

DEVELOPMENT OF A MODEL FOR DISSEMINATING AGRICULTURAL TECHNOLOGY INFORMATION BASED ON SIGNALING THEORY

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Abstract: The effective information dissemination model is greatly meaningful to rural economic development. Applying the theory of signaling games, it's concluded that farmer's demand centered technology supply is essential. On this basis, a new agricultural technology information dissemination model was built in the paper.

Key words: signaling, information, dissemination, model

1. INTRODUCTION

Agricultural technology information dissemination plays an important role in the improvement of rural development and new Socialist Countryside Construction. It is necessary to set up fluent spread and feedback channels in order that the advanced and useful technology information will be available to farmers (Qu, 2001). The agricultural technology information transmit systems in our country ignored the farmers' information demands. There was a gap between information demand and supply (Sun, 2003). In the processes of technical information transmission and spread, farmers lack the effective information feedback channels. It will be not fluent for

information dissemination unless the problem is solved. And the result of agricultural technology spread will be negatively affected by the problem. For one thing, the risks of both resource waste and economic losses would be increased. Furthermore, the risk of new technology adoption of farmer will also rise. Therefore, for solving the problem, it is essential to set up a new agricultural technology dissemination model. Based on the theory of signaling games, an agricultural technology information dissemination model from the angle of farmers' demand will be discussed in the paper.

2. THE ORETICAL BACKGROUND

2.1 The meanings of agricultural technology information demand for farmers

Agricultural technology information demand refers to farmers' demand for agricultural technology information under certain conditions, which implicates two meanings: 1, farmers' desirableness for informational purchase or adoption. 2, the payment capacity of technical information. The payment capacity is not just refers to finance but time, perception and so on.

2.2 Assumptions and model development

There are often asymmetry of information between the organization of agricultural technology spread (hereinafter referred to A) and farmers (hereinafter referred to B). A does not understand fully about B's demand, receptivity and the way they deal with information in the process of receiving. According to the information dissemination model they chose, whether B could get desirable information or not depends on if the problem about asymmetry can be solved. A would bring about wastes in finance and recourses if they do not understand B's demand in the process they provide agricultural technology information to B. For B, it would also lead losses if the technology information not fit to them.

There are differences in quality of information demand among farmers. In the process of agricultural technology information dissemination, A always hopes for more Bs who are higher quality of information demand as their targets customer, because the higher quality farmers can realize themselves' information demand and are able to search, evaluate and use them efficiently. They have high abilities in using information provided by A and they will bring great benefits in information technical spread to A (social benefit for governments and financial benefits for enterprises). It is not easy thing to distinguish farmers' quality of information demand because A often needs

certain signal mechanisms such as B's income, education level and experience in informational application. It will get different results according to Bs who have different quality levels. In this way, A can effectively distinguish farmers with different information demand, thereby enhancing the average quality of information demand of farmers who apply information technology.

We assume that the standard distribution range of B's quality of information demand is $[0,1]$. Generally, the farmers who have higher quality of information demand have the better ability to use technology information, and the farmers who have lower quality of information demand could use less. Here we assume that it is linear function between the ability of using the technology information and the quality of information demand, expressed by the line pp' , and assuming that the externality of information dissemination can get compensation or controlled through certain means. We use [Fig.1](#) to express the quality of information demand of farmers and the corresponding ability of using the technology information. If A doesn't use any signal mechanism, and selects the target customers B randomly, then the average expect-quality of the chosen target customers is 0.5, and the average expect-ability of using information technology is b , both of which belong to the average level. A are always would like to use signal mechanisms to assess B's income level, education level and past experience using information technology, thereby finding the target customers with high-quality of information demand. It is assumed that the cost which B met A's requirements is related to its own quality of information demand, or further assume that the cost is linear and decreasing to the quality of information demand, cc' showing that in the [Fig.1](#). A further assumption is that the interest of getting technology information from A is d . It is cost-effective to send signals for farmers who have quality of information demand above e and have a lower cost of sending signals than their benefits. The farmers who have the quality of information demand bellow e would face higher cost than benefits. It has no sense for them to send signals. In this way, the signal mechanism of A could exclude the farmers with the lower quality of information demand, and the average expect-quality of B can be achieved $(e+1)/2$, thus the average expect-ability of using technology information of B would be higher than a . When A further increase their demand, its average expect-ability of using information technology would be further enhanced, but it is unrealistic to over demand the quality of information demand of farmers. Because on the one hand, B which has high quality of information demand maybe require the higher quality of technical information, on the other hand, it is difficult for A to find sufficient target customers when B having a lower quality of information demand.

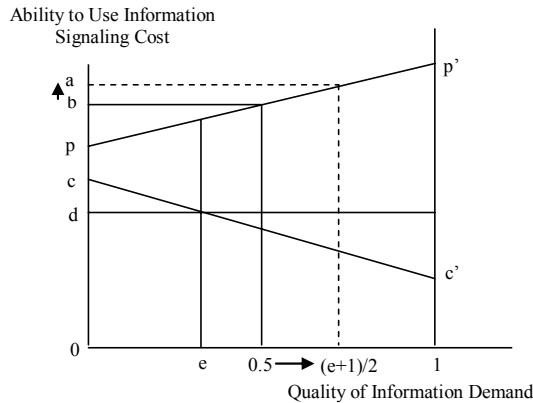


Fig. 1: Relation between Quality of Information Demand and Ability to Use Information

From the analysis above, we can get that it is conducive to raise target customers' quality of average expectant information demand and enhancing the adoption rate of technology information for the agricultural technology information provider. For farmers, their quality of information demand should meet the technology providers' requirements. This would improve the applying efficiency of agricultural technology information to some extent, but two issues must be satisfied: firstly, B can convey their real and effective signals of technology demand quality to the technology information providers, namely, the existence of effective channels for feedback is needed; The second is in the request of A's signal mechanism, A could obtain enough target customers to maintain their investment costs. Therefore, there are two problems at present: first, whether B has condition to convey a real and effective technology demand signals to A? It is effective that A disseminate information to B only when conditions permit, if the conditions are not full or possessive, the informational disseminating from A to B would be invalid or even failure. The second problem is how to access to adequate number of target customers for A in the signal mechanism circumstances. It can meet A's request better only when B possesses of high quality of information demand. On the contrary, it would be difficult for A to obtain sufficient number of target customers.

Based on the analysis above, we should think about that whether the two problems exist in reality. In the current process of agricultural technology dissemination, we can conclude that the answer is no.

Firstly, the farmers are short of channels for information feedbacks. Recently it is mainly by unidirectional transmission of technical information. For instance, the information providers spread their information through newspapers, broadcast, TV, websites, and so on. The farmers can not fully realize the actual useful effect and real value of the information they received because lack the professional informational knowledge. The

information supply lacks pertinence and interactivity. The relevant surveys indicate that presently the fluent information communicational channels have not popularized in the wide countryside in China. Especially pointed, what the farmers need is effective channels for information feedbacks to solve the difficulties they encounter. And otherwise it will result in informational lying idles and wastes. The existing methods of interactive information spread by telecoms, short massagers' platforms, the clerks for information spread, enterprise-farmer household ordered cooperation, expert consulting are still not fully popularized. Generally speaking, the agricultural technical information suppliers do not spread information pertinently and the feedbacks from farmers are usually not available to the suppliers. Therefore it is resulting in transplacement between supplies and demands. Now farmer-feedback channel should be provided urgently to make the information spread more pertinently and increase the efficiency of technical information dissemination.

Secondly, the whole quality of the farmers is not high enough for agricultural technical information demands at present. The whole educational level of the farmers is still on the low side now. With the widespread use of the current techniques of production in agriculture, however, farmers rely increasingly on technical information to help them and Meanwhile it is request the qualities of farmers should be higher. Agricultural technology information dissemination requires of the farmers having a certain scientific and technological knowledge and skills. Under the market economy conditions, farmers only have physical couldn't adapted to the development of the times.

3. MODEL DEVELOPMENT

Based on the analysis above and the experience of foreign countries, this paper will build an appropriate model of agricultural technology information dissemination (as shown in [Fig.2](#)). An effective model of agricultural technology information dissemination should be able to fully mobilize all the elements' positivity. The elements include the disseminator, the recipients, as well as resources, media, and so on. The analysis about the model is from the following two aspects: Firstly, the elements involved in the model and their functions. Secondly, the driving force and the way of the dissemination model act, and feedback mechanisms.

3.1 Elements and their functions

Generally, The information dissemination process includes five elements such as the disseminator, the recipients, the message, the media and feedback. For information dissemination of agricultural technology, "disseminator" mainly refers to government-oriented Agricultural Techniques Extension Organizations, Rural Special Technique Association, agricultural enterprises, agricultural technical education and scientific research institutions, and so on. They are the main force of agricultural technology information dissemination; "recipient" refers to the broad masses of farmers which contain core of farmers who have high recognition, judgment, application and evaluation capacity and general farmers;" Message" is that agricultural technology information itself; "media" means the channels, means or tools of agricultural technology information dissemination including oral media, print media, electronic media, and so on.

3.2 Operating Way

The process of agricultural technology information dissemination is divided into two stages. The first stage is before the agricultural technology information transmitted. We should enable the broad masses of farmers to get the information demand feed backed to the hands of information disseminators through certain channels and means (known as "External Feedback", or "EF" for short). Ordinary farmers may rely on the key information personal in the village to reflect their desire or needs, this process is called "Inner Feedback" ("IF" for short). Then the disseminators should dispose the farmers' information about the demand of agricultural technology information, and transmit the required and appropriate information the farmers need through certain channels. The second stage is after the agricultural technology information dissemination. Information disseminator should have certain channels to track and investigate farmers' response in time, including information technology awareness, the existing problems in the application process and evaluation (also "EF") in order that the disseminators can timely adjust the contents and dissemination channels of the information and transmit the re-adjusted information to the farmers again. After the re-transmission of information, Both the disseminator and the recipients can get better effect in supplying and using the agricultural technology information.

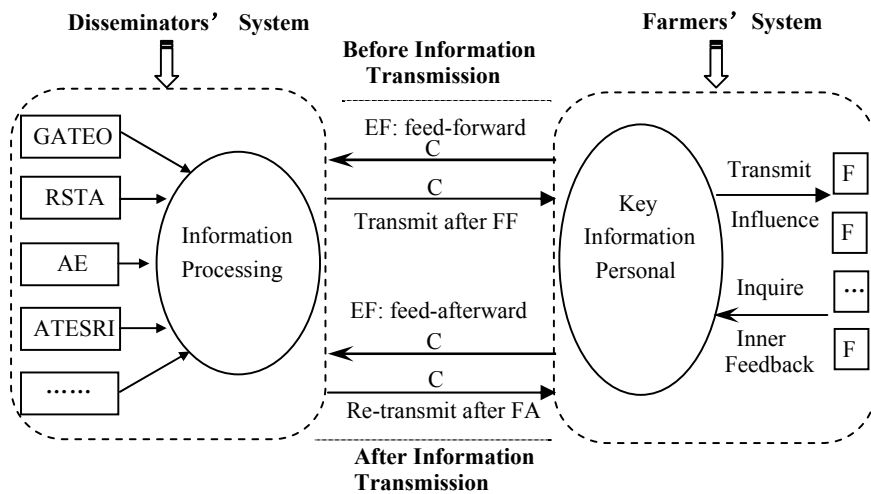


Fig.2: Agricultural Technology Dissemination Model

4. CONCLUSION

Through analyzing the signaling theory, it aims at establishing the feedback channel of information demand for farmers, which is of great significance to improve the farmers' overall quality, improve the adoption rate of agricultural technology, and promote the dissemination of agricultural technology information. The new dissemination model of agricultural technology information puts forwards the two-stage information dissemination model which includes dissemination and feedback of information, and considers the differences within key information personal in the village with higher quality of information demand and ordinary farmers adapting China's reality. It would have given some attention and support by forming the feedback and dissemination, and been contribute to the spread of agricultural technology information.

Farmers today need the guidance and service of agricultural technology information more pressingly than ever before to guide their production and management. The disseminator of agricultural technology information should master farmers' information demand comprehensively and dynamically, and regard them as the important subject developing rural information technology, with orient to meet the farmers' information demand by taking measures in a targeted strategy. It provides the accurate, reliable and useful information to farmers timely, and promotes the development of building the socialistic new rural.

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