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Study on emergency management and countermeasures of flood control problems in Baiyangdian River Basin

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Abstract

How to carry out flood prevention and emergency response scientifically and effectively is the urgent task of current emergency management work. This article explains and analyzes the emergency management mechanism, using the literature research method and interview method, summarizes the construction status of the Baiyangdian flood emergency management mechanism, and discusses the current situation and problems of the Baiyangdian flood emergency management mechanism from the four aspects of reduction, preparation, response, and resilience. Through analysis, it is concluded that the Baiyangdian flood emergency management mechanism has problems such as unscientific urban planning, imperfect emergency management mechanism, poor public awareness of disaster prevention and mitigation, incomplete disaster risk assessment mechanism, and lack of private professional emergency rescue organizations, etc., and then address these issues Questions, draw on the advanced experience of the flood emergency management mechanisms in New York and Paris, and put forward countermeasures and suggestions for improving the flood emergency management mechanism, improve the flood emergency management mechanism, and reduce the loss and impact caused by the flood.

Keywords

Baiyangdian watershed, flood control, emergency management.

1. Introduction

In recent years, extreme rains have occurred frequently in northern regions, and the possibility of severe rainstorms and floods in the Baiyangdian Lake Basin has been increasing.At present, the backbone rivers in the middle and lower reaches of the river basin have not been completely regulated, and the flood carrying capacity is not optimistic. At the same time, the population and economic aggregates of the planned flood storage and detention areas continue to increase, and the difficulty and cost of commissioning are increasing [1]. As the core of Xiong'an New Area, Baiyangdian Lake is the only large plain lake in North China. As the green lungs of the Beijing-Tianjin area, Dian District and related water systems have outstanding ecological value. They play many beneficial roles in flood mitigation and drought prevention, improvement of regional microclimate, protection of biodiversity, etc. [2], and are known as the "Pearl of North China", " Northland Jiangnan". In recent years, Baiyangdian Lake has been facing more and more serious water problems. The past nine scenes of the lake entering the lake no longer exist.

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At present, only the Fu River has urban life retreating into the lake, and the Xiaoyi River and Baohe River have water in seasons, and most of them are Sewage[3]. With the decrease in the amount of water entering the lake, the Dian District has been cut into many fine ditches, which has further led to the weak self-adjustment of water resources and the basic loss of water circulation in the semi-closed and semi-manualized lake [4]. After the establishment of the Xiong'an New Area in April 2017, the requirements for flood control in the Baiyangdian Basin have been increased, which is related to the safety and long-term development of the area.

2. Basin Overview

The Baiyangdian Lake Basin is a semi-humid and semi-arid area in northern my country, with a temperate monsoon climate with four distinct seasons. The annual average precipitation in the basin is 512mm, and the highest precipitation in the basin is 699mm[5], which is in Wutai County in the southwest of the basin, and the lowest precipitation is 414mm, which is located in Lingqiu County in the northwest. The temperature trend in the basin is significant, showing an increasing trend from northwest to southeast. The average annual temperature is 7.6～13.1℃; the average wind speed in the basin for many years is 4.8m/s; the humidity in the basin has increased from north to south for many years[6]; the evapotranspiration in the basin is also the same It appears to increase from west to east. The Baiyangdian Lake Basin is mainly composed of the area near Baiyangdian Lake and the catchment areas of several major reservoirs upstream. It is located in the middle of the Haihe River Basin. The water systems in the basin all belong to the Daqing River system[7].

3. Reasons for flood disaster emergency management

With the steady progress of emergency management of flood disasters in the Baiyangdian River Basin, experience has become more abundant, and the emergency management system is relatively sound and complete[8]. Use the interview method to research and analyze the main problems in the emergency management of flood disasters in the Baiyangdian River Basin, and the analysis process mainly starts from the emergency prevention stage, the emergency preparation stage, the emergency response stage and the emergency recovery stage.[9]. The recovery phase begins, as shown below.

4. Emergency prevention stage

4.1. Public awareness of disaster prevention is weak

Through this interview, it was found that nearly 67% of the interviewees had no experience in flood prevention emergency drills or emergency knowledge training. Some interviewees who participated in emergency drills also stated that they had not improved their emergency response capabilities as they should. It can be seen that the government did not have enough publicity on disaster prevention and mitigation before flooding in urban areas, and the publicity penetration was not strong. In terms of public education and training on disaster prevention and mitigation, the publicity of disaster prevention and mitigation knowledge is only carried out in the traditional mode, and the effect of dissemination of disaster prevention knowledge is relatively poor. During sexual rainstorms, the possible situations, escape methods, first aid knowledge, etc. are not clear.

In addition, the areas where waterlogging often occurs and are prone to accidents lack the necessary warning signs[10], and the public does not fully understand the locations of waterlogging-prone areas in the urban area. Once a disaster occurs, it is difficult to take active measures to avoid waterlogging-prone locations. In addition, the public's domestic garbage

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often causes the drainage outlet to be blocked, causing the drainage system to not work properly, leading to the expansion of the disaster situation.

4.2. Unfavorable investigation of hidden danger points before flood

The drainage facilities in some old urban areas of Baoding have been seriously aging, and the rain-sewage confluence mechanism still exists. This severely weakens the scheduling and capacity of drainage, and is also easily blocked, resulting in drainage capacity that does not meet the expected plan. After heavy rainfall, many hidden danger locations that have not been checked in advance will be revealed along with the accumulation of waterlogging. When the flood control and drainage account is checked back, it will be found that individual disaster-stricken locations have passed through the flood. Before the inspection and dredging work, but in fact, there is still a flood disaster. It can be seen that the relevant operators have insufficient rectification when carrying out the pre-flood dredging work. Insufficient coverage of the investigation of hidden danger points before the flood season and ineffective rectification of hidden dangers will also add burden to the government's subsequent emergency response work[11].

5. Emergency preparedness phase

5.1. Unsound installation of flood prevention institutions at all levels

Baoding City has established an emergency management bureau through institutional reforms, but the emergency management departments at all levels still have the problem of insufficient division of responsibilities. After sorting out the flood control organization system of Baoding City, it is found that this organization system mainly sets up flood control and drought relief headquarters in accordance with the city, districts (cities), counties, towns (subdistricts), and villages (communities). The flood control and drought relief headquarters at the city) and county levels are set up under the corresponding emergency committees, and the anti-fighting offices are set up in the water bureaus at all levels. There are functional departments interspersed between the two.

5.2. The quality of emergency plan preparation is not high

In the process of emergency preparedness, a key link is to formulate a complete plan. Whether the plan is perfect has a direct impact on the effectiveness of emergency management. The establishment of an emergency plan requires a lot of training and exercises, and it can be applied to actual work under the premise of ensuring that all situations can be handled[12]. At this stage, although Baoding government departments at all levels have formulated emergency plans, they have formalized the drills. On the whole, the contents of the drills are relatively general and the plan system is not perfect. Many of the contents are only based on the ideological level and guiding, and lack of guidance. Certain operability, and the feasibility is not high, it is not clear which department should be used to solve the problem of urban floods, how to deal with it and the specific process, how to reflect the flexibility when encountering practical problems, etc.

6. Emergency response phase

6.1. Real-time information sharing of disaster situation between government and society is not smooth

The accuracy of disaster information during flood disasters is of great significance. It plays a decisive role in the effectiveness of emergency management measures, and also determines the magnitude of disaster losses to a large extent[13]. The failure of relevant departments to report information in a timely manner resulted in the inability of disaster relief departments and

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organizations to quickly and accurately understand the location, time, and extent of the disaster in a timely manner, and they were unable to make reasonable decisions. As a result, it affected the disaster resistance and the city's flood prevention. The efficiency of disasters has had a great impact. In addition, the inaccuracy and non-disclosure of information has triggered many rumors and caused public panic, and the government has not been able to dispel such information in a timely manner, thereby reducing the trust of the general public in the government[14].

6.2. Lack of initiative for social participation in handling

The participation of society can further improve the efficiency of flood prevention and control, thereby correcting the deficiencies in the government's work[15]. Because the government has limited manpower and funds, it often feels unsatisfactory in the treatment of floods. However, at this stage, Baoding relies more on the government for emergency management of flood disasters, and the participation of other social forces in auxiliary disaster relief is not high. In real life, the public has not fully grasped the emergency response methods of flood disasters, and their participation methods are relatively simple, and they cannot obtain equivalent information. On the contrary, the process of disaster relief appears chaotic[16].

7. Emergency recovery phase

In this interview, some interviewees mentioned: "I hope the government can pay more attention to the renovation of the old city. When there is a lot of rain in summer, many parts of the old city will be flooded every year, making some streets inaccessible. This should be done as soon as possible. The solution." With the rapid advancement of Baoding's urbanization, the overall road conditions of the city have been greatly improved. However, in contrast to this, the construction of urban drainage pipe networks and other infrastructure equipment is still stagnant. It shows that there are very serious aging problems in the drainage pipe network of the old urban area. On the other hand, it also shows that the original waterlogging points still exist, and it affects the newly-built urban area[17]. In addition, due to the unscientific design of some overpasses and loops, drainage and waterlogging were not fully considered, and new urban waterlogging points were also formed.

8. Countermeasures and Suggestions for Emergency Management of Flood Disasters

Flood disasters caused by extreme weather and climate events are climatic disasters that need to be considered in the construction of the Xiongan New Area. Especially in the context of global warming, the impact of incremental climate change factors on flood disasters in the region should be highly valued. Based on the previous analysis, this article believes that Baiyangdian flood control work can be improved in the following four aspects.

In the prevention phase. Make full use of various media and methods to publicize the dangers, extremes, periodicity of floods, the importance of flood prevention work, and knowledge of safety and avoidance, to enhance the public's legal concept and awareness of floods, and to overcome paralysis and fluke mentality. Improve the flood control supervision system, complete various tasks ahead of schedule, and reduce the probability of urban flood disasters.

In the preparation stage. Improve the emergency team construction work, call for more experts to participate in the construction of the government's emergency management system, and allow emergency management experts to participate in more meetings and educational activities. Optimize the preparation of flood prevention emergency plans, and urge governments at all levels and even enterprises (institutions) to prepare and modify corresponding plans in accordance with the requirements of special emergency plans and the

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requirements of overall emergency plans, so as to concern all industries and departments of urban flood emergency management The objects are covered.

In the reaction stage. To improve the information communication mechanism and improve the information disclosure system, the government should respect the public's right to know, enhance the government's transparency in handling flood disasters, and release disaster information in a timely, accurate, objective, and comprehensive manner. Guide social forces to participate in emergency response, improve and supplement the government's flood disaster emergency management work, and strengthen the effect of disaster relief[14].

In the recovery phase. Scientific urban disaster prevention planning can play a key role in rationally adjusting urban development plans, optimizing infrastructure, and enhancing urban functions. By formulating a scientific and effective disaster prevention plan, the risk of flooding in Baoding can be significantly reduced, and a scientific spatial planning, drainage pipe network system and road design can be constructed for the city. In the construction of various urban facilities, whether the drainage and waterlogging prevention pipe network and facilities are perfect will directly affect the image of the city, and it is also crucial to the impact on residents' lives and urban development[18].

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