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Research on Supply Chain Operation of Connecting Agriculture with Supermarkets Based on Agricultural Brokers System

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Abstract On the basis of expounding the research results of using relevant knowledge about Game Theory for supply chain of agricultural products at home and abroad, we use principal-agent model in Game Theory to research the new function that the supermarkets entrust supervision and control over quality of agricultural products to agricultural brokers in the circulation model of connecting agriculture with supermarkets; then design the optimal incentive contract and influencing factors between agricultural broker and supermarket, and explain the fundamental role of agricultural brokers in the process of circulation; finally in light of the role of government in promoting development and application of agricultural brokers, put forward corresponding policy suggestions: establish government support policy; set relevant standard of industry; establish cooperative organizations of agricultural brokers.

Key words Agricultural brokers, Connecting agriculture with supermarkets, Quality of agricultural products, Game Theory, China

Ministry of Commerce and Ministry of Agriculture in December, 2008 issued a notice on carrying out the work of connecting agriculture with supermarkets farmers, and required that we should actively develop modern circulation model of agricultural products, promote further development of supply chain of connecting agriculture with supermarkets, guide the direct connection of large chain supermarkets with farmers' cooperatives which produce fresh agricultural products, and foster large distribution companies of agricultural products with their own brand. There are mainly two supply chain models of agricultural products in China currently: the first is the supply chain of traditional agricultural products which takes farmers' market as the center; the second is the supply chain of connecting agriculture with supermarkets which takes supermarket as the center, and it has become the mainstream model of agricultural products supply worldwide at present.

As the supply chain of agricultural products, which takes supermarkets as center, gradually forms in China and takes "super city + farmer" model as the mainstream, many problems gradually loom large. One problem is that the agricultural products farmers provide can not meet the quality requirements of supermarkets, which is caused by many factors. On the one hand, when purchasing agricultural products, the supermarket is in the face of "one to many", namely one supermarket in the face of many farmers who provide agricultural products. The quality of various products is uneven and restricted by factors of human and material resources, the supermarket cannot realize "one to one" supervision on various providers of agricultural

products. In this way, the supermarket can not successfully sell agricultural products, but also its desire for further cooperation with farmers abates, affecting the income of farmers. On the other hand, due to limitations of knowledge, technology, and capital of the farmers, they can not effectively improve the quality of agricultural products to meet supermarket requirements. Meanwhile, being that they pursue the maximization of profit, they are reluctant to expend energy on quality of agricultural products, and the behavior of "pass off inferior goods as superior ones" exists.

Therefore, the market needs an independent third party on behalf of it to monitor and supervise quality of agricultural products. We think that the agricultural brokers can assume the role. Agricultural broker refers to natural person legal person and other economic organization which are engaged in intermediary, commission agency or brokerage, in order to promote re-combination of agricultural resources, for the purpose of a commission in the agricultural economic activities. Agricultural broker, the most active and vigorous factor in the independent middle position, does not possess commodity, but to use his knowledge, wisdom, available information, capital and activity, extensive social connections, and exclusive supply and marketing channels to provide services for principal or related parties. Agricultural brokers act for supermarket to conduct guidance and supervision on quality of agricultural products, which can make the supermarket avoid the predicament of "one to many", and obtain high-quality agricultural products. Meanwhile, in the process of monitoring and guiding farmers to improve the quality of agricultural products, the agricultural brokers also promote farmers' planting techniques. Thus, agricultural brokers play role of connecting supermarkets and farmers in the supply chain, conducive to establishing effective long-term supply and demand relations and achieving "win-win".

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After formation of partnerships of agricultural brokers and supermarkets, the two parties will form a typical entrustment-agency relationship. A key feature of these relationships is that the client's interests has a direct close relationship with the behavior of agents, but there is always asymmetry of information between the two parties, the information mastered by agricultural brokers who act as agent more than that of client-supermarket. The agents will show a kind of behavior in the pursuit of the maximization of their own interests, namely moral hazard of hidden behavior (sloth), with effort less than their reward. The client needs to design effective incentive mechanism to control the behavior of the agent in order to safeguard their own interests. This is a problem needs to be solved urgently, because it affects the fundamental role of agricultural brokers.

1 The status quo of research at home and abroad

The earliest relevant study was from Maze (2001) who analyzed the problem of relationship between quality safety of agricultural products and governance structure of agricultural products according to characteristics of supply chain of agricultural products in Europe, and first proposed the point of view that using Game Theory rationally can enhance the quality of agricultural products comprehensively^[1]. Hennessy (2001) discussed the role and mechanism of food industry's leadership in safe food supply and explained the role of oligopoly game in food industry in leading the quality of the industry^[2]. Vetter (2002) used game theory to verify the problem of moral hazard in the process of vertical integration of food supply chain, based on the characteristic that consumer cannot recognize quality safety of food^[3].

Liu Li Feng and Wu Lapin (2006), in the research of mutual game relationship between upstream main body of supply chain and supermarket, thought that stable cooperative relationship between upstream main body of supply chain and supermarket can quality speculation behaviors of main body, such as passing off inferior goods as superior ones. Further by using principal-agent model analysis under the conditions of incomplete information and complete information, they proposed that the supermarket should design an effective supply chain contract including incentive and restraint in order to ensure that the behavior of the upstream main body of supply chain did not deviate from the quality control of agricultural products of supermarket^[4].

In the research of quality safety of agricultural products based on evolutionary game model, by using establishing and analyzing evolutionary game model of quality safety of agricultural products, Chen Xiaolin and Feng Junwen (2007) concluded the evolutionary phase diagram of supply chain market of agricultural products and evolutionary stable properties of each equilibrium point, so as to unravel evolutionary process of supply chain of agricultural products and provide scientific basis for formulating effective relevant policies to ensure quality safety of agricultural products^[5].

Based on these existing studies, this thesis tries to use the knowledge of game theory to design a rational and effective in-

centive mechanism for principal-agent relationship between supermarket and agricultural broker, in order to realize the maximization of interests of agricultural brokers and maximization of interests of supermarkets, ensure the quality of agricultural products, promote and maintain effective long-term cooperation between supermarkets and farmers and give full play to the role of it in the supply chain of new agricultural products.

2 Analysis of game model with complete information

The thesis first analyzes game of quality of agricultural products in the absence of the agricultural brokers, during the cooperation of supermarket and farmer in the current mode of "supermarket + farmers" so as to get their respective choice. We give the assumptions as follows:

Firstly, the labor result of the farmers, namely the quality of agricultural products, is good or bad. is the value of high-quality agricultural products, and is low-quality agricultural products. Apparently $V > W$.

Secondly, the supermarkets want to buy high-quality agricultural products, rather than the low-quality low-cost agricultural products at low purchase price. Therefore, if farmers want to sell agricultural products, they must regard agricultural products as high-quality agricultural products for sale, and then there is only one price (P) of agricultural products in whole market. This also means that if farmers want to sell low-quality agricultural products, they will use certain disguise cost, and disguise low-quality agricultural products as high-quality agricultural products in order to sell them to supermarkets. The disguise cost is C .

Thirdly, assuming the relation between value and price is: $P > C$, $V > P > W$, namely agricultural price is larger than the corresponding disguise cost, while price of agricultural products is smaller than the value of high-quality agricultural products, and is higher than the value of low-quality agricultural products.

We establish dynamic game model of complete information which is shown in Fig. 1. In this model, game party 1 represents farmer, and game party 2 represents supermarket. At the first stage of the game, farmers can choose to produce high-quality agricultural products or low-quality agricultural products; at the second stage of the game, farmers can choose whether to trade their agricultural products. At the third stage of the game, the supermarkets choose whether to trade with the farmers and buy farmers' products. If the agricultural products have good quality, and the deal is finalized, then it is beneficial to two parties; if the deal is not finalized, namely the supermarkets choose not to finalize deal or farmers choose not to finalize deal, although it does not inflict any loss on two parties of game, the two parties lose the opportunity of getting benefit. When the agricultural products have poor quality, if the deal is finalized, then it is a loss to the supermarket; if the deal is not reached, although the supermarkets have no loss, the farmers lose disguise cost.

Through the above analysis, we know that in this game, when the supermarket and farmer actively participate in game,

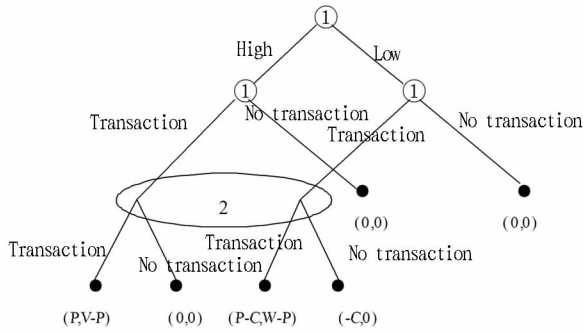


Fig. 1 The dynamic game model with complete information between supermarket and farmer

then the two sides are bound to take risk, and when the supermarket and the farmers adopt conservative game option, then the two sides will lose their potential opportunities of getting benefit. Therefore, when the supermarket can not test and judge the quality of agricultural products, any choice of the supermarket is not good, while the farmers also bear risk that the loss is caused by unsalable agricultural products. The choice of two parties of game has no absolute advantage or disadvantage, so the result of game has great uncertainty. Ultimately the supermarket may pay price of high-quality agricultural products for fear of buying low-quality agricultural products. They lower transaction price which is agreed, so the farmers are more inclined to produce low-quality agricultural products. Thus, in the supply chain of connecting agriculture with supermarkets, if the high-efficiency transaction mechanism is not realized, then it is not the best choice to supermarket, farmer or consumer.

Therefore, agricultural broker, as a relatively new profession, plays an irreplaceable role in realizing high-quality and high-performance connection of agriculture with supermarkets in China. Through regularization of behaviors of supermarkets and agricultural brokers, coupled with government departments' timely formulation of corresponding policies for the supervision of the supermarket and formulation of a series of effective measures, the behavior of agricultural broker will be further standardized, and it will play a more important role in the supply chain of connecting agriculture with supermarkets. If we want to develop the supply chain of agricultural products which takes supermarket as the center, controlling the quality of agricultural products will play an important role. It is not only related to the income of farmers, but also to the sales of the supermarket. All in all, it connects the interests of two parties, and is the foundation of long-term cooperation. So, we think that we can take an independent third party-agricultural broker, as the bridge of connecting supermarkets and farmers.

3 Game model analysis of agricultural brokers and supermarkets under condition of complete information

First, we begin analysis in the case of complete information, namely that the supermarket know clearly the behavior op-

tion of agricultural broker. Although in real life, this case is unlikely to happen, it will have reference significance for further research in the future to a certain extent.

We give the assumptions:

Firstly, the effort degree of agricultural broker e is continuous function. Under the effort degree of e , the effort cost of agricultural brokers is $C(e)$, and $C' > 0$, $C'' > 0$.

Secondly, the quality of agricultural products is affected by natural environmental factor. The economic impact caused by environment θ is continuous variable, and its probability density is $g(\theta)$.

Thirdly, the function of level of quality of agricultural products $x(e, \theta)$, and the corresponding currency income function of supermarket is $\pi(e, \theta)$, where $\frac{\partial \pi}{\partial e} > 0$, $\frac{\partial^2 \pi}{\partial e^2} < 0$, $\frac{\partial \pi}{\partial \theta} > 0$.

Fourthly, according to the level of quality of agricultural products $x(e, \theta)$, the amount of money offered by supermarket as incentive or punishment for agricultural brokers is $p(\pi)$.

Fifthly, the expectancy utility function of supermarket is v , and $v' > 0$, $v'' > 0$; the expectancy utility function of agricultural brokers is u .

From the foregoing assumption, we know that, under the condition of $C' > 0$, $C'' > 0$ and $\frac{\partial \pi}{\partial e} > 0$, the benefit relationship between agricultural brokers and supermarkets is opposite, namely the agricultural brokers want to reduce the effort cost by the least efforts, while the supermarkets want agricultural brokers to increase effort degree, in order to make the monetary income of supermarkets grow.

Based on the assumption, we use "state-space model method" to establish model^[6].

Under the condition of complete information, the effort degree e of agricultural brokers can be observed, and the supermarket can force agricultural brokers to select any effort degree e , so the incentive compatibility constraint (IC) is redundant, and the main problems faced by the supermarket is to choose appropriate e and $p(\pi)$, in order to maximize its expectancy benefit. In order to ensure that the agricultural brokers are willing to participate in the mode of connecting agriculture with supermarkets, we must guarantee that the benefits of agricultural brokers participating in it are higher than the benefits of agricultural brokers not participating in it. Here we introduce a participation constraint (IR):

$$\int u[p[\pi(e, \theta)]]g(\theta) - C(e) \geq \bar{u},$$

where \bar{u} is reserve utility, because commissioned by supermarkets, the agricultural brokers have certain opportunity cost, and \bar{u} is the maximum utility of agricultural brokers when they do not accept the contract.

So we list the equation as follows:

$$(P) \max \int v[\pi(e, \theta) - p[\pi(e, \theta)]]g(\theta)d(\theta)$$

$$\text{s.t. } (IR) \int u[p[\pi(e, \theta)]]g(\theta) - C(e) \geq \bar{u}$$

Objective function (p) represents the utility maximization of supermarket.

Lagrange function is constructed as follows: $L[e, p(\pi)] =$

$$\int v[\pi(e, \theta) - p[\pi(e, \theta)]] g(\theta) d(\theta) + \lambda [\int u[p[\pi(e, \theta)]] g(\theta) - C(e) - \bar{u}]$$

Conduct derivation and solving on e and $p(\pi)$ respectively, we get:

$$\int v \frac{\partial p}{\partial e} g(\theta) d\theta - \lambda \frac{\partial C}{\partial e} = 0$$

This is typical Pareto optimal condition, and the expected marginal revenue of effort equals expected marginal cost, namely when the effort degree e can be observed by supermarket, the Pareto optimal result can be achieved.

4 The optimal incentive contract between agricultural broker and supermarket under condition of incomplete information

From the above analysis of complete information, we have a Pareto optimal result, but in real life, the condition of complete information can not be achieved. Under the condition of incomplete information, the effort degree of agricultural brokers cannot be observed by supermarkets directly, therefore the information between supermarket and agricultural broker is asymmetric. Based on the above discussion, we can draw the utility figure of two sides, which can be seen in Fig. 2, in order to unravel the utility relationship between agricultural brokers and supermarkets.

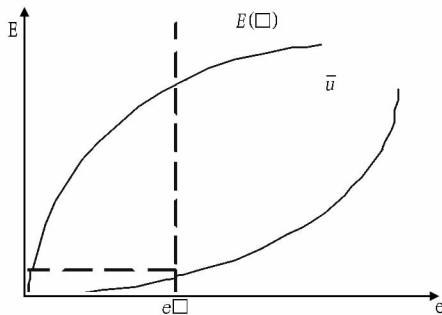


Fig. 2 Game utility of agricultural brokers and supermarkets

The supermarkets can not observed level of effort e of agricultural brokers, and cannot realize the prediction of natural state θ , then the supermarket can get effort degree e^* under the condition of maximization of self-interests. This e^* is the effort degree of agricultural brokers, when participation constraint $\int u[p[\pi(e, \theta)]] g(\theta) - C(e) \geq \bar{u}$ selects equal sign.

In fact, under the condition of meeting the participation constraint, the agricultural brokers are willing to accept job but the level of effort may not be e^* , because they have the behavior of maximizing their self-interests. If the agricultural brokers select the level of effort e^* voluntarily, then e^* must have the ability to make them obtain maximum profit. Assuming that $e' \in E$ is any effort degree which can be selected by agricultural brokers, only when the expectancy utility of e^* is bigger than e' , the agricultural economic talents will select e^* . Based on these, we introduce another incentive compatibility constraint as follows:

$$(IC) \int u[p[\pi(e^*, \theta)]] g(\theta) d\theta - C(e^*) \geq \int u[p[\pi(e', \theta)]] g(\theta) d\theta - C(e'), \text{ where } \forall e' \in E$$

Therefore, the supermarket should make effort degree selected by agricultural brokers consistent with the effort degree of agricultural brokers expected by supermarket e^* through a number of incentives and punishment systems, so as to realize maximization of expectancy benefit of supermarket. We assume that effort and sloth of agricultural brokers are denoted by E and S respectively, and the corresponding judgments of probability on effort and sloth of agricultural brokers by supermarkets are f_e and f_s respectively. Based on these, we list the equation as follows:

$$(P) \max \int v[\pi(a, \theta) - p[\pi(e, \theta)]] g(\theta) d\theta$$

$$\text{s. t. } (IR) \int u[p[\pi(e, \theta)]] g(\theta) - C(e) \geq \bar{u}$$

$$(IC) \int u[p[\pi(e^*, \theta)]] g(\theta) d\theta - C(e^*) \geq \int u[p[\pi(e', \theta)]] g(\theta) d\theta - C(e'), \text{ where } \forall e' \in E.$$

Lagrange function is constructed similarly, and we conduct derivation on $p(\pi)$, and get the following result:

$$\frac{v'[\pi(a, \theta) - p[\pi(e, \theta)]]}{u'p[\pi(e, \theta)]} = \lambda + u(1 - \frac{f_s}{f_e})$$

The above formula is Mirrlees-Holmstrom condition^[6].

Through analysis of these formulas, it is not difficult for us to see that the amount of money as reward or punishment offered by supermarket for agricultural brokers, in a large measure, depends on their own gains of supermarket ($\pi(e, \theta)$). It is from judgment of probability of agricultural brokers in the case of effort (E) or in the case of sloth (S), namely that the subjective judgment of supermarket determines the money of incentive or punishment suffered by agricultural brokers. When the supermarket thinks that probability of effort of agricultural broker is greater than the probability of sloth of agricultural broker, it will offer corresponding amount of incentive money for agricultural broker, while it has no direct relationship with strategy of effort or sloth adopted by agricultural broker.

This result is a bit unfair for agricultural brokers, and the benefit of agricultural brokers is completely influenced by subjective judgments of the supermarket. So in general, after supermarkets have obtained profit, out of consideration of maximizing their own interests, they will inevitably reduce the judgment probability of effort of agricultural brokers and increase the judgment probability of sloth of agricultural brokers. This would cause that the income of agricultural brokers is less than his actual efforts.

5 Policy suggestions

Based on the above analysis, we need to establish a reasonable mechanism, and make use of the constraint and assistance of mechanism, so that when the supermarket judge the probability of effort and sloth of agricultural brokers, the result will be greatly close to reality, and more justifiable. According to the characteristics and realities of China's agricultural development, we put forward the following suggestions.

5.1 Establish government support policies The government should formulate the industry system beneficial to establishment of the long-term cooperative partnership relations for

two parties; promote establishment and development of cooperative organizations of agricultural brokers; introduce industry guidelines of agricultural brokers, in order to regulate behaviors of supermarket and agricultural broker, protect the reasonable benefit of two parties, and give play to the role of agricultural brokers in propelling and promoting development of connecting agriculture with supermarkets to the extreme. When agricultural brokers and supermarkets have dispute, the two sides can have a similar institution like the dispute arbitration committee to make a fair evaluation, in order to avoid the damage on cooperation between supermarket and agricultural brokers, and promote rapid and healthy development of connecting agriculture with supermarkets.

5.2 Formulate relevant industry standards Objectively speaking, no matter from the perspective of model or reality, we all wish that the supermarkets' judgment on efforts of agricultural brokers is very accurate. But as for the supermarket, as an independent individual of management, if there is no guidance and assistance, relying solely on their own experience to make judgment, it is very difficult for the supermarket to make accurate judgments. Therefore, the Ministry of Agriculture can conduct a comprehensive evaluation on external factors that restrict agricultural product quality, such as annual natural conditions, market demand and so on, conduct prediction and assessment on quality of agricultural products, and timely release assessment information, in order that when the supermarket conducts judgment, it can conduct reasonable assessment according to the relevant data of Ministry of Agriculture and avoid serious discrepancies. Ministry of Agriculture also can conduct statistical record of quality level of all varieties of agricultural products, and obtain quality level of all varieties of agricultural products under general natural conditions, so as to bind the information into book form and publish it for reference of supermarkets. Thus, it can avoid the impact of subjective factors of supermarket on income of agricultural brokers, so as to make the industry more standardized, which is conducive to the gradual formation and development of related industries.

5.3 Establish cooperatives of agricultural brokers The so-called cooperatives of agricultural brokers are to unify the scattered agricultural brokers, preclude the situation that the agricultural brokers act independently and blindly, and compete disorderly, improve their ability to prevent risks, and better safeguard the legitimate interests of agricultural brokers. When there are outstanding unfair judgments made by supermarkets on the work of agricultural brokers, the cooperatives of agricultural brokers can act for treatment, as identity of the group to communicate with the supermarket, which will be conducive to settlement of disputes between supermarket and agricultural broker on the basis of equity. In this case, if supermarkets want to establish long-term partnership with agricultural brokers, the supermarkets will not choose to maximize their own interests at the expense of the interests of agricultural broker in one game. If the supermarket disregards the interests of agricultural broker, it is bound to lead to the breakdown of coopera-

tion between the two and the cooperation between supermarket and agricultural broker halts. But due to the existence of cooperatives of agricultural brokers, other agricultural brokers also choose not to cooperate with supermarkets. The reputation of supermarket in industry will be scathed, and thus this impacts the management of supermarkets. Therefore, the establishment of cooperatives of agricultural brokers is a miraculous recipe of promoting mutual restraint, mutual benefit and win-win between supermarkets and agricultural brokers.

6 Conclusion

The market needs an independent third party on behalf of it to monitor and supervise quality of agricultural products. The agricultural brokers can assume the role. Agricultural broker refers to natural person legal person and other economic organization which are engaged in intermediary, commission agency or brokerage, in order to promote re-combination of agricultural resources, for the purpose of a commission in the agricultural economic activities. Agricultural broker, the most active and vigorous factor in the independent middle position, does not possess commodity, but to use his knowledge, wisdom, available information, capital and activity, extensive social connections, and exclusive supply and marketing channels to provide services for principal or related parties. Agricultural brokers act for supermarket to conduct guidance and supervision on quality of agricultural products, which can make the supermarket avoid the predicament of "one to many", and obtain high-quality agricultural products. Meanwhile, in the process of monitoring and guiding farmers to improve the quality of agricultural products, the agricultural brokers also promote farmers' planting techniques. Thus, agricultural brokers play role of connecting supermarkets and farmers in the supply chain, conducive to establishing effective long-term supply and demand relations and achieving "win-win". Agricultural broker, as a relatively new profession, plays an irreplaceable role in realizing high-quality and high-performance connection of agriculture with supermarkets in China. Through regularization of behaviors of supermarkets and agricultural brokers, coupled with government departments' timely formulation of corresponding policies for the supervision of the supermarket and formulation of a series of effective measures, the behavior of agricultural broker will be further standardized, and it will play a more important role in the supply chain of connecting agriculture with supermarkets.

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cy and so on, give priority to the program of infrastructure of rural logistics.

3.2 Reinforce the construction of rural informatization

Incomplete infrastructure of rural logistics is the hard factor constraining China's logistics development in rural areas, while the backward informatization construction in rural areas is the soft factor constraining the development of logistics. In recent years, the logistics development in rural areas slows down, and the income of farmers grows slowly. There are many reasons, and lacking effective and timely information is one reason. The information of rural logistics is crucial to the development of rural logistics. We should know clearly the information of logistics, specifically including the relevant information regarding policies and regulations, production and management of rural logistics, and various kinds of logistics technology information of transport, storage, packaging, delivering processing and so on relating to the process of logistics. The governments at all levels should establish and perfect rural logistics information platform that is in line with actual situation, according to the need of logistics development in rural areas; set up many logistics information sub-platforms in the regions with relatively developed rural logistics, so as to collect logistics information and release logistics information timely; strengthen publicity and promotion degree, so that more farmers know the searching ways of logistics information; strengthen the informatized infrastructure construction of logistics, such as the radio, television, telephone, and internet; promote the development of consulting services industry concerning rural logistics information.

3.3 Foster the main body of market of rural logistics in China

We should actively promote the integration of logistics resources in rural areas, in order to achieve diversification of the main body of market; speed up the restructuring and transformation of assets of former circulation enterprises of agricultural products; change the status quo of small scale, monotonous service and closed operation; according to the direction of industrialized development of circulation of agricultural products, focus on strengthening the support for the wholesale market of agricultural products, transport enterprises of agricultural products, import and export enterprises, logistics distribution enterprises, and large chain supermarket of food; rely on the market and organize transport association of agricultural products; encourage the development of models of "place of production + farmer", "processing enterprises + farmer", and "enterprises of production, transport and sales + farmer, distribution center + farmer"; foster and strengthen the organization degree of the main body of market; develop various kinds of farmers' cooperatives, agencies, intermediary wholesaler and other intermediaries^[6].

3.4 Vigorously foster talents of modern rural logistics Logistics, as a new major, is in the early stage of development of China's higher education. As for the professional researches on logistics, especially the logistics in rural areas, they are weak, and there is a critical shortage of logistics talents in rural areas. In order to address this case, the government, the institutions of higher education, secondary vocational schools should join together to devote themselves to the fostering of professional rural logistics talents. The government should offer certain capital support for the schools which set up the majors concerning rural logistics; on the basis of vigorously introducing logistics teachers, colleges and secondary vocational schools should set up the professional courses suitable for the development of rural logistics in China; in addition, we can adopt the forms of organizing various forms of rural logistics training classes, holding forum of rural logistics development, conduct investigation in overseas regions with developed rural logistics and so on, in order to promote the fostering of rural logistics talents.

3.5 Promote technological level of rural logistics With the development of modern science and technology, logistics equipment and logistics technology develop constantly, which can reduce the losses in the process of transport and storage of agricultural products to the extreme, reduce logistics costs and increase added-value of products. The government should adopt the ways of fiscal interest subsidies, financial support and so on, to encourage the rural logistics enterprises or individual to purchase advanced logistics transport equipments, fresh-keeping equipments and so on; to ceaselessly strengthen the standardization of rural logistics, and actively adopt international or domestic relevant logistics standard according to the market demand in the logistic chains of transportation, packaging, processing, warehousing and so on; actively develop container transport and large refrigerated truck transport so as to constantly improve rural logistics technology.

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