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Risk Management Strategy for Agricultural Operation Subjects in Simple Scale Expansion Mode

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Abstract Agricultural operation subject is a main body of the market economy. At present, the simple scale expansion mode is a major mode of agricultural operation in China. According to some hypothesis, scale expansion will inevitably bring high income, but such hypothesis has serious defects. The operation mechanism of the simple scale expansion mode includes farmer operation mechanism, professional farmer operation mechanism, and "company + farmers" operation mechanism. In the production and operation, they will be faced with different natural risks, technical risks, market risks and policy risks. Besides, their risk control ability is also varied. Therefore, it is required to take different agricultural risk management strategies. The "company + farmers" production and operation subjects have the highest ability of risk management. Other subjects should learn their experience.

Key words Agricultural operation subjects, Simple scale expansion, Agricultural risks, Risk management

1 Introduction

Agriculture is the fundamental industry concerning the bowls of the Chinese (in any situation, the bowls of the Chinese must rest soundly in our own hands)[1] and influencing China's social stability and the second and tertiary industries sustainable development. Now, China's agricultural operation subjects have changed from the household operation dominating pattern to the pattern of coexistence of many types of operation subjects[2]. However, in agricultural operation subjects, traditional rural household operation subjects take up the largest portion. In the process of development, traditional rural household operation subjects take the simple scale expansion as major part, including traditional farmers, professional farmer households, and general professional cooperatives. When faced with agricultural risks, they have low ability of risk prevention and suffer the largest losses. Therefore, it is necessary to strengthen the risk management ability of the agricultural operation subjects with simple scale expansion mode.

2 Basic assumptions and limitations of simple scale expansion mode

2.1 Assumption of operation subjects with simple scale expansion mode The operation concept of operation subjects with simple scale expansion as the core is based on the following assumptions, including three conditions: A. The commodity price (P) is directly correlated with the cost; B. The quantity of agricultural products per unit area (Q) only increases without decline; C. The commercialization rate of agricultural products (K = Goods/Quantity, the quantity of commercialized products is expressed in G) only increases without decline. Based on the above assumptions, it is able to reach the conclusion: large scale brings high quantity, high quantity brings high income. If cost is denoted as C and income is denoted as I, the income formula: $I = P \times G - C = P \times Q - C$.

2.2 Operation assumption of operation subjects with simple scale expansion mode This basic assumption has defects. First, A is a false proposition. The formation of commodity price is restricted by a variety of factors, and the price is inversely proportional to the supply-demand relationship. This is general knowledge. Second, there is uncertainty in B. The yield of agricultural products is influenced by many factors such as varieties, sunlight, drought and flood, and has great uncertainty. Third, C also has uncertainty, commercialization rate of agricultural products = commercialized products / all products × 100%. Therefore, commercialization rate of agricultural products depends on the proportion of agricultural products used for the exchange to all agricultural products. In order to make the problem clearer, it is necessary to use a new concept of "the success rate of commercialization". The success rate of commercialization (S) = 100% of goods successfully exchanged / commercialized products. Agricultural products are perishable and lose the possibility of exchange, thus the income depends on price, the quantity of commercialized products and success rate of commercialization, which can be expressed by the following formula:

$$I = F(P, G, S) - C$$

The price, quantity, and success rate of commercialization are changing, agricultural costs occur before the price, quantity, and success rate of commercialization. Therefore, there are three possible relationships between $F(P, G, S)$ and C: $F(P, G, S) < C$, $F(P, G, S) = C$, and $F(P, G, S) > C$, but only the third case has income. In other words, this formula means that the simple scale expansion of agriculture does not necessarily bring in-

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crease in income.

3 Operation mechanism of simple scale expansion mode

3.1 Characteristics of traditional farmer operation mechanism Traditional farmers use contracted land to conduct various agricultural activities. They take a certain kind of planting or breeding as major part, and agricultural products they produced are used for market transaction after deducting necessary parts for their families. The production and operation mechanism of traditional farmers is characterized by demands coming from themselves rather than market. The primary objective is to meet consumption demands of their families, and the second is to obtain profit. The strength is diversification and decentralization, and the weakness is lack of core products and marketing channels.

3.2 Characteristics of professional farmer operation mechanism Professional farmer is a special form of farmers. Professional farmer households use the land contracted or circulated to conduct large scale single agricultural production activities. They sell vast majority of agricultural products, buy much means of subsistence. Therefore, their commercialization rate and success rate of commercialization are higher than that of traditional farmers. However, they put all eggs in one basket, their individual production has plan, but the market has no plan, the risks they face are considerable. After developing into higher stage, professional farmer households appear in the form of family farm, which has certain characteristics of modern agricultural enterprises, but the scale is relatively small.

3.3 Characteristics of professional cooperative operation mechanism Professional cooperative is association formed by few farmer households and many professional farmer households with certain agricultural products or certain types of agricultural products as connection. The operation mechanism has two forms: from bottom to top and from top to bottom, which also can be called two stages. At the stage from bottom to top, the professional cooperative is a spontaneous, holding together for warmth, and loose form of cooperation. Professional cooperatives obtain pricing power through simple commodity agglomeration and price alliance, to obtain expected income. By contrast, the professional cooperative from top to bottom is a form of organization. It takes leading company as the major part. From variety selection, scale determination, product standard, marketing strategy to price formation, professional cooperatives have complete organization characteristics. "Unified operation and raising the competitiveness" are main purposes of establishment of cooperatives. About 68.42% cooperatives are established for such purposes[3]. Therefore, it can be deemed that professional cooperatives have high influence power in supply and pricing of agricultural products in certain region, and accordingly have low risks.

4 Huge differences in the controllability of agricultural risks

4.1 Controllability of natural risks The controllability of natural risks is lowest. From causes, natural risks mainly include water source risks resulted from drought, floods and soil erosion, heat source risks resulted from snow, ice, and sleet, force risks resulted from windstorm and hailstone, and biological source risks resulted from diseases and insect pests. Taking water source risks as an example, the controllability of drought risk depends on the availability of water resources. Since there is large difference in annual precipitation, the affected area, drought duration, effective water storage and low water consumption are key factors for controlling drought risks. The first two are highly human controllable. Therefore it is necessary to strengthen research and development of effective water storage and low consumption technologies, to enhance the controllability of drought risks. The risk of floods and soil erosion depends on water volume and the duration. Due to influence of various factors such as season, distance from the sea, topography and effective drainage, the first two are not controllable and the topography has a certain degree of human control, and the effective drainage has high human control. Therefore, it is required to improve drainage facilities to strengthen the risk control of flood and soil erosion. Unlike the drought risk which has large affected area, floods and soil erosion are generally small in size and the degree is serious. In terms of planting and breeding, water source risks have basically equal influence, and the influence on aquaculture is greater.

4.2 Controllability of market risks Market risk are generated from the relationship between market supply and demand, thus they are human related. In theory, they have higher controllability. Market risks mainly include supply risks and speculation risks. The supply risks are mainly generated from individual operators having plan while the overall market having no plan, and excessively pursuing scale expansion. The most prominent characteristic of market economy is the core role of market in resource allocation. However, the after-effect of market self-adjustment determines that the possibility of current suppliers suffering loss is increased. The key to prevent supply risks is to formulate production plans. They store goods in spot market and put in futures market. Because the transaction cycle is much shorter than production cycle of agricultural products, no matter in spot market or futures market, the speculation risk is zero-sum game for speculators, and generally there is no loss for speculators. However, for agricultural operation subjects, there are current losses (the investment costs can not be recovered) and opportunity cost. Due to decentralization and multiple parts of market subjects, there is huge divergence in perspective and conclusion of market judgment. In fact, market risks are difficult to control.

4.3 Controllability of technical risks Technical risk is the possibility of losses resulted from defects of variety cultivation technologies and planting and breeding technologies. The resource allocation technology in technical economics is inherently market risk, so no further analysis is carried out. Agriculture generally can be divided into conventional agriculture and high technology agriculture. The market of conventional agriculture tends to be-

come saturate and the market risk is huge, thus the high-tech agriculture has relatively large market space. However, the maturity of high-tech agriculture directly influences success of new variety planting and breeding, and new varieties with technical defects may make investors get no return. Besides, new varieties have higher requirements for planting and breeding technologies. However, the average education level of agricultural operation subjects is lowest, and the scientific and technological quality is relatively low. There is high possibility of losses due to planting and breeding technologies. Compared with technical risks, the controllability of the planting and breeding technical risk is high. Through combining training of planting and breeding technology and technical guidance of experts, it is able to greatly reduce the planting and breeding technical risks. The defects of variety cultivation technologies mainly belong to sci-tech industrialization. It is required to carry out industrialization examination and approval procedure from experiment to extension, strictly prohibited to conduct industrialization of varieties with immature technologies, such as planting risks of genetically modified rice.

4.4 Controllability of policy risks Policy risk refers to the possibility of losses due to the adjustment of agricultural policies. The basic position of agriculture determines that Chinese government always takes prudent policies in agriculture. China's No. 1 Central Document has focused on agriculture for 16 consecutive years. Agricultural policy risks mainly include land policy risks, water resources policy risks, agricultural futures policy risks, national collection and storage and protective price policy risks and agricultural insurance policy risks. At the national level, the rural land policy is relatively stable. Farmland has 30 – 50 years of contractual period, and forest land has 50 – 70 years of contractual period. These policies need to be established in the legislative form. However, at the local government level and grassroots government level, land policies are uncertain. Generally, due to local development, it is necessary to enforce land expropriation and land circulation and land policy risk is big. Land policy risks are fundamental risks, which determine the possibility of recovery of agricultural capital. Water resources policy, agricultural futures policy, national collection and storage and protective policy and agricultural insurance policy are derivative policy, which will increase the operation cost of operation subjects and determine the rate of return on agricultural capital. Policy risk control depends on levels of government, and agricultural operation subjects have no control power over policy risks. The controllability of policy risks at the central government level is higher that that at local government.

5 Recommendations

5.1 Recommendations for risk management of farmer households Farmer households are the largest number of agricultural operation subjects in China. By the end of 2016, there were 266 million farmer households (about 968 million rural people) in China[4]. Farmer households and professional farmer households belong to the same operation subjects. Their difference lies only in industrial structure. They are less influential in coping with policy risks, mainly because of the low organizational degree, the relatively limited land resources of household contract system and the small proportion of individual family economy in the local economy. This is mainly because low economic development level of farmer households, limited contractual land resources, and separate land distribution. Their enthusiasm of irrigation and drainage facility construction is weak, and the benefit of land consolidation is low. Faced with technical risks, farmer households are weak and helpless because of low educational level, low level of science and technology, and simple imitation of production and operation. Although China has formulated strict technical standards in seeds, a large number of inferior and fake seeds still flow to rural market. Besides, it is difficult to learn experience and it is impossible to tell every detail of the key technologies of planting and breeding. In dealing with market risks, decentralized operation is the most effective risk management strategy.

5.2 Recommendations for risk management of company + farmer households The agricultural operation subjects of company + farmer households are increasing year by year, and the professional cooperatives are main forms. In coping with policy risks, the company + farmer household is still simple cooperative organization, but its organizational level is relatively high, and the supply capacity is high and it has great influence on polices of local government. In dealing with natural risks, since means of production are decentralized and have weakness of farmer households, both the organization and economic strength are improving, the ability of dealing with natural risks is improving to a certain extent. In dealing with technical risks, there is high correlation between company's benefits and farmer households' benefits. Company has advantage and enthusiasm of technical training and guidance, thus company has high ability of prevention of technical risks. In dealing with market risks, professional companies have advantages of funds, market supply and demand information, and sales channel, and have better grasp of market situation. In the form of orders, the company invites professional farmer households to participate, to realize combination of funds, technologies, and market of company with land, agricultural products and funds of farmer households, and combination of upstream supply and downstream sales. Besides, it is expected to realize benefit sharing and risk sharing through contract management.

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