

# Impact of Social Capital on Farmers' Intention to Adopt Small Water-Saving Equipment in Yanggu County, Shandong Province

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## Abstract

The report of the Nineteenth National Congress raised the construction of ecological civilization and the revitalization of villages to a new strategic level. In recent years, problems such as water shortages and low water use efficiency caused by economic growth have become prominent. Water-saving equipment can effectively improve water use effectiveness. Social capital as a key factor in the success of public equipment adoption, but due to the lack of social capital, small-scale rural water-saving equipment has not been widely adopted. This article takes farmers in Yanggu County, Shandong Province as the research object, and constructs a two-stage model of factor analysis and logistic from the perspective of social capital. It aims to study the impact path of social capital on farmers' willingness to adopt small-scale water-saving equipment from the perspective of farmers and villages. The research results propose practical control strategies for each subject.

## Keywords

Rural Revitalization, Social Capital, Water Conservancy Equipment, Shandong Province.

## 1. Introduction

The report of the Nineteenth National Congress raised the construction of ecological civilization to a new strategic level. In recent years, problems such as water shortage, low water resource utilization efficiency and water pollution caused by economic growth have become prominent. China is a country with severe water shortage, and its per capita water resource is only 28% of the world's per capita level. Agriculture is a large user of water, but the shortage of agricultural water and the inefficient use of water resources have always been important factors restricting the sustainable development of China's agriculture. Water-saving technologies have the effect of improving agricultural water use efficiency, reducing drought risk losses, and promoting agricultural change. Promoting water-saving irrigation technology and developing water-saving agriculture are of great strategic significance for ensuring water security, food security, and ecological security in the arid regions of the Northwest, and promoting sustainable development of agriculture and rural economies. In recent years, the government has increased its investment in water-saving agriculture. However, agricultural irrigation in most parts of China is still extensive. Traditional backward irrigation methods such as flood irrigation and paddy irrigation can be found everywhere. The equipment has not been widely adopted, especially in the arid regions where the water shortage is severe in the north. Therefore, the problem of insufficient supply of water-saving facilities in rural areas is very prominent. Take Shandong Province as an example. As a large production province since ancient times, it has advantages in climatic conditions, but the terrain is complex, the landforms are complex, and the government is leading. This method is likely to cause water-saving irrigation equipment to be "out of water and soil". The government only changes the annual

precipitation greatly, and the investment in water-saving equipment in rural areas is particularly weak, which greatly hinders the development of the local agricultural economy.

However, social capital as a key factor in the success of the adoption and supply of public equipment, due to the lack of social capital in China's social transformation, has resulted in the lack of widespread use of small water-saving equipment in rural areas. In addition to being affected by the individual's social capital stock, equipment willingness is also affected by social support and social relationships. In most cases, farmers make behavioral decisions through learning, imitation, and interaction. In rural communities, farmers' learning and imitation are formed through the interpersonal relationships they have, the network effects they bring, and long-term living together the common values, behavioral paradigms and mutual trust, interactions between farmers and organizations at different levels and levels, and their behaviors are affected by other farmers and their environment. Social capital, as a prerequisite for the initiation of collective action, has a significant impact on farmers' decision-making from both the peasant household level and the village collective level.

## 2. Literature Review

Study on influencing factors of farmland water-saving equipment construction. There are many factors that affect the introduction and utilization of rural water conservancy facilities. Some scholars have analyzed the different attitudes of farmland water conservancy construction-related stakeholders in farmland water conservancy construction investment under market economy conditions.[1]According to the characteristics of water resources, farmers and farmers can adopt two methods of shareholding system and participant management.[2]From the government perspective, some scholars analyze the impact of institutional changes on the supply of water conservancy facilities[3][4].In addition, some scholars take the construction of farmland water conservancy facilities as an example, and use household survey data to analyze the influencing factors affecting farmers 'demand preferences[5]. The results show that farmers' public goods demand preferences are jointly affected by personal characteristics, family characteristics and village characteristics Influence, but there are significant differences in the direction and degree of influence of different characteristic variables. In recent years, domestic scholars have continued to study the influencing factors of farmers 'investment in farmland water conservancy facilities, and have focused more on the two aspects of farmers' investment behavior in small farmland water conservancy and their willingness to participate in water associations [6]. Farmers participate in investment in farmland water conservancy facilities, mainly investing in small farmland water conservancy facilities. The influencing factors of investment behavior have gradually expanded from economic factors to household factors and individual household factors. Research from the perspective of social capital. As far as independent households are concerned, whether farmers participate in supply depends on the rational choice of farmers, both internal and external factors, including internal factors and external factors such as market environment and government support. From the perspective of social relations Seeing, [7] China's rural areas have significant characteristics of "geographic society" and "kinship society". Individual behavior is largely affected by social network relationships. Social capital plays a key role as an informal institutional constraint [8].In China, there are some explorations on this subject, but different geography and human environment choices make the experimental results have similarities and differences. Based on the survey data of 400 farmers in Xi'an and Xianyang, Shaanxi Province, the analysis of social capital for farmers in water-saving irrigation facilities. The influence of participation willingness and willingness to pay in cooperative supply[9], finally it is concluded that all dimensions of social capital are positively related to farmers 'willingness to participate, social capital has a significant effect on farmers' willingness to pay[10], and some scholars have used 500

household micro-survey The data is used for empirical research, focusing on the impact of social capital and structure on the payment behavior of small-scale water conservancy facilities by farmers[11][12]. The research results also show that social capital is an important variable affecting farmers' willingness to pay. To sum up, there are many researches on how to promote the small-scale water conservancy supply in rural areas at home and abroad, but the research based on the perspective of social capital is not common, and the current research results are far from meeting the needs of reality. An important factor is to explore its impact on the willingness of farmers to adopt small-scale water-saving equipment, and to make suggestions on how to promote the supply of small-scale water-saving equipment in rural areas based on the results of the study. Finally, to promote the innovation of farmer participation mechanisms and achieve farmland water conservancy that meets farmers' needs. The equalization of public service supply process provides theoretical and practical basis.

### 3. Research Process

#### 3.1. Semi-structured Interviews with Residents of Yanggu County, Shandong Province

In order to further explore the factors that affect farmers' willingness to pay, the author visited many farmers on the spot. The willingness of small-scale water-saving facilities to pay for farmers is based on a voluntary basis. Farmers take maximum self-interest as the criterion for behavior choice, and pursue higher returns and lower costs. They will participate in the payment of water-saving equipment only when the proceeds are obtained.

In the conversation, we summarized the main points mentioned by the interviewees: ① Individual characteristics of farmers, age and education level of farmers have an impact on farmers' willingness to pay for water-saving equipment. It may be because the older the farmers are, the more conservative they are, and the less they participate in payments. The higher the educational level of farmers, the more they tend to engage in non-agriculture, so they are less willing to pay for the construction of small water conservancy facilities. ② Family characteristics of farmers. Household population and household income have a positive impact on willingness to pay for water-saving equipment. The larger the rural household population, the more important food security is for the family, and the stronger the willingness of farmers to pay for small water-saving facilities. The higher the household income, the more economically capable they are to pay for small water conservancy facilities, and the more willing they are to invest in small water conservancy facilities. ③ Farmers' planting characteristics. The larger the irrigated area, the stronger the willingness of farmers to pay. ④ Features of farmers' social capital. The more complex the social network, the more reluctant farmers are to participate, because they think they can use other ways to solve the water problem. The higher the social trust, the stronger the willingness of farmers to pay, because the trust between farmers reduces the economic risks and supervision costs caused by the loss of trust after participation. ⑤ Institutional factors. The government subsidy passed the 10% significance test, the sign is positive, and it is consistent with expectations, which means that the government subsidy has a strong incentive effect. The government's input failed to pass the significance level test, indicating that it has little to do with the payment behavior of farmers.

#### 3.2. Questionnaire survey of residents in Yanggu County, Shandong Province

##### 3.2.1. Survey Results

###### (1) Data source

Teachers and students of Hohai University went to Shandong Province to distribute the survey data of rural surveys to farmers. The survey used a simple random sampling method, and

randomly selected 150 farmers in Yanggu County to conduct a survey. The survey returned 150 questionnaires and 138 valid questionnaires, with an efficiency of 92%.

(2) Description of the basic characteristics of the sample.

The male to female ratio in the sample is 28:41, and more men are migrant workers, so the proportion of women is higher than that of men. The average age is 42.39 years. The proportion of young and middle-aged laborers who go out to work is relatively large, so the average age of the respondents is relatively high. The average years of education is 9.39 years, and the average family farming population is 1.90.

(3) Description of farmers' willingness to pay.

In general, farmers' willingness to pay for cooperative supply of water-saving irrigation facilities is relatively high. In the sample, 34.78% of the highest willingness to participate in the cooperation is willing to pay, and 68.84% of the willingness to pay is less than 400; in terms of cooperation, 38.40% of the willing partners choose 10 or more cooperation scale; in terms of cooperation methods, both investment and contribution are preferred, and 61.59% of the total number of farmers willing to cooperate are selected for investment and contribution. See the table below for details.

### 3.2.2. SPSS Analysis

Based on the results of the questionnaire, this paper constructs a binary logistic regression model and uses SPSS19.0 software to conduct an empirical analysis of the impact of social capital on the willingness to adopt agricultural water-saving equipment.

First we analyze the impact of social capital at the farmer level. The scale of social networks has a significant negative impact on willingness to pay at a level of 1%, and the impact of heterogeneity of social networks is not significant, which is inconsistent with expectations. This may be because the scale of the social network is conducive to reducing the cost of allocation. Farmers rationally anticipate this, so the larger the scale of the network they are in, the stronger their willingness to pay. The heterogeneity of the network has a negative impact on farmers' willingness to pay. It may be because the heterogeneous social network makes farmers more able to work together, and agricultural income is no longer the main source of economic income, thus reducing farmers' cooperative payment in agricultural production willingness. Contractual trust has a significant positive impact on farmers' willingness to pay at a significance level of 5%, while human trust is not significant, which is an interesting contrast with willingness to participate. The higher the degree of contractual trust based on interest and industry, the stronger the willingness to pay, because the higher the level of participation in modern social networks, the more they can accept the "pay for service" cooperation principle, which will help increase the farmers' acceptance of cooperative supply. Although the traditional network is helpful for stimulating the willingness of farmers to participate, it is because the farmers rely too much on each other under the trust of human relationships, and the demonstration effect is particularly obvious, thereby suppressing the willingness to pay. The difficulty of getting help and the frequency of community mutual assistance have a significant negative impact on willingness to pay at levels of 10% and 5%, respectively, contrary to expectations. This may be because the easier it is for individual farmers to get community help, or the higher the frequency of mutual assistance among members, the stronger the "free-rider" mentality of the farmers, which inhibits their willingness to pay higher fees.

Second, it analyzes the impact of village-level social capital. The higher the participation of farmers in behaviors such as community election decision-making and the more transparent the decision-making in the community, the more peasant households have a sense of ownership, and the more willing they are to pay for community cooperation. The higher the farmers' compliance with the regulations, the higher the farmers' acceptance of the regulations and the more willing they are to pay. Social reciprocity is negatively related to willingness to pay for

cooperative supply. This may be because higher social reciprocity means that there is more informal cooperation between farmers.

## **4. Suggestions**

### **4.1. Attach Importance to the Role of Social Capital in Public Facilities' Willingness to Pay**

Chinese culture emphasizes the priority of society and advocates individual obedience to the interests of families and groups. These characteristics allow social capital to easily find theoretical prototypes and proofs in China. Especially in rural China, the stock of social capital is very rich, and in the transition period, farmers are not good at using the two methods of resource allocation, the government and the market. Social capital is the most easily available resource. Social capital has an important role in stimulating the willingness of farmers to adopt public facilities and increase their willingness to pay. Therefore, we must pay attention to the positive role of social capital. For example, we invite "highly talented people" with high social prestige as project conveners and family as cooperative units.

### **4.2. Cultivate Modern Social Capital Based on Contractual Trust**

Research shows that traditional social capital and modern social capital have different effects on the willingness to participate and pay in the supply of public goods, and modern social capital based on contractual trust can significantly increase farmers' willingness to adopt. The government and the community can improve the farmers' awareness of contract performance, rights and responsibilities by carrying out legal publicity activities such as legal advancement at the grassroots level and community legal training. At the same time, we should increase the punishment for dishonesty, and give material and spiritual rewards for honest performance and trustworthiness, and create a good environment of trust in the whole society.

### **4.3. Encourage Farmers to Participate in Community Activities and Form Social Norms with Modern Characteristics**

At present, farmers generally do not care enough about public affairs, are not enthusiastic about public welfare, and even do not care about collective interests, that is, lack of enthusiasm for participating in community activities. Non-participation in community activities and the lack of social capital in the community are mutually causal, forming a vicious circle, which seriously hinders the coverage of rural water-saving facilities. Therefore, farmers must be encouraged to participate in community collective activities, cultivate trust and reciprocity norms in the activities, so as to accumulate social capital and form a virtuous circle between community participation and social capital accumulation. At the same time, the community should leave room for farmers to participate in collective affairs decision-making and implementation, allowing farmers to solve some problems by themselves through consultations, and farmers often interact in community participation.

### **4.4. Improve Farmers' Education Level and Awareness of the Importance of Water-Saving Irrigation**

At present, the overall educational level of farmers engaged in agricultural production in China is relatively low, which means that they are unlikely to actively generate demand for water-saving irrigation. Therefore, farmers' vocational education, technical experts going to the countryside, or expert lectures must be used to improve farmers' scientific culture. Knowledge allows them to better accept and master water-saving irrigation technologies and management methods. During the training, farmers with higher education, better understanding, enthusiasm for public welfare, and more prestigious farmers were selected as the key training objects, and they were trained as water-saving irrigation demonstration households to make use of social

relations networks. In addition, the promotion of the importance of water-saving irrigation in farmers' technical training is also very important, so that farmers realize that water-saving irrigation is not only of great significance to the ecological environment and sustainable agricultural development, but also can save agricultural production costs and improve agricultural production benefits. . By measuring the economic and ecological benefits of farmers adopting water-saving irrigation technology, farmers are made aware of the importance of water-saving irrigation, thereby increasing their willingness to adopt water-saving facilities.

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