

# Research on Strategies for Improving Public Satisfaction of Government Flood Emergency Information Service: An Example from Three Cities in Henan Province, China

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## ABSTRACT

Government emergency information services constitute the core basis for the public to assess risks, take scientific precautions, and mitigate panic during an emergency. To enhance public satisfaction with government flood emergency information services, this study first constructs a set of indicators to evaluate public satisfaction. Subsequently, based on data obtained from questionnaire surveys, the level of government flood emergency information services for public satisfaction was assessed, and the impacts of factors influencing satisfaction were analyzed. Finally, strategies and recommendations were proposed to improve public satisfaction with government flood emergency information services. The results showed that (1) the overall public satisfaction level of government flood emergency information services Henan Province (Zhengzhou city, Xinxiang city, and Jiaozuo city) was at a higher level, and the respondents who had high, moderate, and low levels were 57.55%, 39.15% and 3.30%, respectively. (2) The public satisfaction score of government flood emergency information services, from highest to lowest, was emergency warning information service, response information service, and recovery information service. (3) From the perspective of influencing factors, the differences in the effects of age (46-60 years), education level, occupation (students, enterprise employees, others), and information characteristics (information reliability, availability, accessibility) on the public satisfaction were statistically significant. Based on the above results, strategies for enhancing public satisfaction with government flood emergency information services were proposed from four aspects: improving information availability, ensuring information reliability, strengthening information accessibility, and enhancing public response capability. The results and strategies can provide a basis and reference for the formulation and implementation of local government emergency information service policies and the improvement of public satisfaction.

## KEYWORDS

Flooding disaster; Emergency information service; Public satisfaction; Linear regression

## 1. INTRODUCTION

Due to global warming, the precipitation in China is uneven in time and space. Coupled with the impact of rapid urbanization on the nature of urban underlying surfaces and local climate environments, which makes the frequency and intensity of rainstorms and flood disasters increase [1, 2]. According to statistics from the China Ministry of Emergency Management in 2024, 53.449 million people were affected by floods and geological disasters in China, which killed and disappeared 709 people, and caused USD 36.53 billion in direct economic losses. Therefore, how to

effectively respond to rainstorm-induced floods and reduce casualties and property losses has become a key focus for governments, scholars, and the public. Emergency information plays a vital role in stabilizing public sentiment, curbing the spread of rumors, and minimizing disaster losses in the response to flood disasters. Accurately mapping and disseminating flood emergency information has become an effective approach to mitigating harm. In China, the government serves as the primary producer and manager of emergency information. Government emergency information services help individuals cope with the psychological threats brought by crises, forming an indispensable component of the emergency response process. The level of satisfaction with emergency information services impacts public participation and cooperation, and in turn influences the effectiveness of disaster prevention and mitigation efforts. Therefore, enhancing the public satisfaction with emergency information services is of paramount importance. Research on emergency information services in China began relatively late, facing challenges such as limited dissemination capacity, narrow coverage, and poor public engagement [3, 4], which significantly impacts public satisfaction. While scholars have achieved some progress in the research of emergency information services, most of them are in the field of library and information science, focusing on the improvement of the emergency information service level of libraries [5], and there are relatively few studies on the public satisfaction with emergency information services in the context of flood disasters. Therefore, studying individual satisfaction with government emergency information services and improvement strategies in flood disaster contexts is crucial for refining government emergency information services policies and comprehensively enhancing emergency management capabilities.

The three cities of Zhengzhou, Xinxiang, and Jiaozuo in Henan Province have closely related river networks, distinct urban characteristics, and typical historical floods they have experienced together, which can comprehensively reflect the multifaceted challenges of the government's flood emergency information services. In view of this, this study takes residents of Zhengzhou, Xinxiang, and Jiaozuo in Henan Province as the research subjects. By designing a public satisfaction evaluation and influencing factors scale to evaluate the public satisfaction with government flood emergency information service, and analyze its influencing factors. Then, strategies are proposed to enhance public satisfaction with government flood emergency information services. The aim is to provide references for optimizing government flood emergency information service strategies and improving public satisfaction.

## **2. LITERATURE REVIEW**

At present, the definition of emergency information services has not been unified. For example, Liu based on scenarios of major public health emergencies, defines emergency information services as a series of services provided throughout the lifecycle of a public health emergency to ensure users can access and utilize information, thereby meeting their fundamental needs for emergency response and information [6]. Chen drawing on theories from emergency management, emergency services, and information services, defines emergency information services as a series of services related to emergency information provided to users throughout the lifecycle of an emergency [7]. In this paper, emergency information services refer to government pre-disaster warning information release, real-time disaster response information release and disclosure, and post-disaster recovery information disclosure, which are dominated by public demands. Specifically, the release targets directly affected groups to address "how to act" and drive public action, while the disclosure aims to explain "why to act" to the entire society, safeguarding citizens' rights to information and supervision. Research on satisfaction originated from Cardozo's 1965 publication "An Experimental Study of Customer Effort, Expectation, and Satisfaction," which first introduced the concept of customer satisfaction into the business domain [8]. The Sweden Customer Satisfaction Barometer (SCSB) proposed by Fornell in 1989 stands as a classic model in satisfaction research, primarily examining the interrelationships among five variables: customer expectations and complaints, perceived value, customer satisfaction, and loyalty. Subsequently, Fornell introduced and upgraded the SCSB model in the United States,

establishing the American Customer Satisfaction Index (ACSI) model, which added the variable of perceived quality to the original framework [9]. As a vital tool for directly measuring public attitudes, satisfaction survey methods have gained increasing attention and application in government departments. The U.S. government pioneered practical implementation in this field, formally incorporating the ACSI into its systematic evaluation of public service levels in 2001, thereby providing a reference model for establishing such assessment systems. Currently, research on government information service satisfaction primarily focuses on specific digital platforms delivering administrative services or is limited to information disclosure practices conducted by individual administrative agencies. The main contents of the research include satisfaction evaluation, analysis of influencing factors, and improvement strategies.

Regarding satisfaction evaluation, scholars have constructed systematic assessment frameworks from diverse dimensions. Zou et al. established a public satisfaction index model for government information services based on network public opinion, incorporating measurable variables such as timeliness, accuracy, and practicality of information [10]. Zhu and Zhang based on the classic ACSI model by introducing a rough set weight determination method, focused on researching the construction of an evaluation index system for public satisfaction in government information disclosure [11]. Malik et al. investigated and evaluated citizen satisfaction in e-government through technical dimensions such as system quality, information quality, and service quality [12]. Regarding influencing factors, in terms of individual characteristics, Duan et al. examined the differences of different demographic variables in various dimensions of the government information disclosure satisfaction model [13]. Alzahrani et al. validated the differential effects of gender, age, and internet usage experience on the construction of user satisfaction [14]. In terms of information quality, Zhou systematically reviewed emergency information release during the Wenchuan earthquake, emphasizing the importance of disclosure and transparency in emergency information [15]. Shen et al. researched urban community information service satisfaction in emergency scenarios, demonstrating that perceived information quality significantly positively impacts information service satisfaction [16]. Luo et al. proposed that standards for measuring information quality in disaster prevention and relief include reliability, timeliness, completeness, comprehensibility, and interactivity, noting that low-quality information fails to meet public needs and affects assessments of public satisfaction with government information services [17]. Lamb et al. highlighted that accurate, consistent, and complete information facilitates effective emergency prevention and response [18]. Regarding improvement strategies, Ma proposed three directions: optimizing relevant management mechanisms, expanding channels and methods for information disclosure, and strengthening the development of supervision and feedback systems [19]. Shang and Zhang based on the current development status of government website information services, proposed strategies to enhance satisfaction with government website information disclosure services from five aspects: focusing on user experience, strengthening user segmentation, improving public awareness, and more [20]. Kim and Jung investigated the South Korean government's public health emergency management network during the Middle East Respiratory Syndrome Coronavirus pandemic, identifying limitations in the information system, such as slow information release and inconsistent information standards, which hindered effective communication among government agencies and proposed corresponding countermeasures [21]. These studies provide practical guidance for optimizing government information services in various contexts.

Based on existing literature and supplemented by expert consultation and field surveys, this study developed a measurement index for public satisfaction with government flood emergency information services and identified key influencing factors (Table 1).

**Table 1.** Indicators and influencing factors for public satisfaction of government flood emergency information services

—		Questionnaire item	Options	Score ( $\bar{x} \pm S$ )	Sources
Evaluating indicator	Public satisfaction	How satisfied are you with the government's early warning information services?	Very Dissatisfied → Very Satisfied 1-----5	4.41±0.758	[10, 22, 23]
		How satisfied are you with the government's emergency response information services?		4.30±0.742	
		How satisfied are you with the government's recovery information services?		4.25±0.814	
Influencing factors	Individual characteristics	Gender, Age, Education attainment, Annual personal income, Occupation	—	—	[13, 24, 25]
	Information reliability	The government's early warning information is timely and rapid.	Very Inconsistent → Very Consistent 1-----5	4.33±0.757	[15, 26, 27]
		The government's emergency response information is open and transparent		4.28±0.762	
		The government's recovery information is professional.		4.27±0.735	
	Information availability	To what extent does government early warning information meet your needs?	Very Unfulfilled → Very Fulfilled 1-----5	4.28±0.730	[17, 27, 28]
		To what extent does government emergency response information meet your needs?		4.21±0.789	
		To what extent does government recovery information meet your needs?		4.21±0.811	
	Information accessibility	To what extent do you receive government early warning information in a timely manner?	Very Untimely → Very Timely 1-----5	4.33±0.812	[29-31]
		To what extent do you receive government emergency response information in a timely manner?		4.23±0.790	
To what extent do you receive government recovery information in a timely manner?		4.23±0.782			

### 3. DATA AND METHODS

#### 3.1. Data Source

##### 3.1.1. Questionnaire Design

The data used in this paper were sourced from field questionnaire surveys. Based on the literature review and expert consultation, combined with the local actual situation, the questionnaire was designed from the public demographic characteristics and the government flood emergency information service, and the experts were invited to give suggestions on the questionnaire. Finally, a questionnaire was confirmed, which included six questions used to know about the base situation of the participants, three questions to measure the public satisfaction of the government's flood emergency information service, and nine questions to measure the influencing factors of public Satisfaction with government flood disaster emergency information service, covering three dimensions of information reliability, information availability and information accessibility. Here, a five-point Likert scale was used to measure the questions used in Table 1.

### 3.1.2. Sample Size

The minimum sample size was calculated based on Simplified Yamane's formula [32], which can be expressed by

$$n = \frac{N}{1+Ne^2} \quad (1)$$

Where, n is the minimum sample, N is the total number of resident populations in the three cities, and e is the margin of error (set at 7%). Here, the calculated minimum sample size was 205.

### 3.1.3. Distribution and Collection of Questionnaires

Data collection employed a randomized on-site survey methodology across flood-prone communities in the three Henan cities from 20 January to 15 February 2025. A total of 293 questionnaires were distributed and collected on-site. After excluding invalid survey responses with inconsistent and incomplete answers, only 212 valid questionnaires remained. The valid sample size (212) satisfied the minimum sample size (205).

### 3.1.4. Data Processing and Assessment

To ensure the data obtained from the questionnaire was suitable for an exploratory study, reliability analysis, KMO, and Bartlett's test were conducted using SPSS 27.0 software. The results showed that all values of the  $\alpha$  and KMO test were larger than 0.7 [33], respectively, and all Sig-values of Bartlett's test were smaller than 0.05 (Table 2), which indicated that the data were suitable for exploratory study.

**Table 2.** The results of reliability and validity tests

	Public Satisfaction	Information Reliability	Information Availability	Information Accessibility	Total	Smallest Acceptable Value
Cronbach's $\alpha$	0.848	0.811	0.852	0.850	0.949	0.6
KMO Value	0.716	0.714	0.722	0.721	0.904	0.7
Sig. Value	<0.01	<0.01	<0.01	<0.01	0.000	<0.05

## 3.2. Methods

### 3.2.1. Public Satisfaction Index

A public satisfaction index (PSI) of government flood emergency information services was constructed to measure the level of public satisfaction, which is expressed by

$$PSI = \sum_{i=1}^n s_i w_i \quad (2)$$

Where,  $S_i$  and  $W_i$  are the score and the weight of indicator i, respectively ( $w_i=1/3$ ). The higher the PSI value, the greater the public satisfaction with the government's flood emergency information services.

### 3.2.2. Linear regression model

Linear regression analysis has gained widespread application in the field of influencing factor research due to its model simplicity and strong interpretability of results [34, 35]. This study employed public satisfaction as the dependent variable and individual characteristics and information characteristics (information reliability, information availability, information accessibility) as independent variables. Simple linear regression analyses were conducted for multiple demographic characteristics, while multiple linear regression was applied to the information characteristics. The linear regression expression is as follows:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon \quad (3)$$

Where, Y is the dependent variable (public satisfaction), in simple linear regression, the independent variable is the individual characteristic  $x_1$ ; in multiple linear regression, the independent variables are the information characteristics  $x_1 \sim x_3$ ;  $\beta_0$  is the constant term,  $\beta_1 \sim \beta_3$  are the regression parameters, and  $\varepsilon$  is the random error term.

## 4. RESULTS AND DISCUSSION

### 4.1. Assessment of Public Satisfaction with Government Flood Emergency Information Services

The data collected were analyzed using SPSS 27.0 software. Calculations were performed using Formula (2) to derive each respondent's satisfaction score regarding the government flood emergency information services. Satisfaction levels were determined based on these scores. Public satisfaction scores were categorized based on Peng's scoring method [34]: scores  $< \text{total score} \times 60\%$  were classified as “low,” total scores  $\times 60\% \leq \text{scores} \leq \text{total scores} \times 80\%$  were classified as “moderate,” and scores  $> \text{total score} \times 80\%$  were classified as “high”. Therefore, the value ranges for high, moderate and low level of public satisfaction were [2.33, 3), [3, 4], and (4, 5], respectively.

The statistical analysis revealed that the public satisfaction of government flood emergency information services was at a high level, with an average score of  $4.32 \pm 0.68$ . The number of respondents with high, moderate, and low satisfaction were 122, 83, and 7, respectively, accounting for 57.55%, 39.15%, and 3.30% of the total respondents. Further analysis of questionnaire items regarding public satisfaction could reveal the scores from highest to lowest were as follows: satisfaction with early warning information services ( $4.41 \pm 0.758$ ), satisfaction with response information services ( $4.30 \pm 0.742$ ), and satisfaction with recovery information services ( $4.25 \pm 0.814$ ).

### 4.2. Impact Analysis of Influencing Factors to Public Satisfaction with Government Flood Emergency Information Services

#### 4.2.1. Individual characteristics

Here, individual characteristics referred to gender, age, education attainment, occupation, and annual personal income. Using public satisfaction with government flood emergency information services as the dependent variable and respondent individual characteristics as independent variables, simple linear regression analyses were conducted. All categorical variables were coded as dummy variables for analysis. As shown in Table 3, The differences in the impact of age (46-60 years old), educational attainment, and occupation (student, corporate employee, other) on public satisfaction were statistically significant ( $P < 0.05$ ). The differences in the impact of gender and annual personal income on public satisfaction were not statistically significant ( $P > 0.05$ ). Except for the age variable, the variance inflation factor (VIF) for all other variables was  $< 5$ . This may be due to insufficient sample sizes for respondents aged  $< 18$  ( $n=8$ ) and  $> 60$  ( $n=6$ ), necessitating future validation through expanded sampling.

**Table 3.** Regression results of individual characteristics

Variables	Total score	Standardization $\beta$	Standard error	t	P	Collinearity statistics	
						Tolerance	VIF
Gender (male as reference)	4.31						
Female	4.33	0.013	0.093	0.186	0.852	1.000	1.000
Age (<18 as reference)	4.54						
18-25	4.41	-0.096	0.245	-0.531	0.596	0.140	7.125
26-45	4.30	-0.177	0.247	-0.993	0.322	0.145	6.874
46-60	3.95	-0.252	0.281	-2.115	0.036	0.325	3.073
>60	4.00	-0.133	0.360	-1.504	0.134	0.588	1.700
Education attainment (junior high school or below as the reference)	3.85						
High school	4.37	0.295	0.169	3.046	0.003	0.479	2.089
Bachelor's degree	4.40	0.401	0.145	3.739	<0.001	0.392	2.554
Master's degree or above	4.34	0.260	0.176	2.789	0.006	0.517	1.936
Occupation (farmer as reference)	4.00						
Student	4.37	0.260	0.155	2.382	0.018	0.390	2.562
Self-employed	4.22	0.117	0.176	1.222	0.223	0.505	1.982
Corporate employee	4.35	0.192	0.176	2.000	0.047	0.505	1.982
Public officer	4.42	0.160	0.219	1.930	0.055	0.673	1.487
Other	4.48	0.254	0.179	2.680	0.008	0.517	1.936
Annual personal income (¥<10 000 Yuan as reference)	4.32						
¥10 000-30 000 Yuan	4.26	-0.032	0.132	-0.432	0.666	0.883	1.132
¥30 000-80 000 Yuan	4.28	-0.020	0.120	-0.272	0.786	0.871	1.148
¥80 000-150 000 Yuan	4.44	0.059	0.152	0.811	0.418	0.905	1.105
¥>150,000 Yuan	4.53	0.049	0.312	0.696	0.487	0.975	1.026

Since the differences in the impact of gender and personal annual income on public satisfaction were not significant (Table 2), this study focuses on examining the effects of age, education attainment, and occupation on public satisfaction. By comparing individual age characteristics, the inter-group score mean ranking was found to be: under 18 years old > 18-25 years old > 26-45 years old > over 60 years old > 46-60 years old. Notably, respondents aged 46-60 showed a 5% statistically significant lower satisfaction rate compared to those under 18 ( $\beta_{46-60} = -0.252$ ), consistent with previous research findings. For example, Ji found that the age group of respondents had a weak negative impact on satisfaction with public sports services [24]. However, other scholars reached differing conclusions. Ye study on public satisfaction with local rule of law government construction revealed a positive correlation between public age and satisfaction [36]. Alzahrani et al. examined satisfaction with Saudi Arabia's reformed government healthcare services, revealing significant age-related differences in patient satisfaction. They found that for every additional year of age, satisfaction with pharmacist explanations increased by 1% [37]. The impact of age on public satisfaction is complex and hard to explain. On one hand, different age groups exhibit vastly different levels of demand for flood emergency information, leading to significantly divergent evaluations. On the other hand, factors such as the government's channels and methods for disseminating flood emergency information also cause people of different ages to form differing assessments.

Comparing educational attainment levels revealed the inter-group score mean ranking: bachelor's degree > high school > master's degree or above > junior high school or below. Satisfaction levels among respondents with high school, bachelor's degree, and master's degree or above were significantly higher than those with junior high school or below at the 1% significance level ( $\beta_{\text{high school}}=0.295$ ,  $\beta_{\text{bachelor's degree}}=0.401$ ,  $\beta_{\text{master's degree or above}}=0.260$ ). This aligns with prior findings that educational attainment positively influences government satisfaction [25]. Zhu and Tang revealed that rural basic education is the most significant factor influencing farmers' satisfaction with rural public goods investment [38]. Setyawan et al. observed that the educational attainment of Indonesian migrant workers influenced their satisfaction with Taiwan's healthcare services [39]. The core reason is that the higher educational attainment correlates with stronger abilities to access, comprehend, and utilize information, alongside elevated needs level. This enables individuals to better recognize the scientific rigor and transparency of government actions across dimensions such as professional depth, logical integrity, and systemic governance.

Comparing occupational characteristics among individuals revealed the inter-group score mean ranking: other occupations > public officers > students > corporate employees > self-employed > farmers. Satisfaction levels among students and corporate employees were significantly higher than those of farmers at the 5% significance level ( $\beta_{\text{students}}=0.26$ ,  $\beta_{\text{corporate employees}}=0.192$ ). Satisfaction levels among public officers and other occupations were significantly higher than those of farmers at the 10% and 1% significance levels, respectively ( $\beta_{\text{public officers}}=0.16$ ,  $\beta_{\text{other}}=0.254$ ), consistent with prior findings. Different occupational types influence how residents interact with government and whether they access government websites [40]. Jia and Li found that respondents' occupational backgrounds significantly affect residents' evaluations of government satisfaction [25]. Additionally, scholars have examined employment types. For instance, Xu and Liu observed that the satisfaction of farmers with the development of village collective economy exhibits certain heterogeneity across occupational types, particularly between full-time and part-time farmers [41]. Nantabah et al. investigated personal characteristics affecting satisfaction with Indonesian health facility service quality, finding employment status influenced outcomes, with employed individuals reporting lower satisfaction than unemployed counterparts [42].

#### 4.2.2. Information characteristics

Here, information characteristics included reliability, availability, and accessibility of information. A multiple linear regression analysis was conducted with public satisfaction with government flood emergency information services as the dependent variable and three information characteristics as independent variables. As shown in Table 4, the effects of information reliability, availability, and accessibility on public satisfaction were statistically significant ( $P<0.05$ ), with all VIF values below 5.

**Table 4.** Regression results of information characteristics

Variables	Standardization $\beta$	Standard error	t	P	Collinearity statistics	
					Tolerance	VIF
Constant term	—	0.169	2.270	0.024	—	—
Information reliability	0.328	0.071	4.908	<0.001	0.287	3.485
Information availability	0.436	0.069	6.259	<0.001	0.263	3.801
Information accessibility	0.150	0.060	2.443	0.015	0.339	2.954

As shown in Table 4, information reliability, information availability, and information accessibility all have a significant positive impact on public satisfaction with the government flood emergency information services. This finding is broadly consistent with prior research [43-45]. For example, Coombs systematically elaborated on the “Situational Crisis Communication Theory,” emphasizing that the timeliness, accuracy, and operability of information are critical factors affecting public response and trust in crisis management [30]. High information quality is crucial for crisis information

management [46]. Zhong and Duan investigated the key factors influencing public satisfaction with information disclosure during typhoon disasters, found that disaster information quality positively correlates with perceived information performance and impacts public satisfaction evaluations [47]. Weerakkody et al. found that information quality, system quality, and trust all significantly and positively influence user satisfaction. Although the relationship between information quality and system quality with user satisfaction is relatively weaker, it remains of great significance. This indicates that governments should make every effort to ensure systems are user-friendly and provide the most up-to-date and accurate information [29]. Due to the close correlation between e-government and government information services, it is possible to analyze them from the perspective of e-government. For instance, Rana et al. evaluated the validity of applying the Information Systems Success Model to online public complaint systems, finding that both information quality and system quality significantly influence behavioral intentions and user satisfaction [48]. Lee and Levy argue that greater accuracy, timeliness, and relevance of information will enhance users' trust in e-government services [31], ultimately boosting public satisfaction. Additionally, some scholars hold differing views. Biswas et al. argue that citizen satisfaction is primarily determined by system and service quality, rather than information quality [49].

Specifically, at a 5% significance level, each 1-unit increase in information reliability, availability, and accessibility significantly boosts public satisfaction scores by 0.328, 0.436, and 0.150 units, respectively. Comparing the impact of different information characteristics on public satisfaction reveals that information availability exerts the greatest influence on satisfaction changes, followed by information reliability, while information accessibility has the smallest effect. The reason for this outcome may be that during emergencies such as floods, the public faces threats to life and property. Compared to factors like information dissemination channels and formats, “whether the information meets needs” is the most direct experience for the public. Insufficient information availability directly leads to decision-making dilemmas or action impediments for the public during disasters. If government emergency information services can precisely meet the public's information needs during disasters, it will directly enhance public trust in the government's emergency response capabilities. Therefore, information availability is a key factor influencing public satisfaction with government flood emergency information services.

## **5. STRATEGIES TO ENHANCE PUBLIC SATISFACTION WITH GOVERNMENT FLOOD EMERGENCY INFORMATION SERVICES**

### **5.1. Precisely Matching Needs to Improve Information Availability**

When disasters occur, if government information fails to fill the public's demand, the public may obtain unofficial information through social media, relatives and friends, and other channels, which can lead to public doubts about the government's professionalism and authority. Different groups' information demands vary due to their distinct characteristics. The government should deeply understand their needs and provide emergency information services based on those demands. Only in this way can it effectively supply information to meet the public's needs and thereby enhance public satisfaction. Therefore, when providing emergency information services, the government should integrate public needs and implement people-oriented information services, focusing on delivering emergency information that the public cares about and requires. Specifically, the government can identify the differentiated needs of various groups through dynamic pre-disaster surveys. For example, it can separately collect the key concerns of residents, business owners, and vulnerable groups, and establish a demand database. This enables the provision of matched information content across all stages—pre-disaster warning, in-disaster rescue, and post-disaster recovery—such as warning signals, evacuation routes, distribution points for relief supplies, and water quality safety information. Additionally, big data can be utilized to analyze high-frequency search keywords used by the public. A real-time response column is set up on the government platform to provide dialect or voice versions

of information for special groups. Emergency information assistance channels can also be opened, allowing the public to submit specific questions, with the government committing to responding within a set timeframe. These measures ensure that information closely aligns with the actual needs of the public.

## **5.2. Strictly Guarding the Quality Gate to Ensure Information Reliability**

Emergency information is highly sensitive to society. A slight mistake can easily lead to public misunderstanding and speculation, and even trigger irrational behavior and social panic. In the Internet era, information sources are diverse and uneven in quality, leaving the public with an urgent demand for reliable information. This requires government official media, authoritative media, experts, and others to enhance collaboration and communication, leverage their authoritative advantages, and enhance news reporting and public opinion guidance. To expand the reach of information dissemination and mitigate the impact of disruptive information, it is necessary to effectively guide the direction of public opinion on the basis of meeting the public's information needs, thereby promoting the public to form an objective and rational understanding of the flood. Emergency information services should pay particular attention to their transparency, timeliness, and professionalism. Every piece of released information should indicate its source, such as real-time monitoring data from the meteorological bureau or verification results from the emergency management bureau, and be supplemented with expert interpretation videos or data visualization charts to avoid ambiguous expressions. At the same time, a multi-department collaborative verification mechanism should be established, which involves joint cross-checking of data by meteorological, water conservancy, transportation, and other relevant departments to ensure information consistency. Updates on disaster developments should be timely, and any delays due to objective reasons must be clearly indicated to prevent unnecessary public suspicion. In addition, it is essential to balance professionalism with popularization. Technical content should be interpreted in a popular way, using language that the general public can understand. For some professional terms, explanations should be thorough and clear. For instance, the rainfall forecast can be transformed into intuitive expressions such as "It's equivalent to a year's worth of rain in 24 hours", and authoritative experts can be invited to answer questions and provide guidance through live streaming, thereby enhancing the public's trust in the information.

## **5.3. Break Through Communication Bottlenecks to Strengthen Information Accessibility**

Despite society's advanced digitalization, traditional media forms such as television, radio, and newspapers still play a dominant role in the public's access to authoritative information released by the government. Research indicates that compared to new media, the government's use of traditional media to disseminate information has a positive impact on public satisfaction. Given their high social penetration rate and wide coverage, traditional media should play a more crucial role in the dissemination of government information. Specifically, authoritative government information should be regularly released through newspapers, television, and fixed announcement facilities. Additionally, multi-functional information service points, public information distribution stations, government notice boards, or digital information screens can be set up in areas with high public foot traffic to enhance the accessibility and social dissemination efficiency of public information. A comprehensive and multi-level communication network should be established, using emergency broadcasts, TV scrolling captions, and government text messages to ensure basic coverage, while also leveraging emerging technologies such as social media pop-up alerts and real-time danger zone markings on map navigation apps to expand the reach. For areas with weak communication infrastructure, redundant designs should be implemented, such as pre-positioning portable emergency broadcasting equipment, deploying satellite communication vehicles, or mobile charging vehicles to ensure information can still be delivered in extreme circumstances. Special groups, such as elderly people

living alone, should be equipped with one-click call devices that automatically send voice alerts to avoid information blind spots. To ensure the fairness of information access, the social coverage of information services should be further expanded, and significant improvements should be made in the depth of government information disclosure, geographical breadth, and timeliness of dissemination, thereby building an efficient and convenient government information supply system.

#### **5.4. Deepen Cognitive Education to Enhance Public Response Capacity**

To comprehensively enhance public satisfaction with flood emergency information, it is essential to focus on deepening the construction of a cognitive education system. Community disaster prevention volunteer teams should be established in systematic and regular emergency knowledge popularization efforts, and activities to bring emergency knowledge into every household should be carried out. Differentiated popularization content should be developed for various groups based on age, education level, and occupational characteristics, such as creating illustrated disaster prevention manuals for the elderly, designing interactive AR teaching modules for students, and compiling simple and understandable emergency flowcharts for migrant workers. Popularization education should be conducted in diverse scenarios such as community bulletin boards, school classrooms, and enterprise training sessions. At the same time, practical emergency drills should be emphasized, with regularly organized drills for different groups and scenarios, including evacuation drills for community residents, risk avoidance and transfer drills for school students and teachers, and emergency response drills for enterprise employees. VR technology should be used to recreate real flood scenarios, allowing the public to master correct response skills through simulation experiences. Moreover, the public participation mechanism should be actively improved, encouraging the public to become disseminators and supervisors of emergency information. Public information feedback channels should be established to promptly collect and analyze the public's demands and opinions on emergency information, forming a virtuous interaction pattern led by the government, coordinated by society, and participated in by the public. This will effectively enhance the public's disaster prevention awareness and self-rescue and mutual-rescue capabilities, ultimately achieving an overall improvement in the satisfaction of government emergency information services.

### **DECLARATION OF COMPETING INTEREST**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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