Compensation of Grain for Green Programs Impact on Rural Employment Transfer

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Abstract

Grain for Green Programs (GGP) in Zhejiang province plays an important role in protecting the environment, soil erosion prevention, production adjustment, and lifestyles promotion for local farmers. In this paper, the Chun’an County of Zhejiang Province was selected for the case study on analyzing the aspects of employment modes such as agricultural households, their income sources, and the corresponding industrial restructuring caused by the implementation of forestry ecological compensation in Zhejiang province. The corresponding strategies and suggestions for improving the mechanism of forestry ecological compensation were proposed.

1. Introduction

Grain for Green Program (GGP) is a national project to combat soil erosion and improve ecological environment. The implementation of the GGP mainly relies on switching the land use at the location where the original steep slopes are not suitable for the development of crops and bare land by natural recovery or artificial reconstruction. The aims of the GGP are restoring forests, maintaining regional ecological security, and providing some major forest products.

Although Zhejiang province is not included in the National Project plan, the local government attaches great importance to the Grain for Green Programs. While the Central Government proposed to switch the land use of farmland back into forests, Zhejiang province also implemented provincial Grain for Green Program at the sources area of eight river systems. The local government established several methods such as employ seedling compensation, tax refund of special agricultural and forestry products, and guarantee of property rights of forest and grassland, which can encourage and protect farmers’
motivation to change land use from farmland to forests. In other words, forestry ecological compensation mechanism will be useful for those who switched farmland back to forest, which can significantly improve the ecological environment.

The problems in the eco-compensation mechanism of Grain for Green Programs and the willingness of the farmers to be involved in the project in the Zhejiang province were analyzed to propose strategies and recommendations for the implementation of corresponding eco-compensation mechanism such as compensation classification, compensation standards, diversified funding sources and compensation diversification.

2. Theories and Practices

Ecological compensation mechanism has been proved to be an effective solution to ecological protection and coordinated socio-economic development. The Grain for Green Program has an obviously positive externality. The implementation of the project will bring the involved farmers economic benefits, which will improve the ecological environment.

In 1997, Costa Rica adopted a forestry ecological compensation plan, which paid for the farmers’ loss caused by land version into forest and compensated for the behavior of protecting ecological services (Zbinden and Lee, 2005). The U.S. government launched the Conservation Reserve Program (CRP) in 1985, which would function as an excellent reference for the implementation of similar programs in the design of scope, standards, and duration in other countries.

In the respect of policy design, McCaskill et al. (2003) studied how to coordinate the relationship between afforestation and farming, calculated the influence of the economic incentives of the forestry and agricultural policies on private afforestation inclination by regression analysis.

In China, many studies evaluated the performance of the pilot Grain for Green Programs and the progress they achieved in the past 10 years. Since 2000, Zhejiang province started to compensate for resources usage through establishing a forestry ecological compensation fund to subsidize the 10 counties (cities, districts) at The Qiantang River headwater region.

3. Methodologies

3.1. Background of study area

Chun'an county is located in western Zhejiang Province, with a total area of 442666 hectare, in which forest area is 358466 hectare. Local people cultivated in mountains for gain grain. There are 3866 hectare farmlands with slope above 25 degree, which result in deterioration of the local ecological environment, soil erosion, droughts, and floods occur frequently. Thus the GGP plays very important role in the sustainable socio-economic development Chun'an county.

3.2. Methodologies

(1) Modeling development

The forestry ecological compensation in the implementation of Grain for Green Programs exerts profound influence on the farmers’ industrial structure and revenue structure. We conducted on site investigation on the Grain for Green Project at Chun'an county. In order to investigate the effects of compensation policy, we used multivariate selection discrete model to analyze the influence of compensation mechanism on the employment transfer of agricultural households. The selection variables are the employment modes and revenue structure.
Assume there are J choices, the utility function (latent variable) of the jth choice of the ith decision maker is:

\[ n_{ij} = z_i a_j + \varepsilon_{ij} \]  

(1)

Where is the ith decision maker’s 1*q characteristic variable, is q*1 Coefficient vector. If the utility of the kth choice is larger than the other, the decision maker would likely select the k choice. Therefore:

\[ v_{ijk} = n_{ij} - n_{ik} = z_i (a_j - a_k) + (\varepsilon_{ij} - \varepsilon_{ik}) = z_i\gamma'_{ij} + \varepsilon_{ij} \]  

(2)

Assuming the errors are independent, subject to extreme value distribution, then get a multinomial Logit Model.

(2) Dependent and independent variables
Dependent variable (explained variable)
Farm is defined as a set of employment distribution of agricultural household labors (1 = pure farming; 2 = part-time farming; 3 = non-farming).

Independent variables (explanatory variables) were selected by step wise regression analysis, which include: agricultural income in household revenue: the ratio of pure agricultural income over total revenue of the household;
Parti (dummy variable) is participation of grain for green programs: 1 = participation, 0 = no participation;
Hill (dummy variable) : Whether or not does the region lie in a mountainous area (1=yes, 0=no);
Steep (dummy variable) is Steep arable land: 1=no, 0=yes (for this variable is correlated with another variable (parti), this variable choice inverse assignment);
Compc (dummy variable) is Satisfaction about compensation (compc, dummy variable) : 1=satisfied, 0=unsatisfied;
Educ is Education leve: actual age based on the survey;
The governing equation of this model is:

\[ farm_i = \alpha_0 + \alpha_1 wage + \alpha_2 parti + \alpha_3 hill + \alpha_4 steep + \alpha_5 compc + \alpha_6 educ + \varepsilon_i \]  

(3)

3.3 Analysis results

<table>
<thead>
<tr>
<th>Table1 discrete choice model results Compensate effects on employment</th>
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<tbody>
<tr>
<td>Multinomial logistic regression</td>
</tr>
<tr>
<td>Log likelihood = -121.40548</td>
</tr>
<tr>
<td>farm</td>
</tr>
<tr>
<td>1 (plantation) (base outcome)</td>
</tr>
<tr>
<td>2 (agriculture plus)</td>
</tr>
<tr>
<td>age</td>
</tr>
<tr>
<td>parti</td>
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<tr>
<td>3 (non-agriculture)</td>
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</table>
4. Discussion on results

4.1 Participation of grain for green programs

Active participation in Grain for Green Programs will promote the employment transfer of the agricultural households and the correspondent industrial transfer, which can reduce the distinction of economic and social conditions between town and country. The results of analysis suggest that the agricultural households participated in Grain for Green Programs are more likely to transfer to part-time farming than to non-farming employment, which coincides with actual situation.

4.2 The influence of revenue after compensation on employment decision of agricultural households

Agricultural revenue has significant influence on employment behavior of the agricultural households after transferring cropland to forests. The agricultural household who lost cropland will start non-farming activities after been compensated. Agricultural revenue is negatively correlated with non-farming activities, which indicate that rural labor forces gradually have been transferred to non-farming industry after returning cropland to forests.

4.3 Influence of labor forces and human capital on employment transfer

The results show that age has relatively greater impact on employment choices than educational level engaged in agriculture and non-agricultural occupation. The marginal of age added will reduce the occurrence rate of employment choices non-agricultural occupation, but insignificant. Because of higher opportunity cost, the education years of the rural households in employment has a reverse impact on agriculture occupation. Engaged in non-agricultural employment, this impact is positive indicator of high level of education, which is helpful to access the city employment market.

4.4 Influence of zoning of agricultural household on employment

The results show that farmer’s regional advantages have the significant impact on rural employment shift. Farmers who live in the mountains with disadvantage location may have limitation on employment shift, but this trend is not obvious.

4.5 The influence of land types on farmers’ employment after turning agricultural land into forest

According to the policy of returning farmlands to forests, only those farmlands with slope above 25 degree should be transferred back to forests. If the slope of transferred land is below 25 degree, the household will not get compensation. The influence of such land on employment transfer is limited. The
results show that non-sloped farmland is negatively correlated with employment transfer of the households.

4.6 Farmers’ satisfaction with the compensation standards

Compensation standards of returning farmland to forests should be the sum of opportunity cost plus opportunity of the farmland transformation. In fact, the households are not compensated in this way, which leads to higher or lower compensation that affects farmers’ satisfaction with the standards. The results show that farmers’ satisfaction with compensation standards has positive influence on agricultural households’ employment transfer.

5. Conclusion and Recommendation

In term of empirical analysis, we find that compensation of Grain for Green Program will impulse rural employment transfer, optimize rural industry construction and increase farmer’s income as well. It is recommended that the follow advises should be taken into account in the GGP.

(1) Compensation Based on Regional Differentiation
At present, compensation standard of Grain for Green Program was adopted as national standards in Zhejiang Province. The benefits of the uniform standard are transparent, conducive to social supervision, easy to operate, and cost efficient, but its shortages are also obvious, such as inadequate or excessive compensation.

(2) Compensation Based on Structure of Tree Species Differentiation
The final products of ecological forest are ecological benefits. It is necessary to establish ecological compensation mechanism for ecological forest since the ecological forest is a typical public goods with large external economy.

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References