

# **Chapter 9**

## **Review and Outlook**



Agriculture is the foundation of national economy. In China understanding this point is very important because the society progress, the economic development, the realization of modernization, and the changes in people's life are all based on rural, agriculture and farmers. Therefore, studying the management of the business risk of agricultural production and decision issues become one of the arduous and complicated subjects of China's economic development. China's modern agricultural development and market system construction started later, but the development is very fast. Our discussion on the problems is to service for today's agricultural risk management study. Our personal interesting in scientific research on this subject, which is to discover or explore the new things. Therefore, the text can be divided into three aspects according to the theoretical and practical issues of risk management and decision in agricultural operation. First, it's economic theory foundation of risk research. Second, it discussed the application of risk management methods. Third, it is the establishment of the risk system theory and methods-probing in risk system decision methods.

The main research contents are as follows. From those studies we have formed on the problem a logic structure or paradigm of discussion: (i) By risk consciousness and the concept materialized produced the risk market and risk management demand makes market system is becoming more and more perfect; (ii) Should be to rely on the market to transfer and disperse the risk, the agricultural production scale, product standardization and new technology application have become essential conditional choice, thus promoting the modernization of agriculture; (iii) Encourage the agricultural production and the socialization of agricultural capital injected activity, and promote the macro agricultural risk management system building and risk management linkage mechanism research.

## **9.1 History of Agricultural Risk Study Review**

### **9.1.1 Modern Economic Development Is Based on the Evolution of Market Concept**

We know that socio-economic rationality source comes from human social practice and theoretical conclusion. Based on the concept of market economy (Adam Smith, 1776), economics has been in depth research and exploration of the development of the market and the improvement of the market system. When people awareness on market and social labor division growing even become very complex, this also involved their reflection in market practical construction process. Insurance and futures are two important averse instruments for the agricultural market risk, but also related to the development and perfection of market system of Chinese agriculture.

As the professional study of the history, the scholars always find the problems have been very far from today. However, our research is based on the development of contemporary agricultural economy, and it is compared with the advanced experience from home and abroad to carry out the discussion on agricultural risk management. Such as, since 1791 established the world's first agricultural insurance institutions, Germany agricultural insurance has gone through more than 200 years of development history. The types of agricultural insurance also from the original pure crop hail insurance development to a variety of natural disasters comprehensive underwriting, and underwriting the crop species is also increasing <sup>[113]</sup>. From the beginning of 1938, American government is more emphasis on agricultural insurance supply system, continuous system changes the agricultural insurance in the United States in after the 80th of the 20th century develops very quickly, forms the relatively perfect policy insurance, commercial operation mode of system, through the re-insurance plan, government subsidies and commissioned by the commercial company management system, in a certain extent solve agricultural insurance

system risk, information asymmetry and positive external problem. In 1996, the United States established the agricultural risk management agency, using the risk assessment company to help farmers to improve agricultural risk management. In June 2000, the United States Congress passed the “agricultural risk protection act”.

Due to risk aversion made the birth for the modern futures trading, but not because the initial market risk concept. Although some scholars believe that “Japan in 17 Century formed ‘rice ticket’ market” can be traced as one of the earliest futures market. But it is generally believed that the real futures market in the world early produced was also in the United States over 150 years <sup>[114]</sup>. The Chicago Futures Exchange (CBOT) was established in 1848, marking the beginning of futures trading. Futures trading are in cash forward contract trading development foundation, based on the general commodity producers, traders and processors of a wide range of business practice. In the process of the development of futures trading, there have been two changes, the one is the standardization of contracts, and the second was the establishment of the settlement system. In 1865, the Chicago futures exchange to achieve the standardization of the contract, the introduction of the first batch of standard futures contracts. Contract standardization includes the quality, quantity, delivery time, delivery place and payment terms of the contract. Until the establishment of the modern clearing house (the Minneapolis Grain Exchange, in 1891), the real sense of the futures trading can be generated, the futures market to be considered a complete set up. Since 1993 American has been in Ohio, Illinois, and encourage agricultural CBOT market entry options, to purchase corn, wheat, soybean put option.

The risk management was the origin from the world economic crisis in the United States during 1929~1933, which after 1970 gradually formed a global risk management campaign. In 1980s, the United States, Britain, France,

Germany, Japan and other countries have established a national and regional risk management association. Discussed in New York in 1983 and passed the 101 risk management guidelines. In 1986, the establishment of the “European Europe Risk Research Association” will risk research to expand the scope of international exchange.

In past, China on agricultural risk management generally took more attention on the disaster recovery, and disaster prevention was weak, without very good play to the market mechanism. Agricultural risk management is still in the initial stage of insurance management, even after the founding of new China had been established the PICC in the early period, but in practice, since 2007 government to carry out the policy agricultural insurance pilot work, as of the end of 2008, the policy agricultural insurance has covered more than 30% of the agricultural resources in Beijing city. At present, in China to operate a variety of insurance business more than at least 50 companies, including foreign insurance companies have accessed to the China market. However, the China Insurance Regulatory Commission approved the agricultural insurance business is only five qualified to engage in the pilot work.

China’s agricultural products futures market has established from the 90s of the 20th century, after 20 years of development, preliminary already covers the four series of agricultural products futures system. At present, Zhengzhou and Dalian two commodity exchanges were listed a variety of wheat, corn, cotton, soybeans, sugar, soybean oil, rapeseed oil, palm oil and other agricultural products futures, and hog futures varieties in active research and development. China’s agricultural product futures market is in the healthy development of benign orbit. China’s agricultural products futures market price is taking more and more important guidance for the market price discovery function and in the development of the national economy is playing its role in promoting.

### 9.1.2 Research Progress of Agricultural Risk Management Methodology

Scientific progress has brought the change of human ideas and concepts, which will become the wealth pursue if they are combined with the evolution and development of the market. Risk products, risk market, as well as the emergence of risk management is a very good proof. We believe that modern agricultural risk management is a new thing, because contemporary risk management itself is not very old at the time in the world. Based on the probability theory, the risk as a scientific concept was defined and initial developed by Knight (1921). Since the existence of risk and uncertainty, constitute the consensus of influence people's economic life and economic behaviors. From the view of us, the modern concept of agricultural risk has been put forward for less than one hundred years. This view is because, since French mathematician Fermat P. (1601~1665), who gave the famous "Fermat's Last Theorem", to Borel (1871~1956) formed the basis of measure theory <sup>[96]</sup>. Then, related to the rise of the marginal revolution in economics, from the beginning of 19th Century to 1930s, with the marginal analysis methods and principles as the characteristics of the various economics, named as the "new classical economic theory". The formation of modern risk concept and the related theoretic methods as the results have produced the scientific improvement in the field of economics and management. With the open and reforming, the modern economy has been not far away from China!

The research on decision-making of risk behavior can be traced back to the research work done by Friedman (Savage, in 1948), and Tobin (1958) and Markowitz (1959). But its theoretical basis is the John von Neumann and Oskar Morgenstern in 1944, "Theory of Games and Economic Behavior" created as part of the book, later the Luce, Raiffa, Arrow and Pratt et al made the improvement and development of expected utility theory or called "Bernoulli's principle", for people to explore risk provides a very important theoretical basis.

Based on the expected utility maximization model, VNM utility theory can use decision variables, including endogenous and exogenous variables as random variables, and thus will made uncertainty and risk preference into a whole theoretical framework. Based on utility theory, a variety of expected utility maximization model is formed, which can analyze the risk response of producers and the decision-making behavior under the risk condition. Due to the widespread existence of risk and uncertainty, expected utility theory has become the basic theory of risk decision making model.

In particular, those basic theorems are something new to China. Since certain researches on agricultural risk management methods with the process of China's agricultural reform and deepening, only less than 40 years. We first entered those related studies in 1983 that China just started era of agriculture and rural reforming. After the implementation of the agricultural production land contract responsibility system, to improve the agricultural economic benefits became the main target. China was in a planned commodity economic development stage, yet was not today's market economy. At that time, according to the principle of dissipative structure of open system, the whole national economy entered the initial stage of reform and opening up. Had hired foreign experts to China to give lectures, critical study of western economics, the focus were on agricultural production economics, farm management, input-output analysis and agricultural planning etc, and not covered complete knowledge of the market economy system, especially the lack of the contents of agricultural risk management. Simultaneously, nation had begun to send students to go abroad for study economic management theory in developed countries.

In the early 1990s, China put forward the establishment of the socialist market economy system. The world economy has entered a new period of economic development. China from GATT negotiations to real join up the WTO, its economy is becoming more and more prosperous and status to obtain the



promotion. We had shared a textbook by Stiglitz “Economics”, and face-to-face listen to his presentation in Beijing (1997). His book “Whither Socialism” had been translated and published (1994 English, 1998 Chinese version) <sup>[116]</sup>. Even, in Beijing we ever openly discussed the “Chinese economy to where to go?” People’s awareness on the socio-economic development, seems to be back to Adam Smith. Adhere to the market economy system and promote Theory of Moral Sentiments. In China someone thinking was considered to choose the model of plan + market, market economy emphasizes competition and cooperation, promote fairness and justice. In short, these issues are all in the exploration and practice creation process.

Then, due to the long backwardness and imperfect market construction, Chinese economists began to consider the issue from the market system and mechanism modernization. The nation gradually formed the futures and insurance markets. This is because people have formed an operational sense of risk and after this made the concept become universal demands, so that the risk as a subjective thing for economist thinking has its historical and realistic basis. As we can be seen in the book, on theory and method of agricultural risk management, a lot of scholars have carried out the study of the combination of national conditions. Agricultural University of Hebei, the research team, nearly ten years have also published a number of academic papers and doctoral dissertations:

(i) “A study on aversion the risk of cotton production and management with information technology” (by Dr. Lu Xiuru, June, 2006); (ii) “Study on grain compensation for natural disasters in Hebei province” (by Dr. Li lin, June, 2011); (iii) “Study on development of agricultural insurance in Hebei province” (by Dr. Zhao Junyan, May, 2012); (iv) “Study on production and operation entity risk management of vegetable industry” (by Dr. Qiao Lijuan, May, 2014);

(v) “The study of wheat production and price risk management in Hebei province of P. R. China” (by Dr. Abdur Rehmen, June, 2015).

## 9.2 Guidelines to the Future Research

Generally speaking, the research work in some significant is exploratory, but we should improve it not only on theoretical but research method. There are many methods to research risk decision-making, such as fuzzy method, the neural network, and the gray system method and so on which are used by many scholars to solve risk problems. This text is the combination of economics and management method and system approach, but its rationale branch belongs to the economics. Moreover, it lacks the depth and universality to many applications of research methods. For example, we did not use two steps stochastic domain to have a deep explosion and also we did not use sudden change model to carry on the solution with actual cases. It was almost, only from the perspective of conventional treatment of risk retention, risk identification, measurement, and the risk portfolio strategy research results. But once these can be widely used, will become the basis of our research on agricultural risk management of complex systems. Especially regarding entropy model, although the author thought it is a useful instrument to study complex system. Therefore, the further research direction will be:

First, Cheng Siwei (2001) said: “management science is a kind of science which has a close relationship with reality, it has a great effect, once it takes role, it is great”. Economic management belongs to normative decision-making science, so it must base on empirical economic research. It can produce significant achievement once you combine the actual problem in the development of national economy. Therefore, theory linking with reality is one aspect that we need strengthen in the future.

Second, we pointed out that we must use the system conception to study risk issues and established giant system to study the management and decision-making of operational risk system in agricultural production. This must have a close relation with chaos economics. Studying information and entropy theory along with all kinds of non-linear economic methods is the important leading topic in theory and in method.

Third, in the conventional operational risk decision-making process of agricultural production, the combination risk decision-making includes production strategy, sales strategy and financial strategy. Regarding the financial aspect related decision-making activity risk analysis, like VaR had the very big development in the recent years financial risk research. Except information technology can avoid risk, the application of financial instrument is also an essential important aspect. We must use these two kinds of methods in the research of risk decision-making.

In a word, human dreamed of an ideal world for a long time and always expected that they can create a sustainable environment through their work. They want to satisfy their higher needs after they got the basic physical needs. Therefore, people always do their best to struggle with disasters, which come from nature and human itself and try their best to avoid all kinds of risks. If creating another Pandora box is possible, we think everyone wants to do something. Thus, have to put the disease, crazy, evil, jealousy and misfortune, and other risks and uncertainties factor into the “box”. Here, the “box” is a risk management system, which should be managed commonly by the wisdom of the human. We can dream information economy, network technology, Internet plus, integration of various depth intelligent technology innovations and the development of the financial and insurance industry, human are creating such a safe “box”.

