

# **Discussion about the practicability of implementing flood risk management and urban flood insurance in China**

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**Abstract:** This paper explains the flood risk management at first, and then analyzing the insurability for flood insurance by learning the international researches and developments of it, thereby finding out what the success or failure hinge on in practical case. On the basis of above, this essay do further research on the requirement practicability of implementing urban flood insurance in China, thereby pointing out various problems which may be occurred and advancing approaches to deal with them. Finally, paper offers exercisable proposals to the implement of Chinese urban flood insurance system.

**Keyword:** flood risk management ; urban flood insurance ;

## **1 Foreword**

Human understanding of the harm caused by the flood has long history, has also taken a series of preventive measures, and achieved great results. In recent years, National Headquarters proposed flood control and drought "two changes" an important idea, flood insurance is important as flood control and non-structural measures for flood risk further understanding of the characteristics of regulating people's daily behavior, speed up the progress of reconstruction, maintaining social stability, will have an important role. But the lack of a clear flood insurance regulations and policies, the difficulty of predicting the loss of a great flood, a major flood could lead to commercial insurance companies go bankrupt, resulting in commercial insurance companies did not dare set foot in the field of flood insurance; Meanwhile, the foundation work carried out flood insurance is very solid, but also in a blank part of the contents or the exploratory stage, relief customary and legal awareness of flood risk area residents weak, all have to carry out flood protection insurance work difficult.

Flood disaster is one of the biggest natural disaster threat to people's lives and property safety, with great danger and destructive. Guangzhou is located in the Pearl River Basin, flooding has always been a high frequency, wide scale and heavy features, the annual floods were caused by a large number of casualties and property losses is difficult to estimate. In recent years, National

Headquarters proposed flood control and drought "two changes" an important idea, the general trend of the development of flood control is purely from the past emphasis on engineering measures and non-structural measures steering engineering measures a combination of measures, we should be fully learned a long time frequent natural disasters lesson in carrying out engineering measures, governments at all levels, especially the local government to further strengthen the non-engineering flood protection measures. Flood insurance is an important non-engineering flood protection measures.

## **2 Flood risk**

### **2.1 Characteristics of flood risk**

Direct impact on flood risk vulnerability and areas affected by flood dangers. Risk represents the risk of various regions of the likelihood of flooding, the higher the risk the more prone to floods. For each region, said the vulnerability of flood defenses risk, the higher the vulnerability, said the weaker defenses.

#### (1) Dangers of floods

Flood disasters are some naturally occurring variation phenomenon, which occurs entirely in the human will. From the perspective of the mechanism of floods, flooding has obvious seasonal, regional and repeatability. China floods occurred in April to September, typically the east, less the west; coastal areas, less inland areas; plains, less plateaus and mountains. Floods as climate change, has its own variation, this change from a variety of length cycles, so that the cycle of flood disasters occur.

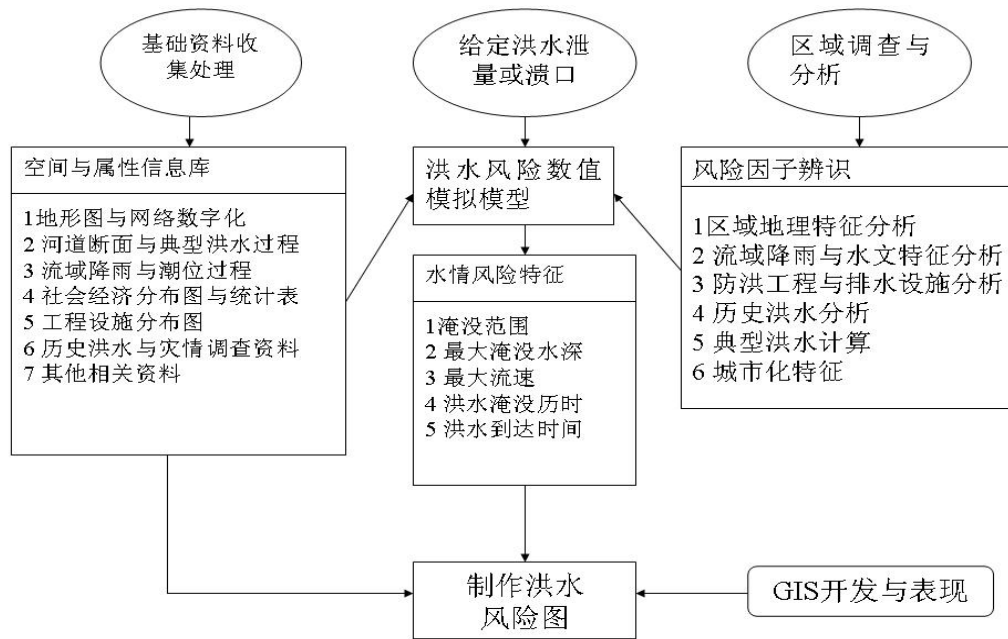
#### (2) The vulnerability of the region

The flood risk areas directly affected by the vulnerability. The main areas of vulnerability factors including local engineering system, non-engineering system is perfect, all aspects of emergency response capability. The main areas of vulnerability factors including local engineering system, non-engineering system is perfect, all aspects of emergency response capability.... Flood risk will be lower.

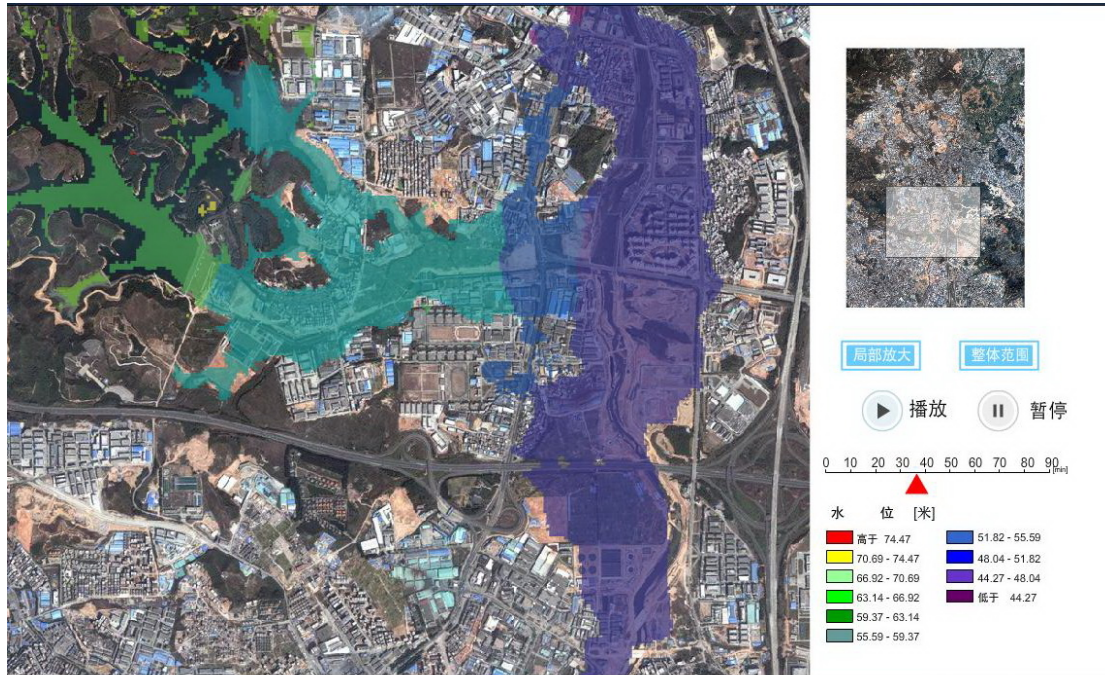
### **2.2 Flood risk calculation model**

Flood risk modeling and analysis is the basis for flood management and flood insurance implementation. Currently apply more flood risk model is based on two-dimensional mathematical

model for the technical means to process peak flow boundary conditions for the upstream research, study the evolution of flooding in downstream urban areas under the dike, dam, etc., submerged process, forecasting floods time to reach the downstream city, destructive (velocity, depth, flow) and flooded a range of different areas to provide scientific basis for management, flood prevention and flood insurance system established scientific floods. First regional survey on the impact of flood control and risk profile analysis, risk factor identification, basic data collection and processing, flood risk analysis, flood risk making diagrams produced. Should also form a complete set of flood risk information management system, so that flood risk information search, rescue and evacuation plan with residents to design automation, scientific and serve the needs of flood control decision-making. Flood risk modeling and systems development process shown in Figure 1.



**Figure 1 Flood risk modeling and systems development process schematic**



**Figure 1 Flood routing and three-dimensional simulation results show the performance chart**

### 3 Flood insurance system

#### 3.1 Flood Insurance Overview

Flood insurance is for residents living in the flood zone, associations, an insurance enterprise (thing) business unit implemented, is a kind of economic losses caused by the floods will be taken by the social or collective approach to economic damages . Insured person (insured units or individuals) by the insurance contract or contract to pay premiums to the insurance agencies; insurance institutions will premiums together to establish insurance funds; When the insured unit or personal property suffered flood damage, insurance agencies on the fund with the performance of its liability under the insurance contract.

Flood insurance mutual assistance with a social nature, society in general to the insured, relatively uniform spending to compensate for the loss of a small number of affected people to focus, which is to change the way sharing flood damage; flood damage is not a bear, but in a long time installments; in the larger context, be shared in numerous insurers who participate.

#### 3.2 Development of flood insurance

In a global catastrophe insurance system established 12 countries and regions in which the United States is one of the most perfect development of catastrophe insurance system in the country. The catastrophe insurance system in the United States among the most representative of

their flood insurance system, the core of the system is the National Flood Insurance Program (NFIP). U.S. flood insurance from the legislation to proceed, by the operation of the government, the use of a private company, through commercial means of implementation. Has established a good mode of operation, so that the federal government, local communities and individuals have the motivation and, ultimately, improve the management level floodplain, reducing flood damage.

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### **3.3 Relationship flood risk and flood insurance**

The objective existence of flood insurance flood risk is a natural prerequisite for the existence of the generation and development of the insurance risk is the objective basis for development. Flood insurance as a non-engineering measures conducive to disaster prevention and mitigation, but also for the disaster and rebuild their homes and restore production to provide the funding channels, and can reduce the national burden. Simply put, flood insurance is a special form of property insurance, which is the loss of the insured or the insured property due to flooding caused by the insurer liable for a financial compensation of insurance liability limits in the prior agreement.

## **4 The possibility of flood insurance system implemented in China**

### **4.1 The necessity of the implementation of flood insurance in China**

China is one of the worst disasters of the few countries in the world, according to Chinese statistics show seven major flood chronology basin floods in more than 20 times. Where the number of the Yangtze River and the Yellow River flood basin occurred the most, while the Pearl River and Taihu Lake Basin as the affected marine climate, disaster loss is more serious. Frequent floods to the lives of people floodplains caused great damage to the country also brought great

financial burden. Especially in the early 1990s after the flood disaster affecting China's economic development has become a major hazard, must draw our attention.

Due to a wide range of Chinese flood disasters, high frequency, serious flood damage, rely on government assistance, can not really solve the problem, in particular, to be used for rebuilding homes, lives next few years to ensure that the victims is not enough, and therefore resulting in frequent occurrence of floods in the region has been struggling in poverty, live a comfortable standard of living without flood insurance goal in the case of difficult to achieve. In addition, frequent floods also caused a heavy financial burden to the government, and the Government's commitment is not conducive to the practice of flood damage in areas of high flood risk proactive risk aversion.

## **4.2 Conditions in the implementation of China's Flood Insurance**

Flood risk analysis is a prerequisite for the implementation of flood insurance, flood insurance needs of flood risk analysis and research for technical support, there is no scientific analysis of flood risk, flood insurance is difficult to proceed smoothly. Flood risk map production is one of the flood risk analysis results, the use of 3S technology to produce flood risk maps are dynamic, real-time, in a timely manner will be sent to policyholders risk map, you can win more time to avoid risks, to minimize losses caused by floods.

A wide range of long duration rainfall is the direct cause of the flood disaster, the increasingly sophisticated and ultra-long-term forecasting of precipitation forecasting techniques for forecasting floods may be provided, try to avoid and reduce the loss of floods in the wet year also possible. The more detailed risk analysis done more easily avoid risks, which will help reduce losses, but will increase the cost of insurance, especially after reaching a certain level of risk analysis, and then to improve the accuracy, will spend the high cost, not to maximize efficiency, which under case the insurance company would rather bear the loss, and therefore the analysis of flood risk analysis is only to a certain extent. Flood insurance on the one hand to promote the study of flood risk, it also suppresses the diseconomies of flood risk, avoid excessive use of bailout funds to unnecessary places.

## **4.3 Carry flood insurance proposal**

### **4.3.1 Establish and strengthen all aspects of flood insurance-related laws and regulations**

Flood insurance is one of the important non-engineering measures of flood relief, it will regulate the development of people's daily behavior, reduce government fiscal relief spending and accelerate the reconstruction progress, maintaining social stability, play an important role. Years of practice has proved that the development of flood relief flood insurance law is very important and urgent.

Legislation and implementation of best national flood insurance and mandatory, it may be an effective means of flood risk management. Because flood insurance is a special insurance: in the flood zone, affected almost every family, there is no "help thousands of families in a" feature, as implemented in the country within a wide range, in order to disperse the burden of flood risks. And, in the course of the flood, or by the national government level macro scheduling management, at the expense of local, protecting a whole, and reflect the "beneficiaries fee, losers of luck" from the flood insurance.

In addition, flood insurance law should clearly define objects flood insurance coverage. As the impact of floods is very extensive, often difficult to distinguish, so flood insurance is not taking on everything, and floods can not be detached as long as it is zoned flood insurance insurance object. Huge property insurance property insurance rather than encourage flood insurance.

#### **4.3.2 Flood insurance reserve is established premise Flood Insurance**

Specificity determines the flood insurance flood insurance can not be a for-profit insurance, insurance for decades in China, and most insurance companies and stop looking flood insurance is because of the huge losses caused by floods, often result in insurance companies the huge indemnity even had to face bankruptcy due to insolvency. Therefore, to ensure the normal operation of flood insurance must have the support of society and the state, to establish flood insurance reserve is a prerequisite to ensure flood insurance company to run. Flood insurance premiums reserve distinguished from households to participate in the flood insurance coverage, but directly from the part of the local government and the central government. Prior to the establishment of flood insurance, flood disasters in China rely on the national and local financial allocations. Frequent occurrence of floods, destruction of property not only affected people's lives

even more to the national and local cause serious financial burden.

### **4.3.3 Flood insurance agency shall establish watershed**

Features Chinese flood disaster determines the flood insurance institutions can only be set by the basin. Floods affected the climate in general will be repeated, but the seven basin wide distribution, the frequency of occurrence of floods is not the same, the severity of the floods and also different, according basin flood insurance agencies set flood insurance can be caused by floods loss between benefit and damage to different units within the same watershed reallocation, that allocate space. In addition, you should also set up on the National Flood Insurance Flood insurance agency or agencies established flood reinsurance companies, insurance agencies share the basin can not afford flood disaster losses.

Depending on the watershed, the different characteristics of different regions for different insurance rates, one based on a different standard of flood control or flood insurance rates different for different frequencies of occurrence, on the other hand be suitable for local production activities based on different levels of the development Different insurance rates.

### **4.3.4 Flood insurance should be not less than one implementation life cycle of floods**

The floods have certain rules, namely cyclical, and therefore, the implementation of flood insurance should be at least one life cycle of floods. Participate insured object should be the subject of the useful life of fixed assets in a few years or decades, and should not be highly mobile liquid assets. To maintain flood insurance premiums relative stability, there is a relatively fixed capital accumulation process.

## **5 Conclusion**

In this paper, based on the analysis of flood insurance leads me through the characteristics of the flood risk, flood insurance, according to the actual situation in China and analyzes the necessity and possibility of implementation of flood insurance in China, pointed out the implementation of flood insurance in the country is the inevitable choice and feasibility of the implementation of flood insurance in China to achieve disaster relief, and targeted implementation suggestions China flood insurance.