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Early-warning Mechanism of Food Security

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Abstract Necessity of establishing the early-warning mechanism of food security is introduced, which is mainly shown in five aspects. First is the particularity of China's national and food condition; China has large population and immense consumption base. Once food insecurity occurs in an all-round way, China could not buy all the food needed from the international market. The second aspect is the importance of food as a commodity; food is the most basic means of subsistence for human being, playing a role of social "stabilizer", and also the basis of the national economy. The third aspect is the fluctuation of food supply: inter-annual variation of grain production is significant in China; and early-warning information of food security is needed in order to stabilize the fluctuation of food supply. The fourth one is the potential crisis in food marketization; both supply and demand of food are relatively small, which is unable to make great response to market price. Thus, risk of food security is exacerbated. The fifth aspect is the political nature of food as a commodity; food, an important strategic resource, has important impact on the political and military actions of a state. Measures to improve the early-warning mechanism of food security are discussed. Firstly, set up an independent early-warning mechanism, which is the premise to improve the early-warning mechanism of food security. Secondly, establish the operating principle of early-warning mechanism, mainly including systematic principle, qualitative and quantitative principle, principle of high efficiency, and principle of integrating legal, administrative and economic means. Thirdly, ascertain the operation mode of early-warning mechanism. Government leading mode should be selected based on the actual situation of China. Fourthly, increase the input in early warning and improve the quality of early-warning information of food security. Fifthly, confirm the legal responsibilities of related subjects, in order to ensure the normal operation of early-warning mechanism and to exert its due social function.

Key words Food security; Early-warning mechanism; Law; China

1 Necessity of constructing the early-warning mechanism for food security

Early-warning mechanism of food security is necessary because a good warning mechanism can effectively prevent and resolve the risk of food security. The existence of early-warning mechanism can release government from the role of firemen so as to reduce the damage on society, economy and politics caused by fluctuation in food supply. Specifically, necessity of constructing the early-warning mechanism for food security is expressed in five aspects.

1.1 Particularity of China's national and food condition On the one hand, China is a big country with large population. It's food, especially the essential ration, has an immense consumption base. "China is not only the world's largest food-producing country, but also the world's largest consumer of food with production capacity of 500 million tons, accounting for 1/4 of the global production"^[1]. The biggest production and consumption of the world determines that food security of China must be based on domestic food production. On the other hand, once food insecurity occurs in an all-round way, China could not buy all the food needed from the international market. According to the medium and long-term development goals of Chinese food, total grain demand will increase from 500 million tons in the year 2000 to 720 million tons in 2030^[2]. Under the premise of ensuring less than 1.6 billion population, the maximum demand for food is limited within 700 million tons; and now the world's

total grain trade on average is about 200 million tons. In the year 1995, China bought 10 million tons grain from international market without prior announcement, which results in the price soaring in international food market. If the domestic grain output reduced sharply by 30% just like the years 1960 – 1961, lack of grain in China would reach more than 100 tons, which is impossible to purchase in the international market^[3]. Therefore, particularity of China's national and grain conditions determines that it is of great significance to construct the early-warning mechanism of food security.

1.2 Importance of food as a commodity Importance of food as a commodity is revealed in four aspects. Firstly, food is the most basic and important means of subsistence for human being. Severe shortage of food will lead to civil unrest. Secondly, food plays a role of social "stabilizer". Grain price is the base of all prices. Only by ensuring a stable grain price, can the general price be maintained. Sustained rise in grain price is likely to trigger inflation, such as inflations after reform and opening up driven by grain price. Thirdly, particularity of food, a commodity, is shown in its basic function in human survival. The ancient Chinese believes that requirement of eating is the foremost. Engel's law (food is the most important) in western economics, Maslow's hierarchy of needs in western psychology and the Marx's economic theory have pointed out that only after meeting people's needs for survival, can other activities be carried out^[4]. Among them, "food problem" is the primary demand for survival. And grain is the staple food of the people in China and the most countries around the world. Investigation by the Chinese Academy of Agricultural Science shows that 3/4 calory and protein are from food in China. Meanwhile, population in China has reached 1 300 million and there is no doubt

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about the importance of grain, a commodity closely related with the 1 300 million population in China. Fourthly, food is the basis of the national economy, and the foundation of grain in national economy will not change at any time. Acute fluctuation of food industry has a negative impact on many aspects. Therefore, some foreign scholars believe that the so called "post-agricultural society" is always a legend^[5].

1.3 Fluctuation of food supply Generally speaking, small fluctuation may lead to high level of food security, and *vice versa*. This is because the income and price of food consumption have low elasticity with the characteristics of rigidity. If grain output fluctuates greatly, it will inevitably lead to the shortage of grain during the years with production decrease^[6]. As for the world's food production, agriculture is easily affected by climate change due to its long production cycle. Together with the uncertainty and instability of inputs and outputs, inter-annual variation in food production is quite remarkable in each country. According to the statistics and estimation of the FAO, overall grain production of four major grain producing countries (India, China, the United States, and the former Soviet Union) steadily accounted for 55% – 56% of world production from the year 1961 to 1984, with significant inter-annual variation in each country. After analyzing the statistical figures in 1961 – 1984, scholars find out that the ratios of production increase years to production decrease years of the United States, and the former Soviet Union are 4:9 and 16:7, respectively. Casley *et al.* have obtained the inter-annual variation degree of grain production in these countries in 1961 – 1984 by using logarithm variance method, which are 6.24% in the United States, 11.41% in the former Soviet Union, 4.95% in China and 6.18% in India. After China's entering the WTO, world grain market will surely exert a significant impact on Chinese grain market. Statistical figure of grain production in China from the year 1952 to 1988 shows that the average fluctuation margin is 4.87%^[7]. The year 1960 has the maximum reduction in grain production, which is as high as 15.22% compared with last year; and the year 1970 has the maximum increase, which is as high as 15.22%. And the maximum fluctuation is 29.32%. Thus, inter-annual variation of grain production is significant in China^[8]. Under market condition, with the deepening of marketization degree of the grain, a certain degree of fluctuation is a normal reaction to market rules. But excessive variation will have a devastating impact on food productivity, and will further endanger the food security of China. Fundamentally, as long as there is grain market, economic fluctuation of grain supply will exist. There are three main methods to stabilize the fluctuation of food supply. Firstly, stimulate food production and enhance the total quantity of supply; secondly, interfere the circulation system and implement market regulation; thirdly, enhance the level of reserve and promote vertical adjustment. All the three methods need the guidance of early warning of food security. Otherwise, they will turn into blind actions. Taking food import and export as an example, grain production declined significantly in China from the year 1959 to 1960. However, China exported more than 4 million tons grain at that time, which can feed more than

20 million people for a year, if each person eats 0.75 kilogram grain per day^[9]. Lessons from reality tell us the urgency of establishing an early-warning mechanism of food security.

1.4 Potential crisis in food marketization Food marketization has aggregated the potential crisis in food security. Firstly, elasticity of food supply is smaller than 1, which is relatively small. Therefore, when market price increases, producers can neither immediately expand the cultivated area, nor can expand the market supply by working overtime. When market price decreases, plant area can not be reduced immediately; and the producers can not turn to plant other cash crops. Secondly, demand elasticity of food is smaller than 1, which is also relatively small. Therefore, when market price rises, consumers still have to buy food for daily diet; and when price falls, they can not purchase more food. With the improvement of people's living standards in China, there may be some changes in the demand elasticity of food, such as the impact of substitutes. However, many of the substitutes are just the value-added varieties of food^[1]. Finally, after the reform and opening up, the state has conducted economic devolution, has intervened social and economic life by law and economy, and has improved the degree of democracy in politics, which reduces the state's control force over society compared with the past. Therefore, the previous force that can rapidly respond to unexpected events by concentrating national strength has gone, just as some scholars said that China today no longer has the former highly centralized political system and its capacity of dealing with crisis has sharply declined. In this case, the problem would become unimaginable due to the characteristics of disaster amplification mechanism of market^[3].

1.5 Political nature of food as a commodity Food is an important strategic resource. A country's political and military actions are all inseparable from the consumption of food, especially at disaster and war time.

(1) From the historical point of view, food almost played the role of money in history due to its basic means of livelihood for residents. And riots and wars triggered by the food problem can be found everywhere. China has set up special mechanisms and official positions to purchase, sell, store and transport food since ancient times so as to strive for balance between grain supply and demand. After the foundation of new China, special significance of food has also been strengthened; and strategy taking grain as the key link has been implemented for more than a decade. However, there are still problems of food. Especially in the serious famine in the 1960s, tens of millions of people lost their lives due to starvation. What's more, western history also proves the political nature of food. As early as 2000 years ago, the Greek philosopher Socrates pointed out that "man who lacks the knowledge of wheat could not be a king". In the 19th century, Europe reduced the production of food during the industrial process, relying on imports from the United States and other low-cost countries to meet the needs of food. As a result, Europe has learned lessons from the two world wars due to the serious shortage of food^[6].

(2) From the actual point of view, firstly, food is closely

related with China's stability and there would be no development without stability, which is obviously a political problem. Secondly, the fact that China is a developing socialist country should not be ignored. Someone argue that the " Cold War Era " has ended. Meanwhile, the United States and other major grain-producing countries have claimed that the embargo of food is no longer adopted today. Thus, China no longer needs to be afraid of the food blockade in North America. However, this is only a subjective guess lacking persuasion. In fact, western countries, led by the United States, still attempt to divide and westernize China. And the so called " China Threat Theory" will strengthen this hostile force. Therefore, food is both an economic and political problem in China. Thirdly, food is an important bargaining chip in the embargo. From the historical point of view, grain embargo rarely succeeded. But there are still some successful precedents. Besides, frequency of embargo can fully prove that food is more than an ordinary commodity, but a special commodity with political nature.

2 Improvement of early-warning mechanism of food security

2.1 Setting up a independent early-warning mechanism of food security Setting up a relatively independent and authoritative early-warning mechanism of food security is the premise to improve the early-warning mechanism of food security. At present, China has not yet established a national early-warning mechanism of food security playing a core role, nor has China set a certain core department to organize and coordinate food security. Considering the actual situation of current administrative system in China, I suggest to establish a national early-warning mechanism of food security with the National Development and Reform Commission as the core, and the food sector, agricultural sector and price sector as the backbones. Institutions under its jurisdiction are early-warning mechanism of food security at province, municipality and autonomous region levels. Early warning points and stations of food security can be established based on local situation, having the authority and responsibility to collect early-warning information of food security according to law, with a form of vertical leadership and a management system of " individual responsibility" . The method of work is combining regular and occasional meetings together in order to achieve a dynamic grasp of warning signs of food security. The main task of the meeting includes making a clear overall objective, main contents and division of work for the construction of early-warning mechanism, conducting construction planning for the early-warning mechanism of food security, analyzing the status of national food security and forecasting an authoritative early warning. Meanwhile, the committee of experts needed to be established can also be the brain trust of the early-warning mechanism of food security. At present, it is very urgent to establish the early-warning mechanism of food security. For instance, some scholars argue that the food security information collected by each department should be released by the authority, so as to perfect the early-warning mechanism of food security^[10].

2.2 Establishing the operating principle of early-warning mechanism Before the issue of the *Law on Food Security Early-warning*, operating principle is the basic code of conduct for early-warning mechanism of food security.

2.2.1 Systematic principle. Operation of early-warning mechanism for food security put emphasis on systematic principle, which is caused by various reasons. Firstly, food security itself is a system. Ensuring food security needs to use various tools and methods comprehensively. For instance, it includes the securities of food production, grain circulation and grain storage, which is impossible to achieve a completely success if only one side is stressed. Secondly, early warning of food security involves in the coordination and integration of many sectors, and the analysis and synthesis of all kinds of indicators and information. It is very difficult to success without a systematic notion or an operating principle. Thirdly, early warning of food security relies on computer and network technique, which coincides with the use of means in system engineering. Therefore, operation of the early-warning mechanism of food security should follow the systematic principle.

2.2.2 Qualitative and quantitative principle. Meaning of qualitative and quantitative principle has two aspects in the operation of early-warning mechanism of food security. On the one hand, early-warning mechanism of food security must conduct qualitative estimation on the security status of food—safe, unsafe, partial safe, or partial unsafe. For instance, food shortage of Guangdong Province in 2004 reached 20 million tons. If there were no other appropriate safeguards, such a huge food shortage would be regarded as partial unsafe. However, food of the whole China is safe in the year 2004, which is called qualitative analysis. On the other hand, early-warning mechanism of food security should follow the principle of quantitative analysis. Firstly, precise quantitative analysis is the basis of qualitative analysis. And a wrong quantitative analysis will lead to poor accuracy of qualitative analysis. Secondly, quantitative analysis lays a solid foundation for the warning signs of food security, and strengthens its authority and effectiveness. Thirdly, quantitative analysis which is based on database technology can help to overcome the subjectivity of qualitative analysis.

2.2.3 Principle of integrating legal, administrative and economic means. Early-warning mechanism of food security must first be carried out according to the law, because market economy is legal economy, and rule by law is a basic strategy of China at present. Moreover, the law means has the characteristics of authority, standardization and routinization. Thus, early-warning mechanism of food security should focus on the application of the law. But under the present conditions, system arrangement in the aspect of early-warning system of food security is insufficient. Therefore, administrative and economic means must be adopted. The authority of administrative means is strong with relatively high efficiency. While economic means uses the rule of market economy, mainly considering the maximum benefits. It can be seen that early-warning mechanism of food security should follow the principle of integrating legal, administrative and economic means.

2.2.4 Principle of high efficiency. Operation of early-warning mechanism of food security must follow the principle of high efficiency, because one of the existence prerequisites is that early warning can provide advance information, relevant departments of the state can prepare to deal with food security risk and adopt corresponding measures. Principle of high efficiency is of great significance to the operation of early-warning mechanism of food security. The process of information collection, analysis, processing and prediction needs a long period of time. Thus, low efficiency will cause delayed forecast; and the role of early warning would never be achieved. Moreover, decision-making sectors need certain time to communicate and understand the forecast information of food security. They are unable to take corresponding measures as soon as the warning signal of food security is released. What's more, policy regulation always lags behind, because organizing and coordinating different departments all need a period of time.

2.2.5 Principle of paying equal attention to corresponding measures and fundamental work. Operation of early-warning mechanism of food security must follow the principle of paying equal attention to corresponding measures and fundamental work. On the one hand, corresponding measures should be improved in order to quickly assemble various forces to cope with unexpected events in case of emergency, which is actually the operating principle at abnormal state. On the other hand, paying attention to fundamental work, such as construction of information network, selection and cultivation of professionals, establishment of simulation laboratory and construction of database, belongs to operating principle at normal state. Only when the two are equally emphasized, can the early-warning mechanism of food security be in a good order. And the social effectiveness of early-warning mechanism can be fully exerted even under the state of emergency.

2.3 Other problems in the improvement of early-warning mechanism of food security

2.3.1 Ascertaining the operation mode of early-warning mechanism. Early-warning mechanism of food security can be divided into two modes. One is established by the government or international organization; and the other is to forecast the food security by relying on the operation of grain market itself^[11], which can be called government leading mode and market leading mode, respectively. I suggest that China should select the government leading mode during the operation of early-warning mechanism of food security. Firstly, market leading mode is built on a fully developed market, which can not be implemented in China due to the current condition. Though food market of China selects the direction of marketization, it does not mean that China's grain market is fully matured. Secondly, market leading mode has an inherent "shortsighted" shortcoming, such as judging food security from the transaction information of grain futures market. It can accurately and sensitively reflect the situation of food security in the short term, but can not reflect the long-term trend of food supply. Finally, government leading mode does not mean to exclude the application of market leading mode. In fact, market leading mode is only

placed in a less important status. Thus, it can be concluded that early-warning mechanism of food security should select the government leading mode.

2.3.2 Increasing the input in early warning. Amount of capital investment determines the quality and level of early-warning information of food security. Firstly, a large amount and high quality of information is needed during the early warning of food security. In quantitative aspect, it includes both the grain production information and the circulation and reserve information, both the existing statistical information and the prospective information, and both the information of grain and the information related with food. In qualitative aspect, statistical means and simulation experiment require a high accuracy of information. Otherwise, forecast information through mathematical process might be enlarged or reduced by many times. Secondly, food security has a high demand for talent quality. Early warning of food security is a forward-looking work, and talent below the expert level is incompetent to the task. Meanwhile, information processing needs senior network talents. Thus, without substantial capital investment, it is unable to attract and retain qualified personnel. Finally, early warning of food security involves modern technological means. Therefore, advanced infrastructure is needed. Otherwise, prediction is just empty talk.

2.3.3 Confirming the legal responsibilities of related subjects. A clear early legal responsibility is needed to smoothly operate the warning mechanism of food security. It should be noted that legal responsibility here is a generalized one, including synonym of legal responsibility in general sense, and that in narrow sense, that is, the legal responsibility caused by illegal activities^[12]. Only in this way, can the early-warning mechanism of food security achieve real coordinated operation. Thus, its due social function can be exerted. It is of great significance to clearly understand the legal responsibility of early-warning mechanism of food security, because any institutional arrangement without responsibility exists in name but not in reality.

3 Conclusion

(1) Early-warning mechanism of food security aims to conduct dynamic monitoring on the food supply status of a country, and to compare and analyze the data obtained and the constant alarming index. When the food supply and demand situation is in a crisis situation, warning signal is sent out. And relevant departments can adopt effective measures to adjust and control the risk according to the signal. "In the developed modern industrial production, social production of wealth is systematically accompanied by the social production of risk"^[13]. Under current information age, it is extremely necessary to establish the early-warning mechanism of food security.

(2) Early warning of food security is an important part to ensure the food security of a country, linked with the production, circulation and storage of food. A good early-warning mechanism of food security can guide the production, circulation and storage of food. The fundamental purpose of establishing early-warning mechanism of food security is to forecast the safety of food and the unsafe degree of food in China.

(3) Early-warning mechanism of food security in the modern sense should be established. This mechanism provides and arranges data in time through monitoring and feedback of multi-evaluation index of food, in order to compare and analyze these data, to send out signal, and to effectively response to social and economic risk of food security.

(4) Since China has not yet introduce the *Law on Food Security Early Warning*, improvement of early-warning mechanism of food security could be more effectively respond to the objective needs. Under the requirements of scientific early warning at information age and the requirements of global economic integration and marketization, early warning of food security in China reveals serious deficiencies and shortcomings. At present, early-warning mechanism of food security should be improved mainly from the aspects of organizational structure, operating principle, operation mode, guarantee of capital sources, and definition of relevant legal liability.

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粮食安全预警机制研究

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摘要 介绍了构建粮食安全预警机制的必要性,具体表现为五方面。一是中国国情、粮情的特殊性:中国人口众多、粮食消耗基数大,出现粮食危机时,通过国际采购无法满足粮食需求。二是粮食作为商品的重要性:粮食是最基本的生活资料,具有社会“稳定器”的作用,是国民经济的基础。三是粮食供给的波动性:中国粮食生产的年际差异明显,而平抑粮食供给波动需要粮食安全预警信息的指导。四是粮食市场化潜在的危机性:粮食的供给、需求弹性较小,无法对市场价格作出较大反应,进而加剧了粮食安全的风险性。五是粮食作为商品具有政治性:粮食作为一种重要的战略资源,对国家的政治、军事行动具有重要的影响。探讨了完善粮食安全预警机制的措施。一是组建独立的预警组织机构,这是完善粮食安全预警机制的前提。二是确立预警机制的运作原则,主要包括:系统原则;定性与定量原则;法律、行政、经济手段并用原则;高效原则;应对手段与基础性工作并重原则。三是酌定预警机制的运作模式。从中国的现实国情出发,应选择政府主导的运作模式。四是加大预警资金投入,提高粮食安全预警信息的质量。五是明确相关主体的法律责任,使粮食安全预警机制正常运作,发挥其应有的社会功能。

关键词 粮食安全;预警机制;法律

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关于贵州省“农村寄宿制工程”的思考

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摘要 介绍了中国贵州省“农村寄宿制学校建设工程”的运行现状,并对其实施情况进行了总体评价。提出了寄宿制工程相关政策执行过程中存在的问题,包括:总体规划不够完备、部分地区政策执行操之过急、住宿补助发放不公平等。探讨了农村寄宿制学校发展中面临的一些困境,即学校“负债经营”、基础设施不能满足学校发展的需要、“食宿两难”问题突出、师资力量薄弱、缺乏专业管理人员和专项资金、存在安全管理及医疗问题、加重了部分家庭的经济负担、心理健康教育不到位、“三方教育”脱节、贫困地区家长教育意识落后等。针对上述问题,从政府、学校、学生及家长3个层面分析了农村寄宿制工程的利弊。在此基础上,结合贵州省的实际情况,提出了建设和发展农村寄宿制学校的相关对策建议:一是加强政策性支持;二是提高家长的教育意识;三是培养“新型学校人力资源”;四是注意当地风俗文化对学校的影响。

关键词 “农村寄宿制工程”;教育资源;教育公平