The Study on Farmers' Cognition and Production Inclination of Organic Vegetable

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Abstract

Based on the department interviews and questionnaire survey in Nanxi County, this paper analyzes on farmers' cognition of organic vegetables and factors which influence farmers' production inclination through Logistic model. The results show: 54.70% farmers can understand organic vegetables well; farmland areas per person, non-agricultural income, price, technology, and educational level are main factors that influence farmers' production inclination. Finally, according to these results the paper proposes relative comments that promote the production and development of organic vegetables.

Keyword: Organic vegetables, Inclination, Cognition, Farmers, Logistic mod

1. Introduction

With social and economic development, the requirement on ingredient and quality of vegetable extremely increases. Guangzhou firstly put organic vegetables safety technical regulations for production, and pointed out that organic vegetables must accord to the standard of the pesticide residues in vegetables. Then, Shanghai, Tianjin and other regions have also developed a series of pollution-free vegetable production and management measures.

Obviously, non-environmental pollution vegetables are favored by more and more consumers (Changqun Duan, 2006). Peasants are not only the most primary micro-economic units in rural area, but also the main producers of green vegetables, whose production behavior directly determines the total amount and growth rate of the non-environmental vegetables. Only supported and anticipated by the peasants, the organic vegetable will have a long and effective development (Qinghua Shi, 2001).

In organic vegetable production field, both foreign and domestic scholars have researched from many aspects.

In technical terms, Gong Lanfang (2007), Cheng Jizhen (2006), Ma Xiuying (2009) separately studied in Simao City, Shanxi Province, and Chengde City, and gave the related technical advice about site selection, seedling breeding, cultivation area planning, pesticides and chemical fertilizers, management, packaging and so on. Then they built organic vegetables production technology system that played an important significance.

In behavior terms, Xu Xiang (2008) did research on the using pesticide behavior of organic vegetables producers in Nanjing city. Xing Weifeng (2004) did research on the organic vegetables production technology learning process of different farmer group in Donghai County of Shi Huxiang. Zhou Feng (2008) did research on the government regulation and farmers production behavior in Jiangsu province. The results showed that the arable land of producers, the main source of income, the local policy and the understanding degree of production are the main factors of producer behavior.

In the countermeasures, Ning Zhenlu (2008), Yu Xiang Ping (2011), Liang Chengfu (2000) and other scholars combined with current organic vegetables production status in our country, and found that the current organic vegetables production existed problems of dimensions small, different understanding degree, many ecological environment pollution sources, pesticide residue, high cost, imperfect laws and regulations. Aiming at these problems, they pointed out the corresponding countermeasures and suggestions, from the views of vegetable

quality inspection, scientific research, marketing, pest control and planning for the base and other aspects.

However, those studies mainly are from macro perspective. And the research on micro perspective is rare. Even, the study of organic vegetable from farmers' production inclination is rarer. Thus, from peasants' perspective, this paper selects Nanxi County of Yibin City in Sichuan Province as an example and analyzes on farmers' cognition and production intention of non-environmental vegetables by Logistic model. Then, comments about improving the development of green vegetables are proposed.

2. Research Area and the Sample Information

2.1 Research Area Condition

Nanxi County, locating in the internal of 28°41′46″-29°3′52″ north latitude and 104°43′52″-105°53′2″ east longitude, is the hilly area of southern Sichuan. The cultivated land area is 17816hm^2. According to the investigation of 2007, the total population is 412,600, including 64,400 non-agricultural people. Moreover, the annual grain sown area of Nanxi County is 29,434hm^2, and the grain output is 171,412 tons. The cultivated land areas of major economic crops-oil plants, watermelon, herbs and vegetables are respectively equal to 2208 hm^2, 942 hm^2, 1055 hm^2, 11160 hm^2. And their outputs are respectively equal to 4,631 tons, 36,303 tons, 215 tons and 317,163 tons.

2.2 The Sample Information

In this paper, Nanxi County, Yibin City, is the typical sample area. Discussing with the relevant local authorities, I have had the status of vegetable production. Base on exploring with the local scientific and technical personnel, I make a survey of peasants of each family. The number of whole questionnaires is 150. 128 ones are back, and 117 ones are valid.

2.2.1 The Information of Sample Peasants' Household

(1) The Character of Age and Gender

From the age distribution, the number of peasant's households whose age is below 30 is at least two, which accounts for 1.71%; the number of households above the age of 60 is less and accounts for 6.84%; the number of most farmers who are between 30 to 60 years old accounts for 91.45%. Obviously, only a few young farmers stay at home. That is due to small-scale operation and surplus labor force. Furthermore, in the surveyed 117 households, 111 people are male and 6 people are female, which respectively occupy 94.87% and 5.13% of the whole number. In Chinese rural areas, head of household is naturally male. The survey also reflects that men are more willing to express their ideas and can explain their answers further. Even some farmers have the courage to put forward their evaluations.

(2) The Educational Background of the Head of Household

The educational background of household heads accords with Normal Distribution. Only two farmers are illiterates which account for 1.71%; 15 farmers have received high school education which account for 12.82%; 100 peasants have educated in primary or middle school which account for 85.47%.

(3) The Family Condition and the Agribusiness Level

In the survey of 117 farmers, the minimum family contains two people. By contrast, the maximum family consists of nine ones. What is more, the number most families including of 3 or 4 people is equal to 67, which accounts for 57.26%. The numbers of families involving 5 farmers and less than 3 peasants are respectively equal to 19 and 2, which also respectively occupy 16.24% and 1.71%. In this study I find that the average labor force is 2.64 people, and 67 families have 2 people to farm which is 57.26% of total number. Notably, the scale of rural labor force is small. 81 families, accounting for 69.23%, include both adults and children. In the aspect of cultivated land area, each household has limited farmland. And most families have less than 10 acres farmland.

2.2.2 The Economic Condition of the Sample Peasants' Household

In these samples of farmer's families, most peasants both do the agricultural work and work outside. And only 16 farmers totally depend on land to live, which accounts for 13.68%. Moreover, 101 farmers both do the agricultural work and work outside, which occupy 86.32%. Additionally, the monthly income of these 117 farmers accords with Normal Distribution. 12 peasants, accounting for 10.26%, get monthly income of 2501 yuan to 3500 yuan. 16 peasants, accounting for 13.68%, have monthly income over 3500 yuan. At last, 17 peasants, accounting for 14.53%, earn monthly income lower than 500 yuan. Evidently, most farmers have monthly income of 501 yuan to 1500 yuan and of 1501 yuan to 2500 yuan. The numbers of them respectively

occupy 31.62% and 29.91%. In a word, the monthly income of farmer is not low.

3. The Cognition Analysis of Peasants to the Non-environmental Pollute Vegetables

In order to better understand the Nanxi County farmer's cognition of non-environmental vegetables, the study designs to investigate from two aspects of both subjective and objective perception. Subjective perception survey is that the subjects evaluate themselves about their cognition degree of green vegetables. And objective perception survey is evaluated by 5 questions. Through this method, table 1 summarizes the result of the two surveys. It shows that only 3.42% of the households have not heard organic vegetables; 27.35% ones have heard but not understand; 14.53% ones know a little; 36.75% ones know some of the contents; only 17.95% households can extremely understand. On the other hand, in the objective cognition survey, 43.59% farmers can correct 4 or 5 questions.

In the meantime, in order to better estimate the trend of peasants' cognition about non-environmental vegetables, I choose the approach of statistics in cross tabulation tables to analyze farmer's gender, age, educational level and cognition of pollution-free vegetables. The result shows that education significantly relates to cognition: 75% of people who have never heard green vegetables are below primary education; 56.26% of people who just have heard green vegetables are below the primary school level; 47.06% of people who know a little are below primary education. However, 76.74% of people who know more about green vegetable have gone to middle school at least; 71.43% of people who understand the organic vegetables most have gone to middle school at least. This proves that education level affects the perception of farmers on pollution-free vegetables.

4. The Influential Factors Analysis of the Peasants' Product Will of Non-environmental Pollute Vegetables

4.1 The Model Selection and Variables Definition

Logistic model are usually practiced in inclination study. Thus through the model, this article analyzes on which factors would affect the production of non-environmental vegetable. According to existing research literatures and the actual survey, this paper assumes that peasants' productions are affected by personal characteristics, family characteristics and the technical and economic factors. The definitions of these factors in the model exist in Table 2.

Specifically, I consider whether the peasants make non-environmental vegetable production as the dependent variable of two Logistic model. The peasants' personal characteristics, family characteristics, and technical and economic factors are the independent variables. Then the model can be expressed as:

$$\ln = \left[\frac{P(Y_1)}{P(Y_0)} \right] = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \mu$$

In this equation, Y_1 means the peasants are willing to produce organic vegetables; Y_0 means the peasants are not willing to produce pollution-free vegetables; β_0 is the constant; β_i means the coefficient of regression of X_i; μ means the stochastic error.

4.2 The Result and Analysis of Model Evaluation

Through SPSS13.0 Statistical software I make the Logistic regression to the survey data of 117 households. The results of model estimation are in Table 3.

(1) First of all, age (X_1), gender (X_2), non-agricultural income (X_4), and total population (X_5) have a negative correlation with the farmer's production inclination; and the others have a positive correlation with it.

(2) In addition, from the aspect of significance level, per capita arable land (X_6), improve level of prices (X_8) have a high significance level; while age (X_1), educational background (X_3), price of non-environmental pollution vegetables (X_7), per unit of earning (X_9), cognitive level (X_{10}), and control level (X_{11}) are significant; the significance level of the rest is low.

(3) Thirdly, according to the model evaluation, the age (X_1) is significant in 10% level, and the coefficient is negative. It demonstrates that with the age increasing, the possibility of production of non-environmental pollution vegetables is smaller; the aged farmers have a relatively poor cognition of the pollution-free vegetables.

The coefficient of gender (X_2) is equal to -9.348. Viewing from the regression coefficient, more women tend to produce pollution-free vegetables than men. However, the factor in the model is not significant. Thus, whether farming non-environmental pollution vegetable is not much relevant with the gender.

The higher of educational level (X_3), the more farmers are willing to produce pollution-free vegetables, and vice versa. It further manifests that production of non-environmental vegetables is no longer a blind choice. The farmers of high educational level can understand government's policy well. They can see more long-term benefit. And this kind of farmers can receive new knowledge and skills easily, which makes the sale of vegetable broader. They also have the more ability to produce pollution-free vegetables.

With the increase of non-agricultural income (X_4), the possibility of producing pollution-free vegetables gradually decreases. It indicates that the production inclination is mostly determined by the farmer's sustainable income of green vegetable production. In the survey, farmer's non-agricultural income is much higher and comes more quickly than the income of vegetable productions. Farmers are mostly concerned about their sustainable income.

The effect of the total population (X_5) is not significant. From the regression coefficients and daily experience, the size of household has not a positive effect on production behavior. In general, the bigger size, the more daily consumption.

Per capita arable land (X_6) is one of the vital factors that impact on the production inclination. From the result of model evaluation, the influence coefficient of per capita arable land area is 5.724, and test values reach a significance level. This displays that the per capita arable land area plays a very important role in production. With the larger area of per capita arable land, the possibility of producing pollution-free vegetables becomes greater. Generally, farmers mainly use land to grow crops, including cash and food crops. According to Maslow's hierarchy of demand theory, farmers must firstly meet their food needs. When cultivated land of each person is limited, farmers would like to plant food crop. But when it enhances, they would like to plant cash crop, such as organic vegetable.

The price (X_7) positively impact on peasants' production. From the result of model evaluation, the higher price of non-environmental vegetables can cause more farmers' inclination to produce, and vice versa. This shows that the product behavior of farmers depends on the prices of this kind of vegetables.

The coefficient of improved degree of price (X_8) is positive, and the factor in the model is a high significant variable. This shows that the price increasing in vegetable production behavior of farmers plays a very important role. The range increasing more leads to the larger possibility of the production of pollution-free vegetables. In general, the price of vegetables is higher than that of other crops. Farmers are more willing to produce vegetables; compared with the ordinary vegetables, the price of pollution-free vegetables has an increasing range.

With per unit revenue (X_9) raising, the possibility of producing pollution-free vegetables boots gradually. It hints that farmers' will of production depends largely on the sustainable income of vegetable production. From the survey, farmers prefer to grow more high-yielding crops. If the vegetable production can improve their income levels and increase their income, farmers would like to grow pollution-free vegetables.

The cognitive level (X_{10}) and control level (X_{11}) of farmers largely promote organic vegetable production. Below the 5% significance level, the model coefficients are positive. This indicates that in the process of vegetable production, more technical understanding and controlling causes more intense inclination of vegetable's production.

5. The Concluding Evaluation

From the investigation of this case, 54.70% farmers have a good cognition of non-environmental pollution vegetables. The education background affects their perception of pollution-free vegetables. From the production inclination, whether producing the non-environmental vegetable is determined by the farmer's age, educational level, non-agricultural income, per capita arable land, pollution-free vegetable prices, price increase of pollution-free vegetables, vegetable's unit revenue, cognition and mastery of other factors. In these factors, the per capita arable land and the improved price have a high significant in the model. The coefficient of both the per capita arable land and the control levels are more than 5. This indicates that larger arable land of each farmer and higher mastery levels tend to the greater possibility of producing pollution-free vegetables. Therefore, if people want to promote the development of pollution-free vegetables, they should speed up the land transfer, increase the size of vegetable cultivation, step up publicity efforts to the quality and safety awareness vegetables, strengthen education and training, intensify information system and agency service, and increase vegetable market competitiveness.

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Table 1. The cognitive condition of peasants' household about non-environmental vegetables

	Subjective cognition			Objective cognition	
	The number of people	The proportion		The number of people	The proportion
Did not heard	4	3.42%	All wrong	0	0
Heard but did not know	32	27.35%	1 correct	0	0
Know a little	17	14.53%	2 corrects	11	9.40%
Know some	43	36.75%	3 corrects	55	47.01%
Know most	21	17.95%	4 corrects	33	28.21%
			All correct	18	15.38%

Table 2. The definition of relating factors

The name of factors	The definition of factors
Age (X_1)	Below 30 =1, 31-40=2, 41-50=3, 51-60=4, above 60=5
Gender (X_2)	Male=1, Female=2
Educational Background (X_3)	Illiteracy=1, primary school=2, junior middle school=3, senior middle school=4, above undergraduate=5
The income of non-farming (X_4)	Below 500yuan=1, 501-1500=2, 1501-2500=3,2501-3500=4, above 3500=5
Population (X_5)	2 people=1, 3people=2, 4people=3, 5people=4, above 6=5
Per capita cultivated land (X_6)	Below 0.5 acre=1, 0.5-1=2, 1-1.5=3, 1.5-2=4, above 2 acre=5
The price of non-environmental pollute vegetables (X_7)	low=1, lower middle =2, middle=3, upper middle =4, high=5
The improve degree of price of non-environmental pollute and normal vegetables (X_8)	low=1, lower middle =2, middle=3, upper middle =4, high=5
Per unit of earning (X_9)	low=1, lower middle =2, middle=3, upper middle =4, high=5
The cognitive level (X_{10})	low=1, lower middle =2, middle=3, upper middle =4, high=5
The control level (X_{11})	low=1, lower middle =2, middle=3, upper middle =4, high=5

Table 3. The model evaluation results of the peasants' inclination

	B	S.E.	Wald	Sig.
Age (X_1)	-3.556***	2	3.162	0.075
Gender (X_2)	-1.248	1.826	0.467	0.494
Educational Background (X_3)	0.786***	0.431	3.317	0.069
The income of non-farming (X_4)	-6.313**	2.572	6.024	0.014
Population (X_5)	-0.305	1.047	0.085	0.771
Per capita cultivated land (X_6)	5.724*	1.84	9.682	0.002
The price of non-environmental pollute vegetables (X_7)	4.620**	1.972	5.49	0.019
The improve degree of price of non-environmental pollute and normal vegetables (X_8)	0.841*	0.297	7.995	0.005
Per unit of earning (X_9)	0.580***	0.334	3.022	0.082
The cognitive level (X_{10})	2.440**	1.09	5.014	0.025
The control level (X_{11})	5.451**	2.582	4.457	0.035
The constant	-1.101	1.979	0.31	0.578

p.s. *, **, *** respectively indicate that the significance level is 1%, 5% and 10%, when the evaluated coefficient do not equal 0.