Analysis on the Influencing Factors of Farmers' Satisfaction to Vouchers--Base on FAO Post-earthquake Assistance Program in Sichuan, China

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Abstract

After the Wenchuan earthquake in Sichuan, China, the Food and Agriculture Organization of United Nations launched the emergency assistance and restoration programs through the approaches of Direct Inputs Distribution (DID) and Agricultural Inputs Voucher (AIV). After the investigation of the 204 AIV beneficial households randomly selected in the 2 pilot counties, the paper analyzed the beneficial farmers' satisfaction of the AIV program and the influencing factors to their satisfaction. The logistic model was applied to detect the influencing factors. The results we got through the software of E-Views 5.0 showed that the gross income, the area of the arable land, the variety can be purchased and the procedure of the voucher using were playing important roles to affect the beneficial farmers' satisfaction to vouchers.

Keywords: Post-earthquake assistance, AIVP, Satisfaction influencing factors

1. Introduction

During and after the Wenchuan earthquake on 12 May 2008 and the abnormally strong rains that followed, millions of heads of farm animals, animal shelters, huge amounts of harvested crops, seeds and other inputs as well as tools, machinery and agricultural buildings were lost. In order to restart the rural farmers' agricultural production to secure their livelihood, totally US$2,261,391 donating by UN FAO and four governments including Sweden, Belgium, Luxemburg and Latvia were conducted to the worst-disaster areas through 2 main approaches named Direct Inputs Distribution (DID) and Agricultural Inputs Voucher Program (AIVP). 9861 households in 69 villages of 14 townships within the 5 worst-affected counties received the assistance. Especially, the AIVP was the first attempt in the post earthquake assistance in China.

Previous research studied the subsidies in Africa and compared the direct subsidies with vouchers, found the vouchers were preferable to direct state distribution of fertilizer and the it could reduce the cost of farmers' also (Nicholas Minot and Todd Benson, 2009). Catherine Longley, Richard Kachule, Mathews Madola etc. (2008) take Malawi, Mozambique and Zambia for example, analyzed the agricultural input vouchers in southern Africa.

Better than nothing, farmers who were badly affected by the earthquake were own strongly willingness to accept it, even though the inputs may have been far less than optimal for their specific needs. Traditionally, the assistance through DID program comes directly in the forms of goods and services. Often, it is composed of only one seed crop or limited assortment of tools or fertilizers. But the problem is that not all the inputs are useful to every household. Inevitably, the range of products in conventional input supply projects is limited. In juxtaposition with direct distribution of inputs, the AIVP was FAO's new experimenting, a ground-breaking approach in disaster relief in China. In general, a voucher is an official piece of paper which is worth a certain monetary value and which may be spent only for specific reasons or on specific goods. Agricultural input

voucher is issued by Chengdu office of the FAO and the Department of Agriculture (DoA) of Sichuan that can be used to buy agro-inputs in designated agro-input stores. The voucher approach offered farmers a high degree of freedom in the selection of proper goods in accordance with their practical needs, types of crops, and farming season. But on farmers' point of view, whether they were satisfied with the fresh assistance approach? And what factors affected their appraisal of the AIVP?

In light of the above, this paper is aim to: (1) descript whether the beneficial farmers were satisfied with the AIVP, (2) analyze what factors affected the farmers' satisfactions with the AIVP.

2. Data sources and analytical method

2.1 Data resource and sample characteristics

The analysis is based on the data from a survey of 204 AIVP beneficial households. The investigation was conducting from January to February 2010. The surveyed townships and villages were selected randomly in the 2 AIV assistance received counties at sampling rate 4% while according to the beneficiaries' list. The distribution of the questionnaires in each village is given.(Note 1)

Within the survey, 91 male persons (44.6%) and 113 female persons (55.4%) received asking. The contract arable land was 3.64 mu on average. The mean age of the surveyed households was 50.4, education year was 5.2, member in each house was 3.7. 90.2% of all the surveyed farmers were the heads of the households or their spouses, so their recognition could well represented and expressed the satisfaction of the beneficial farmers.

2.2 Econometric model and variable selection

2.2.1 Model expression

Logit model is a common and mature method to study the relationship between dependent variable and independent variable when the dependent variable is the dichotomous variable.

The traditional Logistic model is:

$$P = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}$$

β_0 is constant term and $\beta_1, \beta_2, \ldots \beta_m$ are partial regression coefficients. Base on this function, the model could be transformed to a new logistic linear regression model.

$$\ln \frac{p}{1-p} = \ln\left[\frac{\frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}}{1 - \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)}}\right]$$

$$= \ln[\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m)]$$

$$= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \cdots \beta_m X_m$$

Here the value range 0≤ P≤1 is changed into $-\infty < \ln \frac{p}{1-p} < +\infty$.

2.2.2 Dependent variable

The object of this paper is to test the influencing factors to the satisfaction of the farmers who received the AIVP. So the farmers' attitude could be described as dependent variable. Obviously, the farmers' satisfaction with the AIV could be classified as: satisfied or dissatisfied. We deny Y (satisfied) =1 and Y (dissatisfied) =0. Figure shows the satisfaction of the farmers their own. (Note 2)

2.2.3 Independent variables

Influencing factors of the surveyed households' satisfaction were defined as the independent variable. From the survey, we found 109 (53.4%) were satisfied with the AIVP, 95 (46.6%) households were dissatisfied. From their talks, the dissatisfaction reasons could be summarized as: (1) the households who own more arable lands do not satisfied with the value of the voucher; (2) voucher-use duration was limited; (3) the varieties of the inputs were

limited; (4) the inputs brands that can be purchased were limited; (5) scale of the dealers; and (6) the distance to the purchasing sites. Base on the influencing factors summarized above, and the references previously, the paper here classified the factors into two categories: the households' characteristic variable and AIVP characteristic variable. Totally 12 independent variables were selected. The independent variables definition and statistical description see the table. (Note 3)

3. Empirical analysis with its discussion

3.1 Preliminary result of the satisfaction of the beneficial households'

The survey data indicates: 129 (63.2%) within 204 households thought RMB 700 Yuan is sufficient, since the mount of agro-inputs they purchased in the years past was less than RMB 700 Yuan. Also 75 households did not satisfy with the limitation of the voucher-use duration. 59% of the surveyed AIVP assistance households thought the procedure was convenient. 84 households did not like the variety limitation of the agro-inputs. 86 farmers thought the brands could be purchased should be enlarged. And 109 in them did not or not completely satisfy with the dealers. 31 households occupied 15.2% within the 204 surveyed AIVP assistance households purchased the voucher on the big day, while the distributed vouchers in 198 households were completely used. Only 48 surveyed farmers thought the distance to purchasing sites made them trouble.

3.2 Result of the model regression

The analysis on the influencing factors of the AIVP satisfaction was based on the Logit Model. Here the EViews 5.0 was used for the quantitative analysis. The following table shows the regression result, with its estimation of the regression coefficient and the significant test result. From table 3.1 we could find the factors which affect the beneficiaries' satisfaction to the AIVP. The AREA OF THE ARABLE LAND (X5) and THE PROCEDURE OF THE VOUCHER USING (X10) are significant on 1% level. The variables like GROSS INCOME (X4) and VARIETY CAN BE PURCHASED (X8) are significant on 10% level. Other varieties like GENDER (X1), AGES (X2), EDUCATION YEARS (X3) etc. were not significant. (Note 4)

3.3 Discussion

On the aspect of the households' characteristics, except GROSS INCOME (X4) and AREA OF THE ARABLE LAND (X5), the other three variables do not significantly affect the farmers' satisfaction to AIVP. Still, different factors affect the farmers' satisfaction to different extent. Per household's gross income has a significant but reverse influence on the farmers' satisfaction. Statistics showed that, compared with 2008, the average total income per capita of the surveyed AIVP households increased by 0.78% in 2009. The AIV beneficiaries' income from agriculture per person was 1210.8 Yuan in 2008, 2051.9 Yuan in 2009, increased 69.5%. The farmers who got higher income showed lower satisfaction to the AIV program. Previously the paper mentioned that farmers on a big portion (63.2%) thought the agro-inputs worth RMB 700 Yuan is sufficient for their whole year production after earthquake. But the survey data shows farmers who left vouchers not purchased are mainly due to the limitation of their arable land. The farmers who own more farming land, more inputs they may expense on this. So the peasants think 700 Yuan voucher could not fit their satisfaction. Both of these farmers may think the more vouchers the better.

On the aspect of AIV characteristics, the variables of VARIETY CAN BE PURCHASED (X8) and PROCEDURE OF THE VOUCHER USING (X10) are significant. The training given by the experts of FAO played an important role within the assistance process. The agro-inputs-list confirmed by FAO contained a range of agro-inputs which ensured with good quality, people may choose any kind of the agro-inputs they want within the list. But the farmers' demand for agro-inputs were diversified, the project can not meet all the agro-inputs they need. From this point, if more varieties could be contained in the list, the stronger satisfaction the farmers would get. Since most beneficiaries did not have the experiences of using the vouchers previously, the farmers still care about this "fresh paper" and whether it is convenient to use. So the procedure of the voucher using affected their satisfaction. More convenient the procedure is, more welcome the AIVP receive from the farmers.

4. Conclusion and recommendations

By using the data from the AIVAS of 204 households and the Logit model, and on the position of beneficiaries', this paper discussed the factors that influenced the beneficial farmers' satisfaction with AIVP and to what extent the satisfaction was affected by these factors. From the result of the model regression, we may conclude, the GROSS INCOME, the AREA OF THE ARABLE LAND, the VARIETY CAN BE PURCHASED and the PROCEDURE OF THE VOUCHER USING would affect farmers' satisfaction with AIVP in different extent. Within which, the VARIETY CAN BE PURCHASED and the PROCEDURE OF THE VOUCHER USING made a positive effect to the satisfaction while the GROSS INCOME and the AREA OF THE ARABLE LAND

affected the satisfaction negatively. Combined with the information we found in the survey, the relevant recommendations are given below.

4.1 Cancel consistent standard of voucher assistance and offer different value to different households

The voucher distribution could follow the principle of the households' arable land area. The farmers who own less farming lands should receive less voucher, more lands more voucher. So the assistance could cover more disaster affected farmers. But for the peasants who own more arable lands, vouchers worth 700 Yuan could not completely fit their needs. To them, the voucher should be enhanced.

Some of the villagers unqualified to beneficiary were not satisfied with the AIVP and this increased difficulty of the BoA work. The seven pre-set criteria were useful for the selection, but some additional standards like cultivated area and whether or not being engaged in a specific production (garlic or fruits) made many unqualified farmer unsatisfied with the AIV program. Because the earthquake was a covariate crisis for all the villagers, an improvement in this step is quite essential. With regard to the restrictions in the varieties of voucher-convertible agro-input, some agro-inputs that the farmers in fact needed were not listed within the convertible range. In short, the design of the project did not adequately consider the different needs of different farmers. First of all, selecting beneficiaries should focus on the worst-affected farmers by reducing the voucher value. In order to take aim at the worst-affected farmers, the criteria such as the death of family members, the female-headed family and the collapse of home should be given the highest priority. Findings indicated that 700 Yuan worth of vouchers per household were a little higher compared with their needs. If the assistance value for each household were reduced half, more disaster-affected farmers could have been aided given the total donation value. In addition, the families who have migrated to the city and are not engaged in agriculture should be excluded.

4.2 Simplify the procedure of the voucher using and enhance the efficiency of the program implementation

The steps of price setting and reimbursement take long and the qualified dealers are not adequate. The designated dealer selection was time-consuming and related to commercial interests. The criteria of a qualified dealer included a license, fixed business place, abundant stock and good post-sale services. This was too much and prevented more dealers who were actually local farmers to benefit from the programs. Price negotiation with the dealers was based on an overall price survey by the national expert at the provincial level and in the local market. Of course, this took a lot of time. The fact that some of the small designated dealers did not have their own bank account did not meet the basic requirements and made some trouble in reimbursement. At the same time, the number of designated dealers was not sufficient for forming a competitive market. This may cause a monopoly or an oligopoly.

Thirdly, a seven-day trade period was too long for beneficiaries to exchange their vouchers for agro-inputs. A long period might enhance the chance of fraud. As a result, the cost of monitoring went up accordingly. In the second and third round the exchange period was being shortened to three days.

The instruction for the voucher which would be used for training should not be complicated. The inventory and price list should be clear to facilitate the exchange and to assure the negotiated prices. The training of beneficiaries being scheduled before the issuing of vouchers could reduce time costs. With regard to the training materials on voucher use, one page of instruction would be enough. An inventory and price list with 2-3 pages is quite essential.

4.3 Enlarge the range of the agro-inputs that can be purchased

Some important agro-inputs were not included in the agro-inputs list. The feedstuff for pigs was a case in point. In 2009, the livestock industry accounted for more than 50% of farmer's net income per capita, and pig-keeping was the pillar of livestock industry. The restraint of assistance in crop might hinder a quick growth of farmers' income.

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Table 1. Sample Distribution

County	Township	Village	Sample households	Percentage
Mianzhu	Guangji	Xinhe	30	14.7%
		Woyun	93	45.6%
Anxian	Tashui	Shuangnian	81	39.7%
Total	2	3	204	100%

Data source: research survey of agricultural inputs voucher assistance

Table 2. Variable Declaration

Variables	Valuation Content	Mean	Std. error	Effect direction
Dependent Variable				
Satisfaction of the AIVP(Y)	0=,No, 1= Yes	.53	.5	
Independent Variable				
Households' Characteristic Variable				
(1)Gender(X1)	0= Female, 1= Male	.45	.498	+
(2) Ages(X2)	1=over 49, 2 =49~40 3 =39~30, 4 =under 30	1.64	.739	+/-
(3)Education Years(X3)	1 = 0~6, 2 = 7~9, 3 = 10~12, 4 = over 12	1.31	.551	+/-
(4) Gross Income(X4)	1=under 10,000, 2=10,001~20,000, 3=20,001~30,000, 4=30,001~40,000, 5=40,001~50,000, 6=50,001~60,000, 7=60,001~70,000, 8=70,001~80,000 9=over 80,000	4.22	1.734	-
(5) Area of the Arable Land (X5)	Land Area (MU)	3.65	2.225	+/-
AIVP Characteristic Variable				
(6) Voucher Value (X6)	0=Not Enough , 1=OK, 2=Enough	1.61	.537	+/-
(7)7 Days Voucher-Use Duration(X7)	0=Short, 1=OK, 2=Long Enough	1.53	.669	+/-
(8) Variety Can Be Purchased (X8)	0=Not Enough , 1=OK, 2=Enough	1.42	.762	+/-
(9) Agro-inputs Brands That Can Be Purchased (X9)	0=Not Enough , 1=OK, 2=Enough	1.49	.662	+/-
(10) The Proedure of The Voucher Using (X10)	0=Complecated,1=OK, 2=Convenience	.48	.615	+/-
(11) Scale of The Suppliers (X11)	0=Small, 1=OK, 2=Big	1.46	.564	+/-
(12) Distance to Purchasing Sites (X12)	0=Far, 1=OK, 2=Near By	.31	.602	+/-

Table 3. Results of the Parameter Estimates

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Gender (X1)	0.545218	0.368377	1.480055	0.1389
Ages (X2)	-0.108023	0.228583	-0.472576	0.6365
Education Years (X3)	0.31142	0.31654	0.983823	0.3252
Gross Income (X4)	-0.182373*	0.108167	-1.686035	0.0918
Area of the Arable Land (X5)	-0.284506***	0.094184	-3.02074	0.0025
Voucher Value (X6)	0.452376	0.354504	1.276084	0.2019
7 Days Voucher-use Duration (X7)	0.034561	0.26332	0.13125	0.8956
Variety Can Be Purchased (X8)	0.561311*	0.302308	1.856751	0.0633
Agro-inputs Brands That Can Be Purchased (X9)	0.181456	0.3571	0.508138	0.6114
Procedure of The Voucher Using (X10)	1.355497***	0.338442	4.005105	0.0001
Scale of The Suppliers (X11)	0.09459	0.345661	0.273651	0.7844
Distance to Purchasing Sites (X12)	0.305851	0.31535	0.96988	0.3321
Akaike info criterion	1.16368	Schwarz criterion		1.359535
Log likelihood	-106.1136	Hannan-Quinn critier		1.242915
Avg log likelihood	-0.522727			

Note: ***, ** and * mean significant on 1%, 5% and 10% level

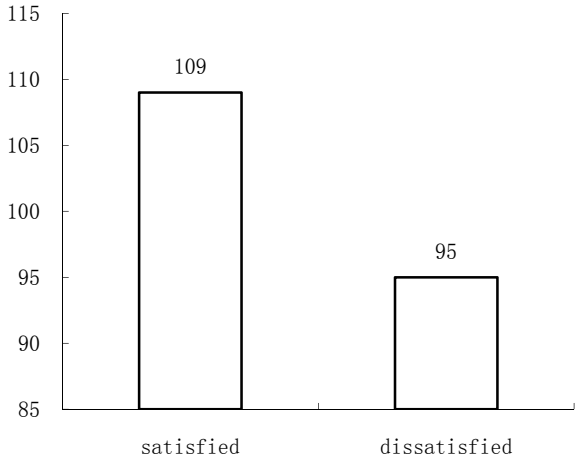

Figure 1. Satisfaction of the surveyed AIV beneficiaries