

Research Paper

A Content Analysis of People's Perception of Climate Change and Its Relationship With Flooding in Parts of Northwestern Iran



Elham Akhlaghi Pirposhteh¹, Mohammad Hossein Ghasemian², Robab Hosseinpour³, Parvin Ahmadinezhad⁴, Yusef Hamidzadeh Arbabi⁵, Mohsen Aminizadeh⁶, Maliheh Eshaghzadeh⁷, Ali Salehi Sahlabadi⁸, Mohsen Poursadeghiyan^{9,*}, Javad Vatani^{10*}

1. Research Center for Addiction and Risky Behaviors (ReCARB), Psychosocial Health Research Institute, Iran University of Medical Sciences, Tehran, Iran.

2. Student Research Committee, School of Health, Guilan University of Medical Sciences, Rasht, Iran.

3. Students Research Committee, School of Health, Ardabil University of Medical Sciences, Ardabil, Iran.

4. Department of Occupational Health and Safety Engineering, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran.

5. Department of Occupational Health Engineering, School of Health, Ardabil University of Medical Sciences, Ardabil, Iran.

6. Department of Medical Emergencies, School of Medical Sciences, Sirjan University of Medical Sciences, Sirjan, Iran.

7. Department of Nursing, School of Nursing and Midwifery, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.

8. Safety Promotion and Injury Prevention Research Center, Research Institute for Health Sciences and Environment, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

9. Social Determinants of Health Research Center, School of Health, Ardabil University of Medical Sciences, Ardabil, Iran.

10. Department of Occupational Health and Safety Engineering, Trauma Institute, Faculty of Public Health, Guilan University of Medical Sciences, Rasht, Iran.



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ABSTRACT

Background: Climate change is a significant natural factor contributing to environmental problems, resulting in substantial political, economic, social, and climatic consequences worldwide. This study aimed to explain people's perceptions of climate change and their relationship to flooding in parts of northwestern Iran and to propose corrective strategies.

Materials and Methods: This qualitative (phenomenological) study included 33 villagers from Ardabil Province, Iran. Participants were selected using purposive sampling, and data were collected through semi-structured interviews. Data collection was facilitated by rural health workers and the researcher's in-person visits to the selected villages. The data collection period spanned from September 2023 to December 2023.

Results: Climate change has affected the lives of rural residents in various ways and across different dimensions. After analysis, 10 themes and 13 sub-themes were identified. Most participants perceived climate change primarily through experiencing extreme weather events. Cultural, religious, and political contexts significantly influence people's perceptions of environmental changes. Among the general population of participants, most understood climate change through extreme events.

Conclusion: Public perception of the risks associated with climate change is crucial for mitigating its adverse social, economic, security, political, and environmental impacts, particularly those related to flooding. Scientific planning and the implementation of targeted interventions tailored to the province's conditions—such as public education—are essential to mitigate the consequences of climate change, particularly the risk of flooding in the region.

Keywords:

Climate change, Flooding,
Perception, Rural population

* Corresponding Authors:

Mohsen Poursadeghiyan, PhD.

Address: Social Determinants of Health Research Center, School of Health, Ardabil University of Medical Sciences, Ardabil, Iran.

E-mail: poursadeghiyan@gmail.com

Javad Vatani, PhD.

Address: Department of Occupational Health and Safety Engineering, Trauma Institute, Faculty of Public Health, Guilan University of Medical Sciences, Rasht, Iran.

E-mail: jvatani@gmail.com



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Introduction

The significant rise in Earth's temperature, commonly referred to as global warming, is recognized as one of the most critical manifestations of climate change [1]. Climate change, especially changes in temperature and precipitation, is among the most influential factors. This phenomenon is crucial due to its scientific and practical dimensions (including environmental, economic, and social impacts), as human systems such as agriculture, industry, and others are designed and function on the basis of climate stability. Any disruption can significantly affect all aspects of human life [2].

One of the most significant consequences of climate change is the alteration of the hydrological cycle and changes in river flow regimes within watersheds. Changes in flood and drought intensity have drawn the attention of both managers and the scientific community as major outcomes of climate change [3].

One of the most evident signs of climate change is the increase in extreme weather events. According to reports by the [Intergovernmental Panel on Climate Change \(IPCC\)](#), ongoing climate change and global warming have increased the likelihood of heavy rainfall events (exceeding 30 mm per hour)—and consequently, the risk of flooding caused by inadequate drainage systems, as well as various physical and environmental factors [4, 5].

Undoubtedly, flooding is recognized as a natural disaster and is considered the most devastating natural hazard worldwide in terms of both human casualties and financial losses [6]. Although the largest floods in recorded history have occurred across vast regions—from countries in Northern Europe to Eastern China—it is noteworthy that, over the past century, most of the world's devastating floods have occurred in developing or underdeveloped countries, particularly in Asia, resulting in the deaths of thousands [7].

Iran is among the countries most vulnerable to climate change. With 31 out of the 40 recognized types of natural disasters occurring within its borders, Iran is considered one of the most disaster-prone countries in the world [8]. Many of these disasters have led to significant shifts in people's beliefs, attitudes, and behaviors [9].

Flooding is considered one of the most unpredictable and devastating natural disasters in Iran, resulting in significant annual economic and human losses for residents of flood-prone areas. These damages are not limited to

high-rainfall regions; even arid and semi-arid areas are increasingly affected by sudden floods [10]. According to data from the Road, Housing, and Urban Development Research Center, floods account for nearly 30% of total damage from natural hazards in Iran [11].

Increasing flood-related losses are partly due to human interventions in river systems and construction activities within river boundaries. Studies show that floods, accounting for approximately 41% of all natural hazard events, are the second most frequent natural disasters in the country after earthquakes [12]. Although floods account for only approximately 3% of fatalities from natural hazards in Iran, their economic damage exceeds the associated death toll, comprising nearly 30% of the total economic losses from natural hazards [13].

Additionally, Ardabil Province is among the ten provinces in Iran with the highest frequency of natural disasters. In addition to floods, the region experiences earthquakes, landslides, droughts, lightning strikes, storms, frost, heavy snow, and severe cold spells, all of which contribute to substantial damage and casualties [14].

Climate change is the primary driver of flooding. Climate change and global warming are among the greatest challenges of our time, having disrupted the hydrological cycle at both global and regional scales [6]. For instance, the Earth's temperature has risen by 0.65 °C during the 20th century due to climate change and is expected to increase by 1.5–4.6 °C by the end of this century if greenhouse gas emissions continue to rise [15].

Iran is situated within one of Earth's arid belts, with over 60% of its territory in arid and semi-arid climatic zones [14]. In addition to its naturally dry conditions, recent global climate changes—both in total rainfall and the intensity of extreme precipitation events—have significantly impacted the country. Therefore, recognizing the role of climate change in intensifying water scarcity and reassessing the frequency and severity of flood events is crucial for enhancing flood management capacity and minimizing losses.

This study aimed to explain people's perception of climate change and its connection to flood-prone areas in northwestern Iran, identify related factors, and propose corrective strategies.

Materials and Methods

This study employed a qualitative (phenomenological) research design. The study population consisted of ru-

ral residents in Ardabil Province. The sample size was determined to be 33 individuals. A purposive sampling method was used. From villages that had recently experienced flooding, a few individuals—trusted community members or village elders—were selected for interviews. Sampling continued until data saturation was reached at 33 participants, meaning that additional interviews yielded no new information.

In this study, the first participant was purposively selected, and subsequent participants were selected based on insights from previous interviews (theoretical sampling). Efforts were made to ensure maximum variation in the sample across age, gender, education level, occupation, economic status, and the geographic locations of villages in Ardabil Province. In qualitative research, participants are those whom the researcher can access and who possess relevant knowledge and experience. Since the participants were selected based on specific research objectives and from specific individuals and locations, purposive sampling was employed. Given the study's aim of exploring a broad range of experiences and perspectives, maximum variation in sampling was prioritized. Therefore, participants in this study were selected based on their experience, knowledge, and expertise, as well as their locations that were accessible to the researcher.

The primary tool for data collection was interviews. Data were collected from villagers using guided interviews. The interviews continued until data saturation was achieved. Data collection was facilitated by lo-

cal (community) health workers (Behvarz¹) from rural health houses and through the researcher's direct visits to the selected villages (Tables 1 and 2). The data collection period lasted from September to December 2023. Qualitative data analysis was performed using MAXQDA software, version 12.

Results

The study's findings indicate that among the 33 participants, 23 were men and 10 were women. All participants lived in rural areas and were over the age of 35. Their educational backgrounds ranged from illiteracy to holding a master's degree. Table 3 presents further details.

As shown in the table, interviews were conducted with 33 individuals: Seven from rural areas of Ardabil (including Namin, Nir, and Sareyn), five from Meshgin Shahr, five from Khalkhal and Kowsar, five from Parsabad, five from Germe, and six from Bileh Savar and Aslan Duz.

Table 4 presents the themes (categories), subcategories, and examples of statements from the interviewed rural residents.

Discussion

This study aimed to explain the rural residents' perception of climate change in Ardabil Province and to propose corrective strategies. In this qualitative study, 10 main themes and 13 sub-themes were identified. Participants primarily perceived climate change through se-

1. Community or local health worker

Table 1. Number of counties, number of villages, selected villages, sample size, and number of interviewees

Row	County Name	Total Number of Villages	No. (%)	Number of Selected Interviewees
			Villages in Study Population	
1	Ardabil (Namin, Nir, Sareyn)	357	36(10.1)	7 (from 20% of villages)
2	Meshgin Shahr	280	28(10)	5
3	Khalkhal and Kowsar	249	25(10)	5
4	Parsabad	222	23(10.4)	4
5	Germi	316	32(10.1)	6
6	Bileh Savar	268	27(10.7)	5
7	Aslan Duz	59	6(10)	1
Total		1751	1751	33 participants

Table 2. Interview question guide

No.	Questions
1	Please introduce yourself and share your opinion about global climate change.
2	What is your view on the seriousness and importance of climate change in Iran?
3	How do you assess climate change in the Ardabil region? Has it become more severe than in the past? For example, please explain whether the air temperature in the Ardabil region has increased or decreased due to climate change compared to previous years.
4	How do you evaluate precipitation (snow and rain) in the Ardabil region? Has the amount of snowfall and rainfall increased or decreased compared to the past?
5	Have you experienced recent floods? In your opinion, how has the flood situation in the Ardabil region changed compared to the past? Has it become more intense and more damaging?
6	Please identify the flood-prone areas in Ardabil Province and name the counties where floods occur more frequently.
7	How do you evaluate the claim that the Ardabil region has many vulnerable areas?
8	Describe the flood history in your village and explain how often floods occur there (e.g. every few years).
9	Where are the flood paths or drainage channels located in your village?
10	Please explain the state of construction in flood pathways in your village. Have these pathways become narrower or been blocked compared to the past, or has construction activity affected them?
11	What are your thoughts on the methods for preventing floods from entering the village?
12	In case of a flood, what response or mitigation strategies do you know of?
13	Do you believe that climate change and global warming can influence the occurrence of floods in your village?
14	Do you think flood management in the Ardabil region has become more difficult compared to the past?
15	How do you assess the impact of prevailing cultural, social, and political contexts on the role of climate change in causing floods in the Ardabil region?
16	How do you assess the impact of prevailing cultural, social, and political contexts on flood management in the Ardabil region?
17	How do you assess the impact of prevailing cultural, social, and political contexts on reducing flood damage in the Ardabil region?

vere local events. The findings of the present study align with those of Kheirkhah et al., who also found that more than 50% of farmers recognized climate change based on its impacts on rice farming [16]. Similarly, the results of this study are consistent with those of Esmacilnejad regarding the perception of climate change among saffron growers; many of them had also become aware of climate variations [17]. Furthermore, the findings align with those of Hashemi Sadati et al., who reported that citrus farmers' knowledge of climate change ranged from low to moderate [18].

One of the most significant factors influencing how individuals perceive climate change is the presence of prevailing cultural, religious, and political contexts, as well as the dominant modes of information dissemination. Ordinary participants perceived climate change mainly through extreme, high-impact events. The public perception of climate risks plays a critical role in reducing the adverse social, economic, political, security, and

environmental consequences of climate change, particularly those related to flooding.

Climate change alters the hydrological cycle, leading to changes in rainfall patterns, increased snowmelt, variations in river runoff, and more extreme events, such as droughts and floods [19, 20]. Depending on the region and climatic conditions, climate change can result in either an increase or a decrease in river runoff [21, 22]. According to Goudarzi and Fatehi Far, rising greenhouse gas concentrations and global warming associated with climate change may increase the probability, frequency, and intensity of climatic events, such as floods, in certain parts of the world [23]. Alterations in the characteristics of floods and runoff caused by climate change are among the most pressing concerns for water resource managers in long-term flood protection planning.

Table 3. Demographic characteristics of rural participants in the qualitative study (2023–2024)

No.	Interviewee's Occupation	Age (y)	Place of Service	Interview Location	Duration of Interview (min)	Gender
1	Male community health worker	54	Ardabil County	Workplace	70	Male
2	Female community health worker	50	Ardabil County	Workplace	63	Female
3	Health supervisor	45	Ardabil County	Workplace	60	Male
4	Village elder	69	Ardabil County	Workplace	60	Male
5	Teacher	50	Ardabil County	Workplace	54	Male
6	Member of village Islamic Council	52	Ardabil County	Place of residence	60	Male
7	Farmer	70	Ardabil County	Place of residence	65	Male
8	Female community health worker	48	Meshgin Shahr County	Workplace	55	Female
9	Driver	60	Meshgin Shahr County	Workplace	40	Male
10	Livestock farmer	67	Meshgin Shahr County	Place of residence	60	Male
11	A well-known figure in the village	65	Meshgin Shahr County	Place of residence	50	Male
12	Farmer–livestock keeper	70	Meshgin Shahr County	Workplace	50	Male
13	Female community health worker	66	Parsabad County	Workplace	55	Female
14	Retired Moghan Agro-Industry worker	72	Parsabad County	Place of residence	50	Male
15	Member of village Islamic Council	58	Parsabad County	Workplace	65	Male
16	A well-known figure in the village	70	Parsabad County	Place of residence	55	Male
17	Owner of industrial livestock farm	62	Parsabad County	Workplace	65	Male
18	Female community health worker	48	Khalkhal County	Workplace	60	Female
19	Master's student	35	Khalkhal County	Workplace	60	Female
20	Farmer–livestock keeper	65	Khalkhal County	Place of residence	60	Male
21	A well-known figure in the village	66	Khalkhal County	Place of residence	65	Male
22	Livestock farmer	70	Khalkhal County	Workplace	60	Male
23	Female community health worker	50	Germi County	Workplace	50	Female
24	Housewife	65	Germi County	Place of residence	50	Female
25	Coffeehouse owner	60	Germi County	Workplace	50	Male
26	Farmer–livestock keeper	63	Germi County	Place of residence	64	Male
27	A well-known figure in the village	68	Germi County	Place of residence	50	Male
28	Female community health worker	45	Bileh Savar County	Workplace	65	Female
29	Farmer	66	Bileh Savar County	Place of residence	55	Male
30	A well-known figure in the village	70	Bileh Savar County	Place of residence	65	Male
31	Poultry farmer	56	Bileh Savar County	Workplace	50	Male
32	Health ambassador	50	Bileh Savar County	Place of residence	50	Female
33	Health supervisor	43	Bileh Savar County	Workplace	50	Female

Table 4. Themes, subcategories, and sample statements from interviewed rural residents in Ardabil Province

No.	Themes and Concepts	Subcategories	Sample Participant Statements
1	Seriousness of global climate change	- Scientific evidence indicating the seriousness of climate change globally and in Iran - Evidence from rural work experience supporting the seriousness of local climate change	Climate change is a reality and is being observed all over the world. The other day, television showed reports from Germany and China, where the rivers had dried up (N. 1). In my opinion, climate change is a global issue, and the recent floods in Golestan, Khuzestan, southeastern Iran, Pakistan, and other places are said to have been caused by climate change (N. 2). Sometimes you see heavy snowfall in one area, flooding in another, and extreme heat elsewhere. Climate change is serious, although we might not fully perceive it (N. 3)
2	Seriousness of climate change in Iran	- Drying of apricot trees in Meshgin Shahr and Kowsar	Climate change is also evident in Ardabil. For example, in the past, winters brought heavy snowfall, and the alleyways remained icy until Nowruz, as the ice would not melt until then. However, now, it only snows once or twice a year, and even then, it is just a few millimeters (N. 4). I recall that we never used fans or air conditioners before; however, now, from mid-June to the end of September, we have to use them constantly. This indicates that the climate in Ardabil has become warmer, and precipitation has decreased (N. 5 and 6).
3	Seriousness of climate change in Ardabil	- Rising ambient temperatures in the region and a decrease in snowfall and rainfall in the province - Shorter duration and increased intensity of rainfall	I do not know for certain whether the recent floods were caused by climate change, but what I do know is that in the past, rainfall used to be spread out over a longer period and were less intense; therefore, it did not cause much damage. However, rainfall now tends to be sudden and very intense, especially in the highlands, resulting in flash floods. The flood channels cannot carry the excess water, resulting in greater damage (N. 9 and 10).
4	Damage to orchard trees in the region	- Damage to orchards in Meshgin Shahr and Kowsar; damage to road structures in Germe	Nowadays, everyone knows that overall rainfall has decreased compared to the past. We have apricot and grape orchards, and we used to have large Hossein Khani grapevines; however, they have dried up. If you look at the Sabalan Dam now, the drop in its water level compared to ten years ago is visible (N. 8 and 9).
5	Regional warming and reduced precipitation	- Disruption of urban transportation in Ardabil city	I believe that floods occur more frequently in Meshgin Shahr, and Khiyav Chay has experienced severe flooding several times, resulting in both human casualties and losses of livestock and infrastructure (N. 11). To date, I have heard or seen nothing about flood hazard maps, zoning, or the design of appropriate levee locations in Ardabil Province (N. 1). Due to prevailing cultural and political conditions, people unfortunately do not pay attention to or are not sensitive to meteorological warnings. They camp near or within riverbeds, and sometimes even take selfies beside the floodwaters — in some cases, individuals have fallen into the flood and been swept away (N. 25). Regrettably, the legal boundaries of rivers and floodways are often ignored, either through indifference or through behind-the-scenes dealings with relevant employees and officials. These areas need to be cleared with the help of responsible agencies, including the Regional Water Company and judicial authorities, to reduce flood-related damage (N. 24).
6	Changes in precipitation patterns	- Lack of visibility of implemented measures - Failure to engage residents - Insufficient public information and awareness	Recently, the greatest flood damage was observed in the Germe region, where several people lost their lives (N. 12). In my opinion, floods do not occur in Ardabil itself because the Ardabil plain has traditionally been known for its stability. Although there have been instances of waterlogging in some areas of Ardabil, particularly in the northern parts, including Meshgin Gate and Kalkhoran Bridge, where heavy rainfall has repeatedly caused street flooding and disrupted transportation, news reports consistently highlight flood damage in Meshgin Shahr and Germe. Therefore, these areas appear to be the flood-prone zones in the province (N. 18). In Ardabil Province, the issue is not so much construction in floodplains as people camping in flood pathways, which causes greater damage. Perhaps in Germe, there are some buildings along the river inside the city, but most of the casualties and damages result from short-duration, high-intensity rainfall (N. 3). In Ardabil, the Balighlu River is lined with concrete walls, and in my lifetime, I have never seen it overflow (N. 4). Although I have not personally seen anything in Ardabil, I have often seen TV programs showing flood barriers built by the Natural Resources Organization in valleys that help reduce flood intensity. In the Ardabil plain, we have Lake Hoor, which receives excess runoff, some of which is also channeled northward via the Balighlu River. Now, the Sabalan Dam controls these flows. However, in earlier times, Khiyav Chay would flow into Ahar Chay, and along the way, floods would damage agricultural land.

No.	Themes and Concepts	Subcategories	Sample Participant Statements
7	Uneven vulnerability of health and infrastructure in different areas	- Inadequate public education on how to cope with the impacts of climate change	In the Ardabil region, in addition to the Yamchi, Sabalan, and Kivi Dams, I have not seen any other infrastructure for flood control (N. 6). I am not very informed about the measures being taken to mitigate the impacts of climate change (N. 7). I have never seen any public education programs aired by the local branch of IRIB (Islamic Republic of Iran Broadcasting) about the causes of flooding or how to prevent it, aimed at raising public awareness of climate change and severe floods. I only recall an animated video broadcast during the floods in Khuzestan and Fars a few years ago (N. 26).
8	Inadequate provincial management actions to address the climate crisis	- Construction along flood paths as a contributing factor to flood-related fatalities	Regarding whether flood control has become more difficult, you would need to ask the officials at the Regional Water Authority — I do not know (N. 25).
9	Public and managerial awareness as a means of adaptation	- Construction along flood paths as a contributing factor to flood-related fatalities	What I do know is that the more aware and informed people are, and the more they pay attention to weather forecasts and warnings, the better flood management will be, and the lower the damages (N. 17, 28).
10	Public insensitivity to meteorological warnings regarding ways to reduce the damages caused by climate change	- Lack of funding as a barrier to the progress of proposed plans	Unfortunately, people are not very sensitive and often ignore meteorological warnings (N. 30). From interactions with officials, it seems that lack of funding and delays in budget disbursement are common issues, which negatively impact ongoing projects (n 23). From what I have heard, insufficient funding has been allocated to climate change mitigation projects (N. 33).

N: Code of participants.

Risk perception and awareness of the consequences of climate-related hazards often drive efforts to reduce the likelihood of their occurrence and enhance preparedness for potential disasters [24]. Various studies have confirmed the impact of factors such as beliefs and knowledge about climate risks, trust in climate and meteorological information, adaptability to climatic conditions, previous experience with climate-related risks, and prior preparedness on people's perception of flood risk. Additionally, environmental attitudes, self-efficacy, concern, anxiety, and a sense of responsibility have been shown to influence risk perception of climate change, particularly flood risk [25–28].

Given the various topics discussed in this study, the effects of climate change can be observed in different ways and across multiple dimensions of human life. However, the impact of climate change will not be uniform across individuals. The way people perceive these effects, interpret events, and recognize them as manifestations of climate change depends on several factors [29].

One of the most important factors shaping public perceptions of such events is familiarity with and engagement in the prevailing cultural and political contexts of their society. In Iranian society, dominant cultural-religious, socio-political, and economic frameworks have influenced the understanding of both the most educated and the least educated rural residents. Among ordinary

participants, most perceived climate change through extreme events—such as flash floods and heatwaves—and considered seasonal shifts and disruptions as examples of climate change.

In contrast, educated individuals tended to obtain their information from virtual networks and Telegram channels and had not personally or experientially observed climate change in the field. Moreover, many participants' statements reflected a strong influence of cultural and religious values. A common theme among participants was placing blame on the government, senior officials, and responsible agencies, as they believed these entities had failed to adequately inform the public and take preventive measures regarding climate change. Additionally, there was criticism of the appointment and dismissal of officials, with claims that non-experts often occupy key positions. At the same time, while specialists are sidelined—an issue that reportedly worsens following parliamentary elections.

Climate change constitutes a crisis for many regions and communities [30]. Adaptation measures are complex and nuanced and require significant financial investments. In many vulnerable communities, deeply rooted economic, cultural, religious, social, and political realities make the implementation of adaptation and mitigation strategies unlikely. Therefore, climate change can be considered a widespread and destructive upheaval

Table 5. Proposed strategies for flood management in rural areas

Proposed Strategies			
1	Develop a flood hazard map to prepare for potential floods in the province.	11	Construct and manage dams wisely to mitigate the impact of potential flooding.
2	Zoning and designing appropriate locations for levees and flood barriers	12	Prepare and enforce comprehensive protocols for surface water and flood control in the province.
3	Study of flood control guidelines in surface waters, as the issue of zoning vulnerable areas in natural disasters has been neglected.	13	Design and implement public education programs through local radio and television to increase public understanding of climate change, its causes, and how to mitigate flooding.
4	Secure funding for flood hazard mapping, zoning, and designing suitable locations for levees.	14	Document and collect precipitation and flood data through the Ardabil Regional Water Company.
5	Evaluate and document flood-related damages in collaboration with the Provincial Crisis Management Headquarters and submit reports to the Planning and Budget Organization and relevant ministries.	15	Ensure coordination among relevant agencies prior to flood events to prepare official communications and actions for flood prevention and mitigation.
6	Assess damages during flood events and ensure timely disbursement of funds for repairing damages—particularly insurance compensation and the fulfillment of commitments by the Natural Disaster Insurance Fund—and allocate budgets to prevent future damages.	16	Enforce the clearance of riverbanks and floodplains with the support of responsible agencies, including the Regional Water Company and judicial authorities, to minimize loss of life and property during floods.
7	Accelerate and expand dredging operations in the province's border rivers.	17	Reinforce the prohibition of construction along runoff channels and take legal action against violators.
8	Encourage farmers to cultivate drought-resistant crop varieties and ensure their crops, as insurance is the most effective way to support farmers affected by natural disasters.	18	Protect the province's natural resources and prevent deforestation and pasture degradation through collaboration with law enforcement and the establishment of forest and rangeland protection units—an urgent need, as forest and rangeland areas are shrinking daily for various reasons.
9	Encourage public attention to meteorological alerts at warning levels of yellow, orange, and red.	19	Implement riverbed and wetland demarcation operations, including marking boundaries and reviewing past designations.
10	Draft and issue official provincial guidelines for surface water (flood) control.	20	Educate the public about the life-threatening and financial risks of constructing buildings in flood-prone areas and runoff paths.

that will negatively affect every aspect of human society, potentially leading to crises. Economically, its financial burden will be very high, and in some areas and among certain groups, it will be unbearable and damaging.

In other words, climate change will directly and indirectly impose high costs on Iranian society across a wide range of areas, including livelihoods, energy, human health, employment, economic growth, poverty, migration, urban marginalization, and the environment [31]. Planning effective interventions to mitigate the consequences of climate change is a complex, challenging task that requires an integrated, multi-decade approach.

From the perspective of climate change's impact on the fate and survival of human societies, several conclusions can be drawn: Economically and in terms of livelihoods, various aspects of agriculture are of strategic importance due to their key role in food security, exports, job creation, market regulation, inflation control, and preven-

tion of migration. Given Iran's hot, dry climate and limited water resources, climate change exacerbates these challenges. Human health is directly linked to various economic survival mechanisms, and climate change impacts all aspects of life. The loss of employment signals economic stagnation and, consequently, disruption in the individual and social life of communities.

Given the vital and strategic importance of these climate change-related components to the economic and social lives of human communities, addressing the economic impact of climate change should be a top priority. It also requires high levels of collective sensitivity and attention to detail. Neglecting climate change will, in the short term, lead to high and irreparable economic, social, and even political costs for human societies. Based on the findings of this study, strategies for addressing flooding in rural areas are proposed and presented in Table 5.

Conclusion

From the qualitative part of the study, 10 main themes and 13 sub-themes were identified, indicating that participants primarily perceived climate change through extreme weather events in the region. Scientific planning and the implementation of precise interventions tailored to the province's conditions are essential to mitigate the consequences of climate change, especially flood-related hazards. This study provides improved insights into future challenges. It can contribute to revising goals and planning efforts regarding the impacts of flooding on strategic areas and the resulting damage in rural regions.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of [Ardabil University of Medical Sciences](#), Ardabil, Iran (Code: IR.ARUMS.REC.1402.153). All participants were informed of the purpose of the study and provided informed consent to participate. Participants were informed that they could withdraw from the study at any time.

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Authors' contributions

All authors contributed equally to the conception and design of the study, data collection and analysis, interception of the results, and manuscript drafting. Each author approved the submission of the final version of the manuscript.

Conflict of interest

The authors declared no conflict of interests.

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