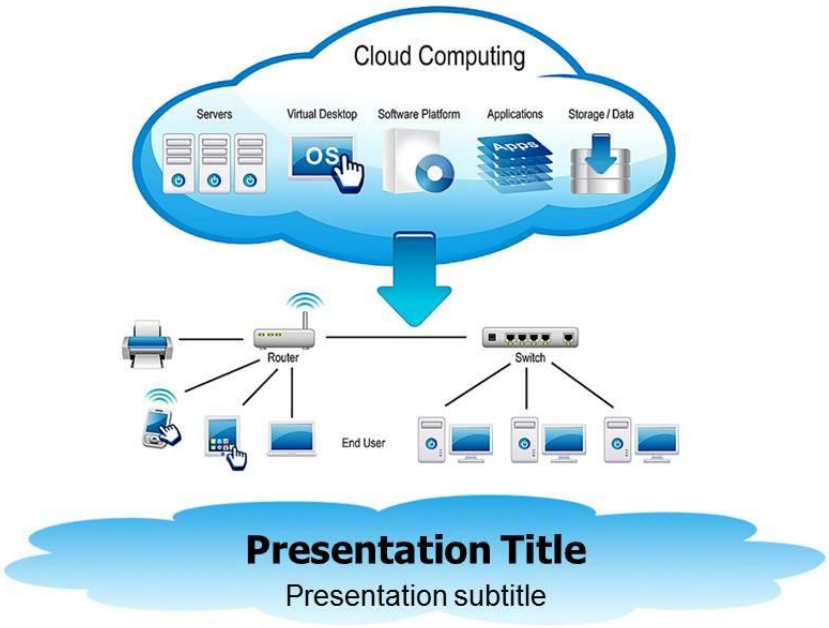

Figure 2. Cloud computing

3. Data Sources and Sample Characteristics

3.1. Data sources

In the paper, the adopted micro data is taken from the sampling survey and interview made by project team in northern, southern and eastern Xinjiang from July to August of 2015.The selection standard of samples is that: combined with project study content, considering comprehensively of those factors such as regional economic development levels, adoption and application of agricultural technologies, crops planting patterns and investigation cost, *etc.*, according to sampling range, it takes Hami Administrative Offices, Urumqi City, Karamay City, Turpan Administrative Offices, Changji Hui Autonomous Prefecture, Altay Administrative Offices, Shihezi City, Aksu Administrative Offices, Hotan Administrative Offices, Aral City, *etc.* as survey area respectively, and chooses 4~5 typical villages from each area accordingly to make household survey and in-depth investigation among approx 20 random-selected peasant households in each village. The investigation content mainly includes that: the individual and family basic information, business scale, input and output of production, the demand willingness for the technology of “Resource-Saving & Environment-Friendly Agriculture”, the cognition of new crop varieties, new pesticides and new fertilizers, *etc.* This investigation has collected 1100 peasant households’ data. According to study purpose, this article has set the limit to samples within the range of agricultural acreage and demand for agricultural technologies during specific analysis, after further inspection on validity of the questionnaire and elimination of invalid questionnaire, sorted and screened out 1039 valid samples of peasant households. In the paper, the adopted micro data is taken from the

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3.2. Sample Characteristics

According to investigation results, based on the land scale, the investigated peasant households have the average agricultural acreage at 50mu (1 mu =0.0667 hectares).As existed research findings haven't make strict theoretical definition on the classification of business scale, in this article it will classify the scale according to the type of selected agricultural industry or the characteristic of agricultural product types that the peasant household dealt with, with the comprehensive consideration for the distribution of investigated samples and the actual production operation characteristics as basis.

Table 1. Features of Farmers' Surveyed Basic Statistical Characteristics

Variables	Indicators	All the Sample Farmers (people)	Percentage (%)	Variables	Indicators	All the Sample Farmers (people)	Percentage (%)
Gender	Male	852	82	Level of Education	Know a Few Words	155	14.9
	Female	187	18		Primary School	289	27.8
Age	30 Years Old and Under	64	6.1		Junior High School	444	42.7
	31～40Years Old	212	20.4		High School (or Secondary)	98	9.4
	41～50Years Old	595	57.3		College Graduate or Above	53	5.2
	51 Years Old and Above	168	16.2	Concurrent Business	Yes	585	56.3
Total	2 and the	202	19.4		No	454	43.7

Household Income （Yuan）	Following						
	2.1～5	242	23.3	The number of taking part in technical training or guidance	1 and the Following	581	55.9
	5.1～10	242	23.3		1～2	252	24.3
	10.1～15	186	17.9		3 or more	206	19.8
	15.1～20	77	7.4	Whether participate professional cooperatives	Yes	132	12.7
	20.1 or more	90	8.7		No	907	87.3

According to the table 1 and relative investigation results, the labor in sampling areas is mainly the male peasants with age older than 40 and education background as junior middle school or below, it presents that the rural labor are quite aged people with even lower education background; 66% of sampling peasant households is with total household income less than 100,000 Yuan, and the parergon rate as 56.3%, it shows that non-agricultural income gets higher proportion among their family income, but along with the expansion of their farmland scale, the proportion of non-agricultural income declines accordingly, and the proportion of agricultural income increased gradually. The number of peasant households to participate in agricultural technology training is relatively small, the proportion of participating in professional cooperatives is relatively low at 12.7%. Overall, the samples basically comply with the main characteristic of peasant households in general areas, and with certain representative significance.

3.3. The present situation of demand willingness that peasant households hold to the technology of "Resource-Saving & Environment-Friendly Agriculture"

The "Resource- Saving & Environment- Friendly Agriculture" means that the "Resource- Saving & Environment- Friendly" sustainable agricultural production system, it takes the improvement of resource utilization efficiency and protection of ecological environment as the core, with such characteristics as intensivism, thrift, high efficiency, ecology, safety in production procedure, and it is the objective requirement for transformation of agricultural development mode. The technology of "Resource- Saving & Environment- Friendly Agriculture" aims to introduce the ideas of theory in sustainable development and circular economy into agricultural production system, the purpose is to promote the efficient and economical use of resources. At present, the problem of water resources has become the bottleneck which influenced the sustainable development of agriculture in arid area, and related to the existence and development of the oasis ecosystem. The arid region as one of the most concentrated contradiction regions of China's population, resources and environment, whether it can effectively carry out efficient water-saving irrigation and improve the utilization efficiency of water resources has an impact on the vital interests of local farmers. Accordingly, in this article the question related to the demand willingness of peasant households for technology of "Resource-Saving & Environment-Friendly Agriculture" is set in the questionnaire as following: whether you are willing or not to use the drought resistance and water saving technology? The option of the answer is set as "willing" and "unwilling" respectively.

Table 2. Farmers' Demand Desire For the Drought Resistance and Water Saving Technology

	All the Sample Farmers	
Demand Will	Yes	No
Number (a person)	860	179

The Percentage (%)	82.8	17.2

The table 2 shows the demand willingness of peasant households for the technology of the drought resistance and water saving. It shall be seen that peasant households' willingness to technology is obvious, as high as 82.8%. During field investigation it also found that, along with expansion of farmland scale, the peasant household shall have more demand for other agricultural technology. At the same time, it presents that the peasant households in bigger-scale farmland group shall have higher dependence on agriculture and farmland that that in medium and small-scale farmland groups, therefore, they shall pay even more attention and have even higher initiatives on present agricultural production & operation activities and the science and technologies related to agriculture future development. During field investigation it also found that, the peasant households in bigger-scale farmland group shall put more investment on agricultural infrastructure and farmland and possess more labor number than that in medium and small-scale farmland group, they shall be more inclined to adopt the production mode in mechanization.

4. Theoretical Analysis, Model Setting and variable description

4.1. Theoretical analysis

The technology demand of peasant households is the demand willingness that the peasant households showing to certain technology according to their own existing conditions, resources and social factors, *etc.* During such procedure, the peasant households understand, recognize, approve, implement and acknowledge a certain technology, and purposely apply it to production and living. So the technology demand of peasant households is such a continuously developing and changing dynamic process including the whole psychology and action of peasant households, is the result of combined action with multiple influencing factors (Liu Ran, 2013). Thus, the peasant households' demand for agricultural science and technology shall include three elements as purchasing willingness, purchasing power and absorbing capacity for application, and none of the three is dispensable, they both consist of realization mechanism of demand for agricultural science and technology, By combing the characteristic of the "Resource-Saving & Environment- Friendly Agriculture" technology, based on present theories and relative researches, in this article it takes following factors in 5 aspects to verify the influence that impacted on demand willingness for peasant households adopting agricultural technology:

- Individual characteristics:

(1) Gender. Doss (2001) has appointed out in research that, the gender shall make influence on labor force, various agricultural inputs,land property right, land scale and technology promotion etc, then to impact the technology demand of peasant households. Meanwhile the gender shall also influence the preference for technology choice by peasant households. Therefore, it still need empirical test on the influencing directions that gender made for demand willingness of technology.

(2) Age. The age difference usually means the differences among the aspects of knowledge, psychology and physiology (He Ke, 2014). In the research on behavior of peasant households, Gao Qijie (2000) found that there's negative correlation between the different age of householder and the adoption rate of new technology, generally speaking, the younger peasants shall have strong studying willingness for new things, they are more easier to accept new knowledge and new technology; the more aged, contrariwise. Thus, in this article it expects that, the age shall have negative impact on the demand

willingness that peasants learning, accepting and applying the technology of "Resource-Saving & Environment- Friendly Agriculture".

(3) Education degree. The education degree is such an important indicator to reflect the population quality of a country, and a nation. In relative researches, Yang Chuanxi (2011) appointed out that, the educated years of the householder has the positive correlation to adoption rate of technology, and the higher education degree he (she) may has, the more willingness he (she) may hold to adopt such technology. At the same time, higher education degree shall improve the proficiency of peasant households themselves to production technology and market information, then to enhance the production efficiency of peasant households effectively [20].

- Family characteristics:

(1) Family total income. The possessed capital amount of peasant households has the significant positive correlation to the adoption willingness of technology (Lin Yifu, 1994). Because of their strong capacity of paying ability and responding to risk of new technology, the peasant households with strong economic power shall have bigger probability to adopt the new technology, thus they may have stronger adoption willingness for the new technology (Zhu Xigang, 1995). Therefore, in this article it expects that the family total income may have positive impact on the demand willingness of that the peasant households learning, accepting and utilizing the technology of "Resource- Saving & Environment- Friendly Agriculture".

(2) The circumstances of parergon. The parergon degree is the important factor for influence on adoption of agricultural technology. With higher parergon degree and longer time for dealing with non-agricultural production, the peasant households may have more passive attitude to adopt the new agricultural technology, and they may also have even lower demand degree, demand types and investment willingness for agricultural technology (Zhu Mingfen, 2001; Zhang Jian, 2002); but there're also some scholars proposed the contrary views that, the labor flow promoted the optimal allocation of production factors and scale management of rural land, improved their living material conditions, and benefited for adoption of technology [20]. Thus, it still need empirical test on the impact directions that the circumstances of parergon put on the demand willingness of technology.

- Perceived ease of use:

(1) Ease of use for new technology – reflects the ease degree that the peasant households thinking about the application for the technology of "Resource- Saving & Environment- Friendly Agriculture". Through their research, Sorebo and Eikebrokk (2008) both thought that, in case of the peasant householder subjectively judging that the technology of "Resource- Saving & Environment- Friendly Agriculture" is easy for application, they may have stronger demand willingness for such new technology; while the householder subjectively judging that such concerned technology has quite big application difficulty, then their demand willingness may be weak accordingly.

(2) Availability for technical service – is the subjective judgment made by the peasant households for the level of difficulty on obtaining the service from agricultural science and technology extension station and service personal. Jamnick and Llindt (1985) thought that whether they could get relative training and guidance for relative technology shall impact the willingness of those peasant households adopting certain technology, the higher obtaining frequency they may have, the higher probability for the peasant households accepting such technology.

- Perceived usefulness:

(1) Perception of production structure – is the subjective judgment made by the peasant households for whether the production structure shall be turned from high energy consumption, high pollution, low output into the lower energy consumption, lower pollution and higher output after application of the "Resource- Saving & Environment-Friendly Agriculture" technology. Generally speaking, if the peasant households made the subjective judgment that the technology of "Resource- Saving & Environment- Friendly Agriculture" may help improving production structure, promoting the complete reasonable utilization on rural social economic resources and agricultural natural resources like the land, *etc.*, then their demand willingness may be quite strong. Therefore, in this article it expects that, the perception of production structure has the positive impact accordingly.

(2) The environmental perception – is the subjective judgment made by the peasant households for whether the agricultural production environment and living conditions shall be improved and if it could keep the human body in such health status after application of "Resource- Saving & Environment- Friendly Agriculture" technology. Generally speaking, if the peasant households made subjective judgment that the technology of "Resource- Saving & Environment- Friendly Agriculture" may benefit the improvement on production environment such as lands, *etc.*, and keeping human body healthy, they may have stronger demand willingness accordingly; on the contrary, the weak. Thus, in this article it expects that, the environmental perception may have positive impact accordingly.

- Perceived profitability:

(1) Perception of economic benefits – is the subjective judgment made by the peasant households for whether the application of "Resource- Saving & Environment- Friendly Agriculture" application shall improve the crops output, economic benefits and their own economic returns. The motive for rational decision making of the peasants to adopt the technology of "Resource- Saving & Environment- Friendly Agriculture" depends on the comparison between the marginal benefit and marginal cost caused by the technology of "Resource- Saving & Environment- Friendly Agriculture", while the above two are in equality, it reaches to the maximum profits [3]. Generally speaking, while there's more obvious earnings increase, the demand willingness shall be stronger accordingly.

(2) Cost perception – is the subjective judgment made by peasant households for whether the application of "Resource- Saving & Environment- Friendly Agriculture" technology shall bring declined input cost of production and living. The decreased cost may help improving the income of peasant households. If the peasant households started the agricultural production activities, they should input certain manpower, material and financial resources accordingly, if the investment is too large or shall be on the personal account of peasant households, it may impact the willingness for peasant households adopting the technology. Generally speaking, the more decrease on the cost, the stronger demand willingness they may have. In this article it expects that, cost perception shall have positive impact on demand willingness for technology.

4.2. Model setting

Aiming to "Resource- Saving & Environment- Friendly Agriculture" technology, the paper sets up the influencing factors model for the demand willingness of peasant households on agricultural technology in arid area.Whether the peasant households have such demand willingness on "Resource- Saving & Environment-Friendly Agriculture" technology or not (Y) should be typical binary variable, that with the value as "willing" or "unwilling", thus in this article it takes Binary

Logistic regression model to analyze this problem. it uses p to present probability of demand willingness that peasant households in arid area on "Resource- Saving & Environment- Friendly Agriculture" technology, then:

$$p = \frac{e^{f(x)}}{1+e^{f(x)}} \quad (1)$$

$$1-p = \frac{1}{1+e^{f(x)}} \quad (2)$$

From this it can get the opportunity ratio for the peasant households in arid area applying the "Resource- Saving & Environment- Friendly Agriculture" technology as:

$$\frac{p}{1-p} = \frac{1+e^{f(x)}}{1+e^{-f(x)}} = e^{f(x)} \quad (3)$$

To convert (3) into linear equation, it can get the Logistic function form as following:

$$y = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i + \mu \quad (4)$$

Among this equation, β_0 is the regression intercept, x1，x2，…，xi are the relative independent variable that influencing demand willingness of peasant households on technology; β_1 , β_2 , … , β_i are the regression coefficient of corresponding variables; μ is the stochastic disturbance term.

4.3. Variable description

Table 3 represents the main influencing variables for peasant households' demand willingness for utilization of technology and their specific meaning, valuation and expected effect.

Table 3. The Meaning of Variable and Expected Effect

Category	Variable name	Code	Meaning and valuation	Expected direction
Dependent variable	Demand willingness on technology	y	No demand willingness = 0 With demand willingness =1	
Individual characteristic	Gender	X1	male = 1, female =0	?
	Age	X2	The actual age of investigated peasant household (years)	—
	Education degree	X3	illiterate or semi-illiterate =1, primary school =2, junior middle school =3, senior middle school =4, junior college and above =5	+
Family characteristic	Total family income	X4	Actual total family income last year (ten thousand Yuan)	+
	Parergon	X5	Yes =1, no = 0	?

Perceived ease of use	Ease of use for new technology	X6	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+
	Availability for technical service	X7	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+
Perceived usefulness	Perception of production structure	X8	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+
	Environmental perception	X9	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+
Perceived profitability	Perception of economic benefits	X10	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+
	Cost perception	X11	Strongly disagree =1, don't agree =2, general = 3, quite agree =4, totally agree = 5.	+

5. Influencing Factor on Willingness

5.1. Empirical analysis results

In this paper, it uses Stata12.0 statistic software, through establishing Binary Logistic regression model, it performs the process and analysis on the sample data of demand willingness on "Resource- Saving & Environment- Friendly Agriculture" technology by peasant households in samples, the evaluation results are given in Table 4:

Table 4. Model Parameter Evaluation and Test

Variable		All the Sample Farmers	
		B	Exp(B)
Individual characteristic	Gender	0.789** (0.035)	2.201
	Age	-0.023 (0.208)	0.977
	Education degree	-0.310* (0.066)	0.733
Family characteristic	Total Household Income	0.003 (0.856)	1.003
	Concurrent Business	0.130 (0.703)	1.138
Perceived Ease of Use	New Technology Usability	-0.098 (0.604)	0.907
	Technical Service Availability	0.370* (0.064)	0.690
Perceived Usefulness	Production Structure Perception	0.118 (0.548)	1.126
	Environmental Perception	0.547*** (0.005)	1.728

Perceived Net Benefit	Benefit Perception	-0.524** （0.014）	0.592
	Cost perception	0.166 （0.412）	1.181
X^2		24.725	
Nagelkerke R^2		0.128	

Remarks: *, ** and *** presents the significance of variable on the statistical level with 10%, 5% and 1% respectively.

From Table 3 it can be also seen that the statistical results under $p<0.01$, the χ^2 statistic of model is 24.725, shows that each independent variable shall have significant interpretation capacity on peasant households' utilization willingness on "Resource-Saving & Environment- Friendly Agriculture" technology. In addition, the value of Nagelkerke R2 in models is 0.128, also show that there is existed relationship both in independent and dependent variable of each model, and it shall have statistical significance. After multiple collinearity test, in order to test the impact that each variable taken on agricultural technology adoption behavior of peasant households, in the paper it builds up the binary Logistic model for analysis, the results is shown in Table 4. From the regression results, the model has quite good fitting situation, the individual characteristic, family characteristic, perceived ease of use, perceived usefulness, perceived net benefit shall have important influence on agricultural technology adoption behavior of peasant households.

5.2. Evaluation results analysis

(1) Influence of individual characteristic

The regression results show that, the gender variable has significant positive impact on the sample group. According to statistical results, the female and male ratio is 32% and 68% respectively. It means that by the increased farmland scale, the female labor quantity declined accordingly, but peasant households' demand for agricultural science and technology increased. The potential explanations shall be that: first the male peasants almost have the decisional position on agricultural production among all rural families, thus they shall have stronger demand on agricultural science and technology than that female peasants; second, the male peasants shall have the dominant position on the ability for acquisition agricultural science and technology resources especially the resources outside their region than those female peasants; third, the male shall have even better physical qualities, psychological qualities and endurance capacity relative to the females, so the male shall prefer to try and accept the new science and technology.

The education degree variable has significant negative impact on technology demand willingness of peasant households. Generally speaking, the educated years of the householder has the positive correlation to adoption rate of technology, and the lower education degree he (she) may has, the less willingness he (she) may hold to adopt such technology. According to statistical results, the demand for agricultural technology is the highest in junior high school education and above of peasant household, and the demand for agricultural science and technology is lower in primary school education and under. The potential explanations are that: the higher the degree of education, the higher the ability to understand and grasp the knowledge, the stronger the learning ability, the easier it is to learn agricultural technology.

(2) Influence of perceived usefulness

The regression results show that, technical service availability has significant negative impact on technology demand willingness of peasant households. Whether peasant

households could get relative training and guidance for relative technology shall impact the willingness of those peasant households adopting certain technology, the higher obtaining frequency they may have, the higher probability for the peasant households accepting such technology. According to statistical results, peasant households received technical training less than three times accounted for 80.2% each year, to a certain extent, it affected the farmer's perception of advanced agricultural technology, and influenced the willingness of agricultural technology utilization.

Environmental perception has the significant positive impact on sample group. The statistical results also show that, farmers' awareness of the importance to the environment is as high as 90.5%. It means that along with increased land scale, the peasant households' demand willingness on "Resource- Saving & Environment- Friendly Agriculture" technology increased gradually as a whole. The potential explanations are that: first, the peasant households in bigger-scale group have the highest dependency to the land; therefore they're more focusing on the issues concerning agriculture, countryside and farmers. It is thus clear that with the expansion of land scale, the agricultural production has more increasing importance to peasant households continuously; second, without other physiological diseases, better living environment is the necessary condition for human keeping health. This also illustrates that the changes on agricultural production and living conditions are closely linked with their own development of peasant households, the environmental quality shall directly impact peasant's economic earnings, physical and mental health even survival conditions.

(3) Influence of perceived profitability

The regression results show that, perception of economic benefits has significant negative impact on sample group. The potential explanations are that: being rational manager, while selecting the advanced and applicable agricultural technologies, the peasant households should inevitably comply with maximization principle, that in case of one technology could replace another technology, it must bring even higher profitability or economic benefits for the peasant households.

6. Conclusion and Suggestion

The article from the perspective of agriculture in arid area, using the micro survey data of rural areas in Xinjiang, with the help of Binary Logistic regression model to explore the willingness for "Resource- Saving & Environment- Friendly Agriculture" technology utilization and its influencing factors analysis. Based on analysis as above, it shall get several study conclusion as following: (1) most peasant households have the willingness to utilize "Resource- Saving & Environment- Friendly Agriculture" technology, the greater the land scale, the higher the technology Willingness to use technology; (2) there were significant differences in the influence factors of the willingness to use the technology of "two types of agriculture": gender and environmental perception have significant positive affect; education degree, technical service availability and economic benefits have significant negative impact on peasant households' willingness.

According to above study conclusions, it can get a few suggestions on policy as following: the first, to complete and promote the rural land transfer system and actively explore farmland scale management methods. The small farmland scale management is matching with lower productivity levels and production efficiency; it does neither benefit the application of new technology, nor benefit market competition, coupled with that sales of product cannot get social average profits, these all make peasants losing their enthusiasm for being engaged in agriculture. Thus, the small scale management shall become one of the main reasons for farmland non-cultivation and disguised non-cultivation; it's already just the time for the trend of farmland management in proper scale accordingly. The second, to innovate and reform farmland system and household registration system, push the peasant households in small-scale or high parergon status

towards the transformation to non-agricultural industry, to let the land converged to the peasant households in medium and bigger-scale management, then enable the peasant households that have the willingness for dealing with agricultural production activities and the certain farmland management capability expanding their production scale, in order to improve the willingness for peasant households to utilize agricultural technology in new types and participate in relative agricultural promoting activities. The third, strengthen the guidance and education of peasant households, especially in the agricultural ecological environment protection awareness and improve the quality. Because peasant households are the possession and consumption subject of agricultural resources and agricultural environmental resources, they are the most direct passive acceptance subject, and also is the main body of ecological environment governance and construction.

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