

Discussion on the Construction of the National Multifunctional Disaster Prevention and Reduction Information System

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Abstract

At present, the national disaster prevention and reduction information system is in a relatively independent state, each system can't be closely linked, and there has not a comprehensive disaster prevention and reduction system be formed. So this paper propose that we need to establish an information system which is improvement and closely related to each other. Particularly, we need to ensure that the system which has the national macroscopic properties must be a unified system, standardized system, and multifunctional system. At the same time, the system development principles and standards, a variety of information systems resources which need to be integrated, and how the system to work will be discussed in this paper. At the end of the article, the development and improvement of the system in the future is prospected and summarized.

Keywords

Disaster Prevention and Reduction; Information System; Sub system; Data Base.

1. Introduction

Disaster is a word we are more familiar with. Although there is not a uniform definition, but we all agree with this fact that it is various phenomena which damage to human survival and development of social due to natural, man-made or man and nature comprehensive causes. In generally, disasters is divided into four types: Mutation Disaster, Development Disaster, Continuous Disaster, Environmental Evolution Disaster [1]. Mutation and development disasters has a quick and lack of signs onset. It is harmful to human and animal life. Sometimes, the both combined action produce can cause a sudden disasters. Duration disasters last for a long time, and impact a large of scope generally. It can cause a great of economic losses. But the long-term potential losses caused by the evolution disasters is the largest. Thus it can be seen that the occurrence of disaster is generally more destructive and not easy to predict, more than that, the occurrence of disaster can lead some interference effects to the effected object or the normal life in affected area for a period of or even longer time. However, the existing research on disaster prevention and mitigation information system or the research and establishment of the platform are often based on disasters caused by a particular object [2-3], based on some specific disaster in a certain region [4-6], or based on some kind of technology applied for prevention some disasters [7-10]. In addition, there are some other researches such as the type of simulation system. The situation shows that the current research is more in a relatively independent state, each system can't be tightly linked in the horizontal and vertical directions, and a comprehensive and perfect disaster prevention and mitigation system has not been formed. Based on that, a kind of multifunctional disaster prevention and reduction information system which is perfect and connected closely in vertical and horizontal directions is urgently needed. In particular, the establishment of national macroscopic

multi-functional disaster prevention and mitigation system with the unified and standardized properties is very necessary.

With the improvement of China's disaster management systems and legal systems, the natural disasters monitoring and early warning system has been basically formed. Moreover, with the promotion of the each supporting disciplines research and computer technology, it is possible to establish an integrated database [11] information system based on the basic database. The database information system should be built on the basis of the existing basic databases, disaster emergency management systems and professional disaster databases. It need to constantly improve the disaster information sharing mechanisms, Standards and Regulations, and to actively integrate relevant departments involved in disaster. Though changing the disaster management models, optimizing the technology combination, and strengthening the horizontal and vertical links to achieve sharing and collaboration services and other operations, this information system will have a remarkable application effect. If such system is established, it will greatly improve the defense and response capacity of disaster engineering in China. It is beneficial to improve the work efficiency of the professional talents for disaster prevention and reduction. More than that, it will promote the development of disaster prevention and mitigation research and promote social participation degree in disaster prevention and mitigation at the same time. After that, our country can occupy the technical and empirical advantages for disasters prevention and mitigation in the international cooperation.

2. The Development Principles and Standards

In order to better meet the needs of the national disaster prevention and mitigation, the development and building of this system must be led by the Government from global planning. It needs the research institutes and academic institutions to part in actively, and develops as a long-term planning and infrastructure. Disaster prevention and mitigation information system itself is a complicated systematic project, a variety of information, data systems, equipment and even satellites are needed. In current stage, these only can be provided relative perfectly by the state. In this system, the updating of the information in each plate and the application of the new research results can't be separated from the efforts of the research institutions and the academic institutions' workers. Therefore, the construction and development of the multifunctional and national disaster prevention and reduction information system must follow some certain principles and standards. So considering the contents of each individual information system, the management and application of data information system, and the expansion and sustainability of the whole national disaster prevention and mitigation system is very essential. We should not only base on the results obtained, but also draw nourishment from the foreign advanced experience. Through combining it with China's national conditions at this stage, we can develop this comprehensive-national disaster prevention and reduction information system better.

2.1 Development principles

The development of Disaster Prevention and Reduction Information System should be based on the following principles: practicality, usability, normalization, economical efficiency, sharing and real-time. Practicality is the most basic requirement which means this system can not only satisfy the academic research needs, but also satisfy the needs for decision-making of common engineering departments in disaster prevention and reduction. Usability requires engineers who don't need to be familiar with this system can get the expected results by inputting certain parameters. Normalization means operators can easily understand and operate the system when various system parameters are clearly defined. Setting up a huge disaster prevention information system need to spend a lot of money, but in the long term, the implementation and maintenance cost is low after the completion of this system, so it is economical. Sharing means each subsystem should be interconnected and shared to enhance the reference value of this system. Real-time means the system supports real-time updating of the data to make the judgment and decision-making more accurate.

2.2 Development standards

This multifunctional system should obey present specification, laws and plans. In the meantime our country needs to make standards and laws as supplements to implement such system. At present, there are many specifications for the design of disaster prevention and mitigation in our country such as Code for Building Seismic Design (GB 50011-2010), Code for Fire Protection Design of Tall Buildings (GB 50045-95), Code for Fire Protection Design of Civil Air Defense Engineering (GB 50098-98), Code for Fire Protection of Building Design (GBJ16-87), National Comprehensive Disaster Reduction Demonstration Community Standard etc. Laws include Emergency Response Law, Water Law, Sand Control Law, Flood Control Law, Meteorological Law, Earthquake Prevention and Disaster Reduction Law, Forest Law etc. Administrative regulations include Destructive earthquake emergency regulations, Flood control regulations, Interim Measures for compensation for flood detention area application, Forest Fire Prevention Act, Grassland Fire Prevention Act, prevention and control of geological hazards regulations etc. In addition, we have promulgated a number of special planning for disaster reduction such as Disaster reduction planning of the People's Republic of China, National comprehensive disaster reduction five eleven planning, urban earthquake disaster prevention planning Standard etc. Even so, it is not enough for establishing the multifunctional system. For example a unified law for disaster prevention and reduction has not been established [12-13] (L.F. DONG promoted to legislate in 1998), disaster prevention and mitigation and the insurance industry has not formed a good system for disaster reduction, and the environmental protection factors in disaster prevention and mitigation etc. are not fully considered.

Thus, integrated disaster prevention and reduction information system development standards include: the disaster prevention and mitigation design standards, legal standards, planning standards, disaster prevention and mitigation information system and insurance industries docking system standard, environmental protection standards. Only by comprehensively utilizing all kinds of standards and let the disaster prevention and mitigation information system has a relatively sound development framework, then it can better meet the needs of the continuous development of disaster prevention and mitigation. These standards are introduced into the system, which is very beneficial to the disaster assessment and prediction. It can greatly save the decision-making time and make a reasonable and feasible decision plan.

3. Information Systems needed

Chinese satellite expert YANG Q.L. once ever said: "Systematization and standardization are the keys to information construction of disaster prevention and reduction." thus integrating a variety of information systems is a good systematic process. Currently there are a variety of the independent systems on disaster, such as geographical information systems, meteorological information systems, bridge information systems, landslide information systems, debris flow information systems and so on. They are all individual information systems, which is good for the study of a single thing, but not conducive to the implementation of the whole national macro decisions on disaster prevention and mitigation. Therefore, the multifunctional integrated disaster prevention and mitigation information system development requires the integration of all these systems [14]. This integration should include the observation information system which provides compliant observing remote sensing data and ground truth data, disaster mitigation survey information system which provides mitigation related socio-economic data and disaster information, disaster reduction resource information system which provides human, financial, and material resources to ensure other systems the resources demanded, the communication and transportation network system which provides communications support to ensure that the data and information are effectively transmitted, and also include many other units such as disaster reduction functional components, etc. Under this classification of several information systems, each contains another classification of sub-professional or trade information system, and then broken down to a specific object information system. There are information evaluation and decision-making

systems at all levels of the information systems, not only that, there has a general evaluation and decision system for the whole.

Of course, to accomplish this purpose, we must ensure that the current information systems are in close contact both vertically and horizontally and in good coordination and communication, establish disaster prevention and mitigation information system data bases around the country, collect local disaster prevention and mitigation information, and update the information collected in real time and transmit it to the terminus. Thus both central and local governments can be kept informed of the circumstances of each local disaster prevention and mitigation. It facilitate the national decision-making. Meanwhile, various research institutions may also obtain data from these base stations and make it easy for the development of scientific research. Moreover, the government can also use the development of modern social communication information technology to freely release disaster situation as well as emergency measures adopted by units or individuals through personal mobile phone, so we can promptly prepare accordingly and get guidance recommendations, thereby reducing the corresponding disaster losses. In fact, the country releases the appropriate disaster prevention strategies to the mobile phone, such as how to deal with it when elevator is out of control, how to escape in earthquakes, how to deal with fires in a right way and how to deal with mudslides, which makes everyone inadvertently learn some basic anti-disaster contingency skills at ordinary times, thereby eliminating the expenditure for centralized training or supplement thereto. And also the disaster prevention and emergency preparedness throughout the country will be greatly improved.

4. How to Play Its Due Role

Via setting up the multifunctional disaster prevention and reduction information system which is perfect and national macro. Meanwhile, exploiting a client just like a stock system, and users can register the client to get correspondent information. The client can satisfy both the national policy and research for preventing and reducing disaster, and the normal users study and research about disaster prevention and mitigation. Units can set the data collected by their own device, and input or import to the client, and then do a preliminary assessment about enterprises disaster prevention, of course, senior evaluation must be conducted by proper professional disaster prevention and mitigation team. By using subsystem to collect, analyze, research, and then make a policy after comprehensive analysis, ensuring reliability and rationality of policy. So whatever the disaster happened, we can get timely and accurate understanding of the situation, after making damage judgments and decisions, the effectively rescue arrangements can be adopted, so the loss of life and property and the potential hazards to the environment will be reduced.

Of course, to obtain such good result, effective management of data is essential, so the multifunctional disaster prevention and mitigation information system also needs corresponding data maintenance and update team, which need to establish a scientific screening and classification of data, unified identification code and parameter name, to strengthen or improve the correlation and their succession between information. Moreover Backing up data periodically or real-time, reduce accidental data loss caused due to the system paralysis is also needed.

5. Prospect and Summary

In the future, the disaster prevention and reduction information system will inevitably contain more detailed subsystems, multi information release platforms, more perfect functions, but also to the internationalization [15]. A detailed subsystem is beneficial to the study of individual objects, so that research is more effective, thus promote the development of Science; Multi information release platforms which is conducive to disaster prevention and mitigation work to carried out, so that we can understand the accurate information in time, reduce the spread of rumors and appease the masses; More perfect functions can make the operation more simple, more able to synchronize with the development of the times; Internationalization which is conducive to international technical exchanges and cooperation is much helpful to solve the more complex problems. In view of this, to develop the

multifunctional comprehensive disaster prevention and mitigation information system with the national macroscopic properties is very necessary and reasonable, it is not only conducive to the development of disaster prevention and mitigation engineering in China, but also conducive to take up a place in the international disaster prevention and mitigation technology in the future. Therefore, we should integrate existing resources and speed up the development of this system, so as to make great contributions to disaster prevention and reduction in China.

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