

A Study on Knowledge, Response Capabilities, Experiences, and Perspectives Regarding Environmental Flooding and Flood Disasters: The Case of Sinop Province

Çevresel Sel ve Su Baskını Afetine Yönelik Bilgi, Müdahale Becerileri, Deneyim ve Görüşlerin Araştırılması: Sinop İli Örneği

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Abstract

The aim of this study is to comprehensively assess the training and knowledge levels, response capabilities, equipment, experience and views of specialist staff working at the Disaster and Emergency Management Directorate in Sinop Province, an area at high risk of flooding. The study adopted a qualitative research method, and a single-case model was developed using the “in-depth interview” technique as the data collection method. Interview content was analyzed using MAXQDA software to identify hierarchical code-subcode models through thematic analysis. The results of the study indicate that the staff of the Sinop Provincial Disaster and Emergency Management Directorate (AFAD) possess sufficient and high levels of knowledge regarding floods and flash floods, have a well-equipped capacity in terms of personnel and equipment, are experienced in response processes, and maintain a high level of readiness. AFAD personnel (n=17) who participated in the survey emphasized the need to develop technology, improve infrastructure, and enhance the community’s capacity to mitigate the effects of floods and waterlogging. Taking into account the geographical structure, climatic characteristics, and current infrastructure conditions of Sinop Province, the primary measures that can be taken specifically regarding floods and flash floods have been identified.

Keywords: Disaster risk, Flooding, AFAD personnel, Disaster awareness.

Öz

Bu çalışmanın amacı, su baskını afet riski yüksek olan Sinop ilinde Afet ve Acil Durum Müdürlüğünde görev yapan uzman personelin sel ve su baskınları hakkında eğitim ve bilgi düzeylerini, müdahale becerilerini, ekipman donanımlarını, deneyimlerini ve görüşlerini bütüncül biçimde değerlendirmektir. Çalışmada, nitel araştırma yöntemi benimsenmiş olup, veri toplama tekniği olarak “derinlemesine görüşme” yöntemi kullanılarak tek-vaka modeli geliştirilmiştir. Görüşme içerikleri tematik analiz yoluyla hiyerarşik kod-alt kod modelleri ortaya çıkarılmak suretiyle MAXQDA programı ile analiz edilmiştir. Yapılan çalışma sonucunda; sel ve su baskınları konusunda Sinop İli Afet ve Acil Durum Müdürlüğü (AFAD) personellerinin bilgi düzeylerinin yeterli ve yüksek olduğu, ekip ve ekipman hususunda donanımlı bir kapasiteye sahip olduğu, müdahale süreçlerinde tecrübeli olduğu ve hazır bulunurluklarının yüksek olduğu belirlenmiştir. Ankete katılan AFAD personelleri (n=17), sel ve su baskını afetlerinin önlenbilmesinde veya etkilerinin en aza indirilmesinde teknolojinin geliştirilmesi, alt yapıların iyileştirilmesi ve afetlere karşı toplumun kapasitesinin artırılması gerektiğine vurgu yapmıştır. Sinop ilinin coğrafi yapısı, iklim özellikleri ve mevcut altyapı durumu göz önünde bulundurularak, sel ve su baskınları özelinde alınabilecek başlıca önlemler belirlenmiştir.

Anahtar Kelimeler: Afet riski, Sel-su baskını, AFAD personeli, Afet bilinci.

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1. Introduction

Disasters are events that disrupt the daily lives of individuals or communities, causing loss of life and property, which those affected cannot cope with using their own personal resources and which sometimes even local authorities are unable to handle. They necessitate the simultaneous collaboration of public institutions and civil society organizations (CSOs) and represent a major threat resulting in economic, social, environmental, and physical losses caused by human-made or natural events (Acanga et al., 2025; Xu et al., 2025; Varol and Kırıkkaya, 2017; Boran and Ulutaşdemir, 2023; Erkal and Değerliyurt, 2009; Yılmaz, 2012). Climate change has led to a significant increase in climatological and hydro-meteorological disasters in recent years across all countries. In Türkiye, floods and flash floods caused by days of intense rainfall are among the most prevalent of these disasters. Among the disasters that cause many lives and property losses on a global scale, floods and waterlogging are determined to be the second most common disasters causing the most lives and property losses in Türkiye today (Cüce, 2023; Kızılelma and Karabulut, 2025; Cüce and Cüce, 2024; Erkan et al., 2018; Çatal, 2022). However, when studies on floods and flash floods are examined, it is seen that there are limited and very few studies at the national level that examine knowledge, attitudes, and behaviors related to these types of disasters (Çatal, 2022). However, attitude studies on disaster issues play an important role in developing disaster protection policies, understanding the attitudes and behaviors of society in disasters, and evaluating disaster education programs. Disaster attitude refers to individuals' thoughts and tendencies regarding the perception of risks related to disasters, preparing for these risks, and responding effectively when disasters occur. Individual attitudes toward disasters are a critical guide, particularly for reducing the effects of disasters and increasing societal resilience (Erkin et al., 2025; Bulat and Özbaşı, 2021; Paton, 2003; Gerdan, 2014). Indeed, the literature emphasizes that knowledge, awareness, behavior, and positive attitudes toward disasters are effective in creating prepared and more resilient societies by strengthening individuals' preparedness and response behaviors. It is stated that exposure to disasters and previous disaster experiences, as well as factors such as the level of disaster education and social awareness, are quite effective in the formation and development of individual attitudes towards disasters (Mariam et al., 2021; Baytiyeh and Öcal, 2016; Bulat and Özbaşı, 2021; Chen et al., 2017). Minimizing damage from disasters depends not only on having a strong physical infrastructure but also on the response capacity of personnel who effectively combat disasters. Considering the academic studies conducted in this context, the knowledge, experience, and opinions of AFAD personnel have been frequently evaluated. In a study by Bayraktar and Sahtiyancı (2020) examining the flood disaster in Düzce, it was emphasized that the reason the disaster did not result in much greater losses was that the intervention teams were part of a rapid and effective mobilization effort. In particular, in disasters

such as floods and flash floods, factors such as the knowledge level, experience, and preparedness of AFAD personnel are of vital importance.

The most common type of disaster causing the greatest loss in Sinop province, selected as the research area, is floods and flash floods. Flood events are more effective in areas where the natural balance has been disrupted by human intervention, especially in coastal regions during periods of excessive rainfall. In this context, while many natural factors play a role in the formation of floods, numerous human factors also have a significant impact on floods reaching disaster proportions. Various causes, such as sudden water rises and rapid snowmelt due to atmospheric and tectonic factors in seas and oceans, can lead to flooding in low-lying areas and along sea and lake coasts (Özcan, 2006). On August 11, 2021, floods and flash floods that affected the eastern part of the Black Sea Region, particularly the provinces of Sinop, Bartın, and Kastamonu, caused social, physical, and economic losses (El, 2021). In order for institutions and organizations to overcome these events with minimal damage, they must have sufficient information and equipment, effective coordination, and a feasible plan (Çınar, 2021).

Based on this idea, in this study selected the province of Sinop in the Black Sea Region, which has a high risk of floods and flash floods due to its geomorphological features and climatic conditions, as the study area. It evaluated the education and knowledge levels, intervention skills, equipment, experiences, and opinions of the expert personnel working at the Disaster and Emergency Management Center regarding floods and flash floods. For Sinop Province, the high level of knowledge, response skills, equipment adequacy, experience, opinions, planning, and preparedness of Disaster and Emergency personnel regarding this issue is extremely important in preventing loss of life and property in possible disaster situations. It will also provide data-driven recommendations to decision-makers for the development of preventive and preparatory strategies at the local level.

2. Materials and Methods

2.1. Research Methodology

This study adopted a qualitative research method and examined the education and knowledge levels, response capabilities, equipment, experiences, and opinions of expert personnel working at the Sinop Province Disaster and Emergency Management Center regarding floods and flash floods. The “in-depth interview” method was used as the data collection technique, and the interview content was analyzed using MAXQDA software through thematic analysis. This choice is related to the adoption of a process that involves a detailed and in-depth examination of a current event. Qualitative methods are among the most suitable options for such studies because they offer the opportunity for

detailed and comprehensive analysis (Patton, 2018; Kervankıran et al., 2021). Techniques such as observation, interviews, and document review are used in the data collection process in qualitative research methods (Yıldırım and Şimşek, 2018). MAXQDA is a professional data analysis software programme with a user-friendly interface, designed specifically to enable comprehensive analysis of survey data in qualitative and mixed-methods research. Its key features include versatile data import capabilities, advanced visualisation tools and support for mixed-methods analysis. For this reason, MAXQDA software was used for the analysis of the data.

2.2. Research Design

The “case study” design was chosen from among qualitative research designs for this study. Specifically, each participant's level of knowledge, attitudes, and behaviors regarding floods and flash floods were analyzed using the “single-case model.” In this context, criterion sampling, one of the purposeful sampling methods, was used; only 17 AFAD personnel working in Sinop province who had knowledge about floods and flash floods were included in the sample according to the specified criteria. The demographic information of the participants is provided in Table 1 below. The majority of the participants are male, married, aged between 36-45, have a bachelor's degree, and are civil servants. The length of service of the participants is predominantly 12 years or more.

Table 1. Participant demographic information.

Participant	Gender	Marital status	Age Range	Educational Status	Position within the organization	Working Hours
K.1	Woman	Single	36-45	Bachelor	Information officer	12 years and older
K.2	Male	Married	36-45	Bachelor	Information officer	12 years and older
K.3	Male	Single	36-45	Bachelor	Accountant	12 years and older
K.4	Male	Married	26-35	High school	Officer	0-3 years
K.5	Male	Married	36-45	Bachelor	Officer	12 years and older
K.6	Male	Married	36-45	Bachelor	Engineer	8-11 years
K.7	Woman	Married	36-45	Bachelor	Officer	12 years and older
K.8	Male	Married	26-35	Bachelor	Officer	0-3 years
K.9	Male	Single	26-35	Bachelor	Officer	0-3 years
K.10	Male	Single	26-35	High school	Officer	0-3 years

K.11	Male	Married	46-55	Bachelor	Officer	12 years and older
K.12	Male	Married	46-55	Bachelor	Officer	12 years and older
K.13	Male	Married	36-45	Bachelor	Engineer	8-11 years
K.14	Woman	Married	36-45	Bachelor	Officer	8-11 years
K.15	Woman	Married	36-45	High school	Employee	12 years and older
K.16	Male	Married	46-55	Primary school	Employee	12 years and older
K.17	Male	Married	36-45	MSc	Purchasing officer	12 years and older

2.3. Data Collection Tool

The interviews were conducted using a semi-structured interview form, and the questions were prepared to be answered without any guidance. A total of 50 open-ended questions were used to apply the in-depth interview technique, participants were given sufficient time to respond, and it was observed that sufficient satisfaction was achieved in the research content. The prepared questions were reviewed and approved by three faculty members who are experts in the field. Coding was first performed in the MAXQDA interface, and then themes were created within the context of these codes, revealing hierarchical code-subcode models. In addition, a single-case model was developed for each participant to support the study.

2.4 Data Collection Process

Prior to the data collection process, ethical principles were taken into consideration, and ethical committee approval was obtained from the Presidency of the Ethics Committee for Social Sciences, Natural Sciences, and Engineering Research at Giresun University (E-50288587-050.01.04-10288, Ethics Committee Decision dated 08.05.2024 and numbered 05/38). Prior to the interviews, a “volunteer consent form” was sent to the AFAD Sinop Provincial Directorate through Giresun University. In addition, prior to the interviews, the necessary permissions were obtained from the Sinop Governor's Office (dated 17.05.2024 and numbered E-35842865-300-11488) for conducting the research study and applying the interviews. Each interview with the volunteer participants lasted between 30-40 minutes.

2.5. Data Analysis

MAXQDA is a computer-assisted coding and analysis program used in qualitative and mixed data analysis that includes text, audio, and video data (Kuckartz and Radiker, 2019). In this study, the participants' data were transferred to the MAXQDA program and analyzed using the thematic analysis method. The MAXQDA program is used as a powerful interface that can be utilized in the process of systematically interpreting and coding qualitative studies using the thematic analysis method (Kuckartz and Kuckartz, 2002). The “coding within a general framework” method was used for data analysis. According to this form, code assignments appropriate to the conceptual structure created during the data analysis phase were made. The codes were added to the code list, and where appropriate, changes were made to the codes in response to the findings (Corbin and Strauss, 2014). Coding was first performed in the program interface, and then, since the study involved interviews with a single group, a single-case model was developed. In order to elaborate on the thematic analyses in the study, four different themes were created, and the findings were evaluated by revealing hierarchical code-subcode models.

3. Findings and Discussion

3.1. Findings Regarding the Hierarchical Code-Subcode Model Analysis of Themes

Themes were developed based on the groups of questions directed at the personnel during the coding process of the research. A “hierarchical code-subcode model” was applied to analyze these themes in detail. Four different themes were examined in the study, and codes with high frequency were analyzed. The expression indicated by “n” represents the code frequency.

3.1.1. Theme 1: General Information About Floods and Flooding

One of the factors most emphasized by participants was that excessive and sudden rainfall (n=15) is the primary cause of floods and waterlogging (Figure 1). Following this, it was stated that environmental factors such as the impact of climate change (n=14) and its negative effect on soil structure (n=10) increase the risk of flooding. Water accumulation following extreme rainfall (n=12) is among the direct physical impacts and points to the inadequacy of drainage systems. In terms of institutional knowledge, it was stated that basic needs support could be provided to the affected population (n=9) and that online disaster awareness training was available (n=9). This situation

demonstrates the functionality of not only intervention but also preventive and educational activities in disaster management.

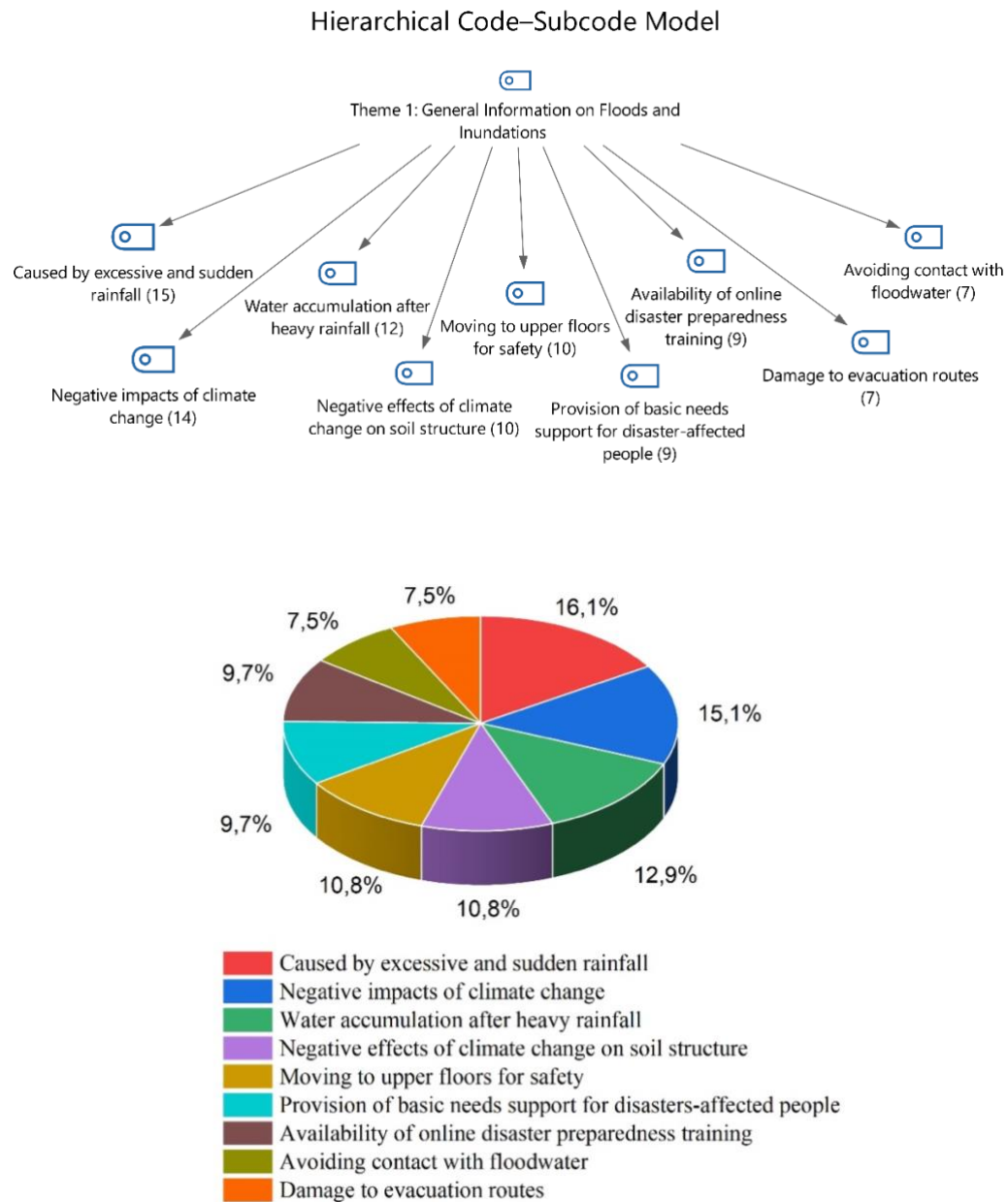


Figure 1. General Information of AFAD Participants Regarding Floods and Water Inundations.

Participants developed awareness regarding the form of construction in high-risk areas and expressed the view that moving to upper floors ($n=10$) is an effective behavior for protection against flooding. This finding demonstrates that measures taken at the individual level also play an important role in reducing flood risk. Regarding the direct safe evacuation process, codes such as damage to evacuation routes ($n=7$) and the need to avoid contact with water ($n=7$) are also included, emphasizing the importance of physical infrastructure during and after a disaster. As shown in Figure 1, participants emphasized that the main cause of floods and flash floods is excessive and sudden rainfall

(16.1%). Climate change (15.1%) was also frequently mentioned as triggering rainfall.

3.1.2. Theme 2: Education and Preparedness Regarding Floods and Water Logging

All participants stated that floods and waterlogging frequently occur in the region (n=17) and that training (n=17) and drills (n=17) are regularly conducted within the institution at specific intervals each year (Figure 2). This finding shows that field personnel have the opportunity to develop themselves both theoretically and practically. It was also noted that internal training contributes to updating knowledge (n=17) and thus reinforces the response skills of personnel during disasters.

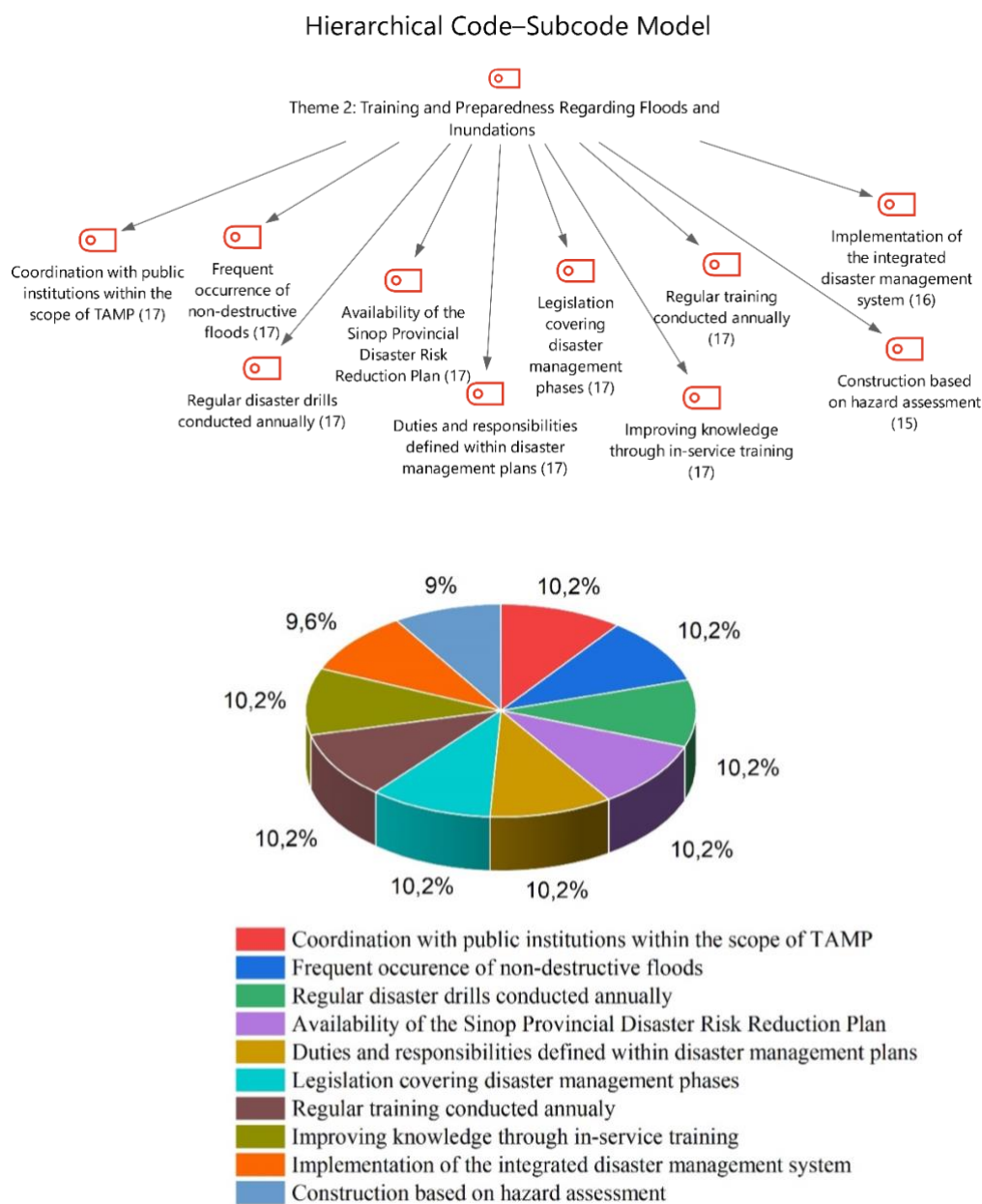


Figure 2. The Level of Training and Preparedness of AFAD Participants Regarding Floods and Water Inundation.

Again, all participants emphasized that they worked in coordination with other stakeholders within the scope of the Türkiye Disaster Response Plan (TAMP) (n=17). It was stated that duties and responsibilities were clarified within the plans (n=17) and that strategic preparations were made at the local level within the framework of the Sinop Provincial Disaster Reduction Plan (IRAP) (n=17). This situation shows that a planned approach to disaster management has become an institutional reflex. The fact that the concepts of legislation knowledge covering the stages of disaster management (n=17) and integrated disaster management system (n=16) are in the participants' vocabulary reveals that actions are based on legislation and that a structured systemic preparation is in place.

Another noteworthy finding is the statements regarding the need to take disaster risk into account in infrastructure planning. In particular, the code stating that structures should be built taking into account the existence of danger (n=15) demonstrates the importance of risk-focused spatial planning and increased awareness in this area. In this regard, it can be said that institutional personnel have a strategic approach not only in the intervention phase but also in the risk reduction and prevention phases.

3.1.3. Theme 3: Skills, Competence, and Response to Floods and Waterlogging

The analyses conducted under this theme reflect the opinions and experiences of Sinop AFAD personnel regarding their competence in responding to floods and waterlogging, their technical equipment, and their field preparations (Figure 3). All participants stated that sufficient equipment was available within the institution (n=17) (Figure 3). However, despite this, there is a strong consensus that people are not adequately prepared for disasters (n=17), highlighting a significant gap between institutional adequacy and public awareness. In terms of data sharing, it was stated that real-time data transfer is carried out through AYDES (Disaster Management and Decision Support System) (n=15) and that this enables a more coordinated response process. The existence of AFAD volunteer system training (n=11) shows that institutional capacity is not limited to personnel, but that volunteer support elements are also integrated into the disaster response system. The effectiveness of early warning systems is one of the key topics highlighted in this theme. Participants stated that warnings were received before the event occurred (n=17) and that this accelerated the response process. It was noted that these warnings were largely based on meteorological data (n=15) and played an effective role in operational decision-making processes in the field. This demonstrates the functionality of early warning systems in the disaster management chain. It was observed that personnel improved their equipment usage (n=15) and field intervention skills (n=15). This shows that training is useful in practical field applications and that division of labor and operations management are carried out effectively during disasters. Within the scope of preventive intervention

measures, participants stated that disaster drills and simulations should be made more widespread (n=8), emphasizing that this is particularly effective in strengthening intervention reflexes. However, the issue of strengthening infrastructure and superstructure (n=7) also emerged as a risk-reducing factor. It was frequently stated that infrastructure deficiencies delay response, and therefore the physical environment must be strengthened prior to disasters.

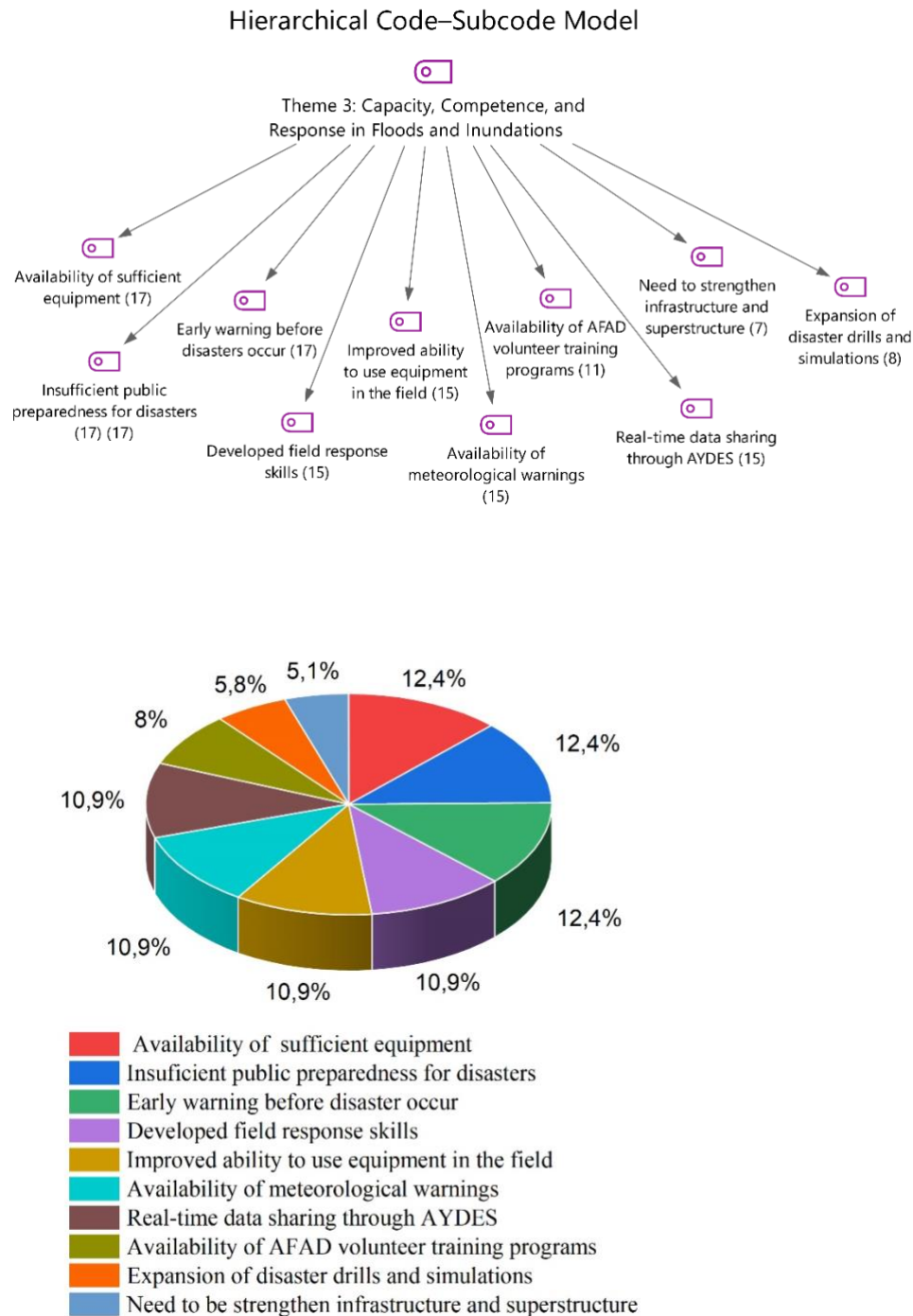


Figure 3. AFAD Participants Skills, Competencies, and Response Abilities Regarding Floods and Water Inundations.

3.1.4. Theme 4: Opinions and Experiences Regarding Floods and Flooding

This theme addresses the attitudes of Sinop AFAD personnel based on their individual and institutional experiences with floods and flooding, as well as their social observations, as presented in Figure 4. When the codes were examined, a significant portion of the participants stated that they observed an increase in the frequency of floods and flash floods (n=16); as can be seen in Figure 4, this code represented 15.1% of the relevant theme. This indicates a strong awareness that climate change and environmental factors are shortening the recurrence interval of disasters. It was also emphasized that disasters create socioeconomic impacts such as a decline in quality of life and production (n=9). This impact is felt more acutely among vulnerable groups, particularly those living in rural areas, women, and children.

Participants stated that psychological trauma was experienced following flood events (n=11) and drew attention to the negative impact of traumatic processes on social relationships. Raising disaster awareness was one of the prominent topics in this theme. A significant proportion of participants emphasized the need to raise disaster awareness in every individual (n=13) and pointed out that disasters caused by uninformed settlement plans increase the level of risk (n=10). This situation demonstrates that disaster management policies should focus not only on response but also on preventive urban planning and public awareness. From an institutional perspective, statements indicating that river rehabilitation works have been initiated (n=10) and that the sustainability of green spaces needs to be enhanced (n=16) show that AFAD has a perspective of risk reduction not only after disasters but also before them. The emphasis on nature-based solutions and ecological planning reflects the adoption of environmental sensitivity at the institutional level.

This theme also details how information flow is achieved. Participants stated that information flow to citizens during and after a crisis was carried out face-to-face (n=10) and via social media (n=6). This reveals that AFAD has adopted a multi-channel communication strategy, but that face-to-face contact is still important for reliable information transfer. Participants emphasized the need to place greater importance on the risk management phase (n=7), stressing that focusing solely on disaster response is insufficient and that the key is to manage disasters before they occur.

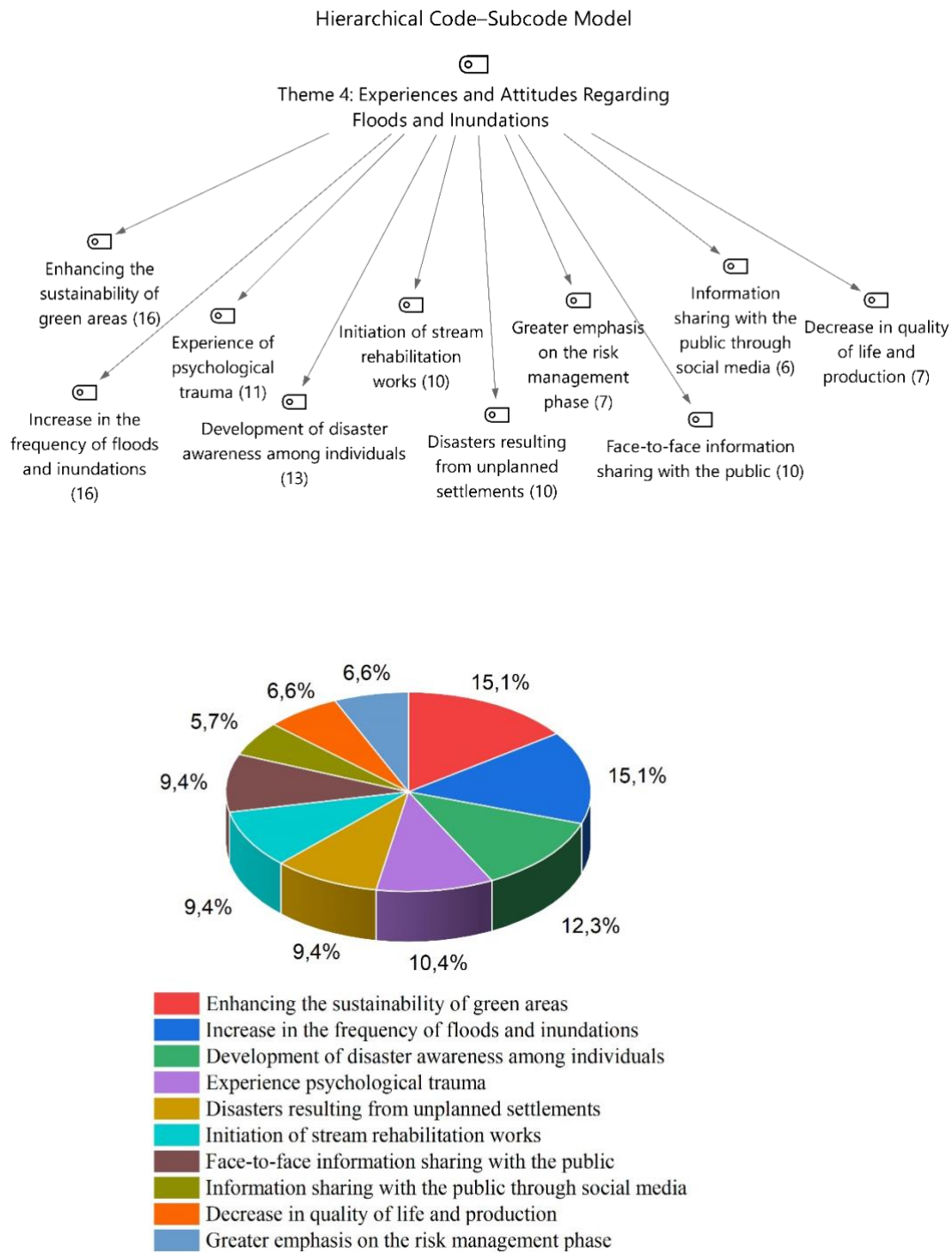


Figure 4. Opinions and Experiences of AFAD Participants Regarding Floods and Water Inundations.

4. Conclusions

Considering the demographic characteristics of the participants, it is observed that the opinions of personnel with 8 years or more of experience are shaped based on their experience. It has been observed that personnel with high levels of experience propose practical solutions for the risk management and crisis management process. While female participants' suggestions in the intervention processes were more focused on social and psychological needs, male participants

focused more on technical issues in operational processes. Based on the participants' views reflected in the themes, it was understood that floods and flash floods were caused by excessive and sudden rainfall (16.1%) as well as climate change (15.1%). It was stated that non-destructive floods (10.2%) occur frequently every year in Sinop. These causes of floods and flash floods were also highlighted in a study by Karaman (2019) and coincided with the observations of AFAD personnel in Sinop province. Coordination and cooperation in the disaster management process are essential for the efficient use of resources, and AFAD has emphasized the need for coordination with all public institutions and organizations (10.2%) within the scope of the Türkiye Disaster Response Plan (TAMP). Additionally, participants indicated that drills and scenarios are conducted at regular intervals (10.2%). Attention was drawn to the availability of adequate equipment for pre-disaster preparedness activities (12.4%). It was stated that warnings for flood and water inundation events or disasters occurred before the event took place (12.4%), but it was emphasized that the community was not sufficiently prepared for disasters (12.4%). Based on the participants' experiences, it was clearly stated that necessary measures should be taken due to the recent increase in the frequency of floods and water inundations (15.1%). Among these measures, statements regarding increasing the sustainability of green areas (15.1%) drew attention, and it was emphasized that raising disaster awareness in every individual (12.3%) is inevitable. In light of the findings, it is evident that disasters not only cause physical destruction but also trigger social, psychological, and economic vulnerabilities. A large proportion of participants stated that there has been an increase in both the frequency and severity of floods and flash floods; it was emphasized that this situation leads to various consequences such as a decline in quality of life, migration, unemployment, and greater impact on vulnerable groups such as children and individuals with disabilities.

In the post-disaster process, it was stated that the institutional response capacity was largely sufficient. Participants indicated that adequate equipment was available, equipment use and field response skills had been developed, the AFAD volunteer system was active, and pre-disaster training had been completed. However, many participants stated that structural problems such as technological infrastructure failures and inadequate infrastructure and superstructure could negatively affect intervention processes. The level of preparedness of the community for disasters stands out as one of the weakest links. Almost all participants emphasized that the public is not sufficiently responsive to disaster warnings, that individual preparedness for disasters is inadequate, and that disaster awareness must be instilled in every individual. This finding shows that disaster management cannot be limited to institutional efforts alone, but that social awareness and participation must also be integrated into the process.

In terms of environmental sustainability and physical prevention strategies, measures such as increasing green spaces, stream rehabilitation works, constructing flood barriers, and cleaning water

collection areas have often been recommended. Participants emphasized the need to prioritize not only intervention processes but also pre-disaster risk reduction and spatial planning processes. It was highlighted that uninformed settlement plans increase disaster risk, clearly demonstrating the need for sustainable and disaster-resilient urban transformation policies in this area. The findings obtained within the scope of this research reveal that the knowledge and experience levels of AFAD personnel in Sinop province regarding floods and flash floods are quite advanced. Participants indicated sudden and heavy rainfall as one of the most important causes of disasters. This situation is also frequently emphasized in studies on disaster dynamics in Türkiye. For example, a study on disaster management practices specifically at Adıyaman University (Ateş, 2023) states that floods and inundations caused by sudden rainfall pose a serious risk, particularly on university campuses, and that these risks can only be mitigated through effective infrastructure planning. This situation is consistent with the findings regarding the inadequacy of evacuation infrastructure in Sinop province.

The regular participation of AFAD personnel in disaster-related training and drills plays a significant role in increasing their knowledge levels. Memiş and Babaoğlu (2020) emphasize the importance of the process approach and technology in disaster management, highlighting the necessity of continuous training for personnel. The regular participation of AFAD personnel in Sinop province in training and drills demonstrates that this requirement is being met in practice. Another important theme that emerged in the study is the regular implementation of disaster training. Participants stated that these trainings were sufficient at both the theoretical and practical levels. This finding is also supported by a study on logistics processes in disasters centered in Kahramanmaraş (İpek, 2023). The study emphasizes that trained personnel directly increase the effectiveness of field interventions and that knowledge updates contribute positively to disaster performance. Similarly, the fact that Sinop AFAD personnel are familiar with current disaster legislation indicates the strength of internal reflexes within the institution. The technical competence of personnel in the response process and their level of knowledge regarding equipment use were found to be high. However, it was also stated that the public is not sufficiently prepared for disasters. This dichotomy was also highlighted in a comparative study on the disaster management systems of French and Turkish gendarmerie forces (Ersoy and Aslan, 2023). The study indicates that while high institutional capacity can limit the impact of a disaster, resilience to disasters remains weak in societies with low social awareness and preparedness. This finding highlights the need to support volunteer systems and educate the public, particularly in Sinop.

From a corporate strategy perspective, it is observed that the risk reduction approach is increasingly being adopted. Sinop AFAD personnel expressed their views on issues such as river rehabilitation, green space sustainability, and spatial planning. An analysis of AFAD and the Türkiye Disaster Response Plan (TAMP) (Altun, 2023) states that planned disaster management has now gone

beyond the intervention stage and that preventive urban planning is at the forefront. This approach is consistent with the findings of the study. Furthermore, it was emphasized that disasters have not only physical but also socio-psychological effects. Participants stated that vulnerable groups, especially in rural areas, were more affected and experienced trauma after the flood. This situation shows that the long-term effects of disasters on society need to be addressed in greater depth. Research shows that failure to consider the psychological effects of disasters in the intervention process delays social recovery.

The effectiveness of early warning systems is a critical factor in disaster response. Karaman (2019) states that early warning systems are an important tool in reducing disaster risks. The emphasis placed by AFAD personnel in Sinop province on the effectiveness of early warning systems and their role in accelerating the response process supports this view. Social awareness and individual precautions play an important role in reducing disaster risks. The researcher states that raising disaster awareness is effective in reducing the negative effects of disasters. The fact that Sinop AFAD personnel indicate that the public's level of preparedness for disasters is insufficient shows that more effort is needed in this regard.

Ultimately, flooding and waterlogging events caused by excessive rainfall in the region have reached disaster proportions due to the influence of numerous human factors. Settlements built in and near riverbeds, deforestation, excessive migration to the region, the lack of forecasting and early warning systems, the failure to strengthen infrastructure and drainage systems, the failure to rehabilitate riverbeds, and the existence of an uneducated and unaware society have resulted in disasters. Floods and flash floods in the region can cause housing problems, disruptions in production, difficulties in obtaining reliable food and water, infectious diseases, injuries, psychological trauma, and loss of life and property. Interviews with personnel revealed that AFAD personnel are sufficiently aware of and responsible for management plans for floods and flash floods. It was understood that they are sufficiently aware of the subject, have received the necessary training to become experts in their field, and have gained experience due to the frequent floods in the region. They stated that their current team and equipment are sufficient and that they frequently provide training to the community living in the region about floods and flash floods.

5.Recommendations

When negative observations were considered, it was stated that the people living in the region were not sufficiently aware and that they had not prepared for floods and flash floods. Similarly, they believe that prediction and early warning systems and other infrastructure systems are inadequate. It was also stated that scientific studies are not given sufficient attention. Based on the opinions of the

personnel, it is necessary to increase various activities, drills, and disaster simulations to raise public awareness. Within the scope of strengthening infrastructure and superstructure, it is recommended that buildings be made resistant to flood and water damage risks, drainage systems be established, rivers and streams be rehabilitated, appropriate barriers be installed, infrastructure be strengthened to quickly remove heavy rainfall without disrupting the natural flow, and forested areas and the environment not be destroyed. In order for society to be able to take swift action, it is important to develop prediction and early warning systems and deploy them in hazardous areas. Based on the discussions held, it was emphasized that universities' scientific studies and participation in disaster management are also important. In addition, various projects should be implemented to ensure that communication and technology continue to function after a disaster. In order to make society resilient to disasters and to ensure preparedness in line with the requirements of a new learning experience in the event of a possible disaster, it is recommended to establish flood and drought early warning systems in basins, update flood management plans, increase flood control systems, preventing human interventions in riverbeds, and increasing education and awareness efforts for the local population.

Measures that can be taken to prevent floods and flash floods in Sinop Province should be planned as both short-term and long-term measures, taking into account the province's geographical structure, climate characteristics, and current infrastructure status. The main measures that can be taken specifically in Sinop Province are listed below:

1. Infrastructure Development and Improvement;

- Strengthening rainwater drainage systems: Water discharge capacities should be increased, and blockages should be cleaned regularly.
- Separation of sewage systems: Rainwater and sewage lines should be separated.
- Stream rehabilitation works: Stream beds should be widened and arranged in accordance with their natural structure without being covered with concrete.
- Flood control structures: Flood barriers, flood prevention channels, and regulators should be constructed.

2. Early Warning Systems and Crisis Management

- Meteorological early warning systems should be established.
- Emergency action plans should be prepared: Coordination should be ensured between local authorities, AFAD, and citizens.
- Drills should be conducted: The public should be taught what to do during a flood.

3. Planning and Zoning Regulations

- Ban on construction in high-risk areas: Construction should be prohibited in riverbeds and areas with high flood risk.

- Updating zoning plans: Planning should be carried out taking into account flood risk maps.
- Evacuation of areas at risk of disaster: Relocation of existing settlements to safe areas should be encouraged.

4. Protection of Natural and Green Areas

- Afforestation and reforestation: Trees should be planted, especially on sloping land, to reduce erosion and surface runoff.
- Protection of wetlands: The destruction of natural water retention areas such as marshes and ponds should be prevented.
- Use of green infrastructure: Nature-based solutions such as rain gardens, permeable pavements, and green roofs should be encouraged.

5. Raising Public Awareness

- Educational campaigns should be organized: People living near rivers should be made aware of flood risks.
- Participatory approaches should be supported: Neighborhood-based disaster volunteers should be established.

- Due to the serious flood disasters that Sinop's Ayancık district has experienced in the past, measures that can be taken specifically for Ayancık district are suggested below.
- Rehabilitation of the Ayancık River: Flood capacity should be reviewed, and the riverbed should be regulated.
- Structures around the riverbed should be removed or rearranged.
- Floodgates, flood barriers, and retarders should be constructed for flood control.
- Bridges destroyed during floods should be rebuilt with high clearance and durability.
- Roads at river crossing points should be elevated and reinforced with permeable materials.
- Underground channels should be constructed in the district center to collect rainwater.
- Drainage systems should be continuously monitored, and blockages should be cleared immediately.
- Flood risk maps should be drawn up, and construction should not be permitted in these areas.
- Neighborhoods close to the riverbed in Ayancık (e.g., Babaçay village, Yalı and Merkez neighborhoods) should be monitored as a priority in terms of flooding.
- Settlements at risk of flooding should be identified and urban transformation should be implemented.
- New construction should be directed to high and safe ground.

- Neighborhood-based audible warning systems, sirens, and mobile notification applications should be activated.
- Local disaster management teams should be established. Trained volunteers should be assigned to each neighborhood.
- Neighborhood meetings, educational sessions in schools, and informational brochures should be used to raise public awareness.
- Special awareness campaigns should be conducted, particularly for children, the elderly, and those living in rural areas.
- Drills should be organized to teach the public how to act in the event of a flood.
- Neighborhood-based “Disaster Volunteer Teams” should be established.
- These teams should be trained in first aid, evacuation, and the use of early warning systems.

As a result of this research, the findings obtained from the comprehensive analysis of the knowledge, opinions, and experiences of AFAD personnel working in Sinop province, which has a high risk of disasters, will contribute to issues such as the reflection of national disaster management strategies in the field, the updating of training content, and the enhancement of local capacity. It will also provide data-driven recommendations to decision-makers regarding the development of preventive and preparatory strategies at the local level.

Authors’ Contributions

This study was produced from the thesis work of Gülşah BAŞLAR, a Master's student in the Department of Disaster Management, Institute of Natural Sciences, Giresun University. Prof.Dr.Erkan KALIPCI contributed to this study by serving as the thesis advisor, providing academic oversight throughout the research process, and offering critical feedback that helped improve the scientific rigor of the graphs and analytical framework presented in this article.

Statement of Conflicts of Interest

There is no conflict of interest between the authors.

Statement of Research and Publication Ethics

The author declares that this study complies with Research and Publication Ethics.

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