



Determination of social perception of the role of forest fire break roads and fire lanes in fire prevention

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ARTICLE INFO

Received: 10/04/2025

Accepted : 03/06/2025

<https://doi.org/10.53516/ajfr.1673462>

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ABSTRACT

Research Article

Background and Aims As in many countries, forest fires are one of the leading factors that jeopardize the sustainable management of forests in our country. To prevent forest fires, firebreak roads and fire lanes have been established to contain fires early and limit their spread. Therefore, establishing forest fire break roads and fire lanes to protect forests from fire is important in protective, preventive, and fire extinguishing works.

Methods This study explores public awareness of the role of firebreak roads and fire lanes in forest fire prevention. It investigates knowledge levels regarding their effectiveness in combating wildfires. The research aligns with the responsibilities in Article 170 of the Constitution, promoting state-public cooperation in forest protection. The study was conducted in the Kastamonu central district and rural neighborhoods of the central district. A literature review was conducted, and survey questions were developed. The number of people to be surveyed was statistically determined as 97 at a 95% confidence level and 10% margin of error using sample size determination methods. The participants' knowledge level about forest roads, forest fire break roads and fire lanes. Their perceptions about the prevention of forest fires by these facilities were determined.

Results As a result of the study, it is revealed that people's knowledge about forest fires breaking roads and fire lanes needs to be increased, and awareness should be raised.

Conclusions It is essential to know about forest fires, break roads, and fire lanes to act safely, quickly, and effectively in preventing and fighting forest fires.

Key Words: Forest fires, forest fire break roads and lanes, social awareness

Orman yangın emniyet yolları ve şeritlerinin yangın önlemedeki rolüne dair toplumsal algının belirlenmesi

ÖZ

Giriş ve Hedefler Dünyanın birçok ülkesinde olduğu gibi ülkemizde de ormanların sürdürülebilir yönetim anlayışını tehlikeye atan etkenlerin başında orman yangınları gelmektedir. Orman yangınlarının çıkmasına engel olmak için alınan birçok tedbirlerle beraber, çıkan bir yangının saha olarak küçük kalmasını sağlamak ve yanan sahalara erken müdahalede bulunmak amacıyla yangın emniyet yolları ve şeritleri geliştirilmiştir. Dolayısı ile ormanların yangından korunmasında; koruyucu, önleyici ve yangınların söndürülmesi çalışmalarında yangın emniyet yol ve şeritlerinin tesis edilmesi büyük önem taşımaktadır.

Yöntemler Bu çalışmada yangın emniyet yol ve şeritlerinin orman yangınlarını önlemede ve mücadelesinde sağladığı faydaların toplum açısından farkındalığının ve bilgi düzeylerinin araştırılması amaçlanmıştır. Anayasanın 170. Maddesinde öngörülen “Ormanların ve bütünlüğünün korunması bakımından ormanların gözetilmesi ve işletilmesinde devlet ve halkın iş birliğini sağlayıcı tedbirlerinin alınması” görevlerine de hizmet edilecektir. Çalışma Kastamonu Merkez İlçesi ve Merkez İlçeye Bağlı Kırsal Mahallerde gerçekleştirilmiştir. Çalışma kapsamında literatür taraması yapılmış, ardından anket soruları geliştirilmiştir. Anket uygulanacak kişi sayısı istatistiksel olarak örnek büyüklüğünü belirleme yöntemleri kullanılarak %95 güven düzeyinde ve %10 hata payı ile 97 kişi olarak belirlenmiştir. Araştırma sonucunda katılımcıların orman yolları yangın emniyet yolları ve şeritleri hakkındaki bilgi düzeyleri ve bu tesislerin orman yangınlarını önlemesi hakkındaki algıları belirlenmiştir.

Bulgular Yapılan çalışma sonucunda insanların orman yangın emniyet yolları ve şeritleri hakkında bilgi düzeylerinin yetersiz olduğu ve bilinçlendirilmesi gerektiği ortaya çıkmaktadır.

Sonuç Orman yangınlarının önlenmesi ve mücadelesinde orman yangınlarında güvenli, hızlı ve etkili bir şekilde hareket etmek için orman yangını emniyet yolları ve şeritleri hakkında bilgili olmaları oldukça önem arz etmektedir.

Anahtar Kelimeler: Orman yangınları, yangın emniyet yol ve şeritleri, toplumsal farkındalık

Citing this article:

Özer Genç, Ç., Demirci, K.C., 2025. Determination of social perception of the role of forest fire break roads and fire lanes in fire prevention. Anatolian Journal of Forest Research, 11(1), 153-161.



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1. Introduction

Forests are ecosystems that contain the world's necessary underground and above-ground resources, such as water, soil, energy, biodiversity, and wildlife. Forests are recognized as one of the most important natural resources worldwide due to their multifaceted economic and ecological benefits. However, despite all these benefits, forests are being destroyed excessively worldwide, and their existence is decreasing daily (Korkmaz, 2002). Forests cover vast areas worldwide and, in our country, providing habitat for diverse species and valuable ecological services. Their protection is crucial due to factors like the limited regrowth potential of destroyed forests. Additionally, the steep and rugged topography increases vulnerability to degradation. Urbanization, industrialization, and population growth further intensify the need for forest conservation (Bingöl, 2017).

In the last hundred years, rapid population growth and consumer demands have significantly increased the pressure on forests, a renewable natural resource. The pressure on forest resources results in clear-cutting and legal regulations that narrow forest boundaries. It also leads to an excessive demand for wood materials and non-compliant logging practices. Additionally, forest fires are a significant consequence of this pressure (Ertuğrul, 2005). Forest fires seriously destroy forests, jeopardize the sustainability of forest resources, and cause significant biological and ecological damage to plant geography (Bilici, 2009).

Since more than half of the forests in our country are spread in fire-sensitive areas, forest fires cause severe damage to forest areas and jeopardize the sustainability of forests (Bilici, 2009). As a result of fire, the value of the wood biomass of trees decreases. In addition, the soil and humus layer of the burnt areas deteriorates, the vegetation cover is damaged and threatens the sustainability of forests (Sağlam et al., 2005; Jalaludin et al., 2020; Certini et al., 2021). At the same time, forest fires cause soil erosion, acceleration of surface runoff, destruction of water resources, air pollution, and loss of recreational value. The negative impacts of forest fires should be considered not only environmentally, but also socially and economically (Tariq et al., 2021). In forests damaged by wildfires, the planned production of forest products is not realized, resulting in significant monetary losses. In addition, if forest fires spread to residential areas and affect those areas, loss of life and property also occurs (Akay et al., 2011).

The cause of 44% of forest fires in Turkey in the last ten years is unknown. It has been determined that approximately 90% of the leading causes of forest fires whose cause can be determined are human induced (Elvan et al., 2021). Therefore, the most important way to prevent forest fires from occurring is to increase social awareness (Oduncu, 2018).

Although there has been a decrease in the amount of burnt forest area in Turkey since 1937 (except for the period 2012-2021), it is seen that the number of fires has been increasing continuously since the 1970s. While the average annual number of fires was 580 between 1962-1971, this amount reached 2,165 in the 1990s and 2,715 between 2012-2021. This number decreased to 2,579 between 2021-2023 (Figure 1; Anonim, 2022a; Atmış et al., 2023; Anonim, 2023). These data show that despite technological advances and increased efforts in firefighting, the increasing trend in the number of forest fires

continues, and the effectiveness of fire management policies should be questioned.

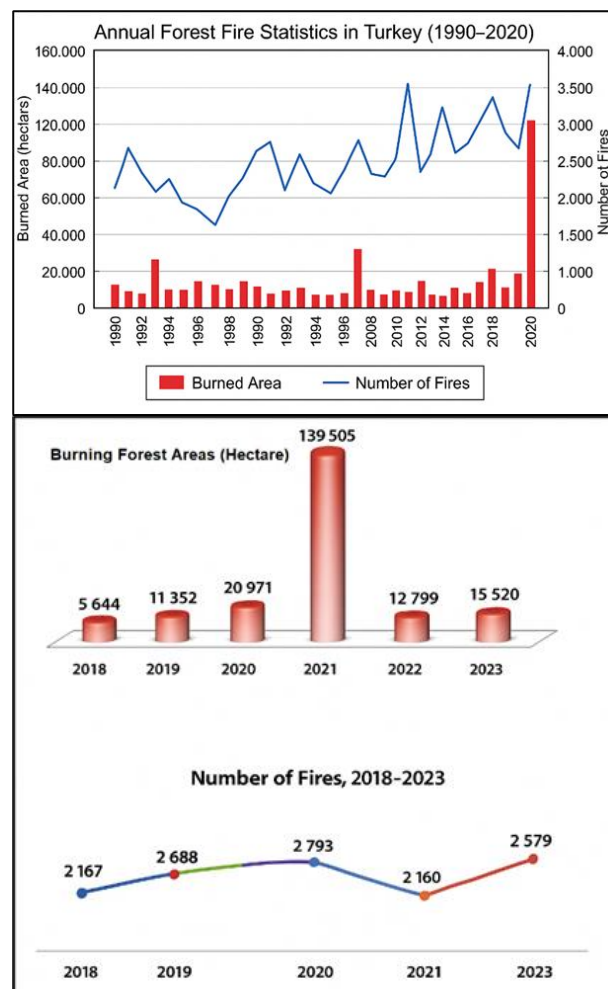


Figure 1. Forest fires and the amount of burnt area in Turkey in 1990-2021 and 2018-2023 (Anonim, 2023)

Considering the increase in forest fires, the fight against forest fires is considered to be very important for Turkey. Identifying potential fire ignition points is crucial. Efficiently distributing resources to affected areas is essential. Optimizing conditions for fire suppression is a key firefighting strategy (Emiroğlu and Koçyiğit, 2014; Ergün, 2023). Thus, early detection of forest fires and rapid first response will be very effective in preventing and responding to forest fires (Ateşoğlu et al., 2016; Akay et al., 2020). At this stage, some physical measures come to the fore. Forest fire break roads and fire lanes are important in firefighting (Hasdemir et al., 2009; Gralewicz et al., 2012; Stefanović et al., 2016). Forest fire break roads and fire lanes to prevent the spread of covered or naked fire by utilizing natural and artificial obstacles before the fire break out. Due to their cost and maintenance difficulties, they are mostly constructed in forest areas with high fire hazards. They are built to establish a defense line in firefighting. They serve as a starting point for the backfire application. They also act as a mechanical fire barrier and provide transportation access (Stefanović et al., 2016; Mostafa et al., 2024). In short, they are used to prevent the spread of fire, reduce intervention costs, and minimize damage (Küçükosmanoğlu, 1987; Hasdemir and Küçükosmanoğlu,

1991; Enez, 2002; Beguš and Pertlik, 2017; Akay et al., 2020). However, forest fire roads and lanes (fire safety roads and lanes), although very effective structures in firefighting, can also create some negative ecological effects. These effects can affect the integrity and functioning of forest ecosystems both in the short term and in the long term. For example, Alternative methods (e.g. green fire lanes, use of natural barriers, keeping lanes to a minimum width) may help reduce these impacts (Demir et al., 2009). As of the end of 2020, a total of 5,295 km of forest fires have broken roads and fire lanes have been built in Turkey, and it is estimated to increase by 2023 (Anonim, 2021).

Forest fires, a major threat to forestry management, can abruptly alter forest structure and management based on their functions. Therefore, despite the importance of forest fires, people do not have complete knowledge about the practices and facilities for firefighting and prevention (Güngöroğlu, 2013; Kuklina et al., 2020). The Eighth Five-Year Development Plan prioritizes the construction of firebreak roads, the deployment of equipped fire teams, and the use of land vehicles, helicopters, and aircraft. It also emphasizes training to raise awareness among villagers and those living near forests for fire prevention (Anonim, 2000). However, in the Eighth Development Plan, forest fires were not considered under disasters, and other disaster management was included (Anonim, 2000). Ensuring the sustainability of forests is directly proportional to the awareness of the benefits of these facilities. It is thought that increasing people's knowledge about these facilities will create positive pressure on planners and decision-makers in institutions related to the protection of forests. Scientific studies indicate that forest fire break roads and fire lanes are very important in preventing and fighting forest fires. This study highlights that forest roads and fire lanes significantly influence wildfire activity and control tactics. They serve as fuelbreaks and firebreaks, aiding in safer and more effective wildfire management (Cui et al., 2019; Carta et al., 2023; Hongsheng and Weizhao, 2025). One of the applications frequently used in firefighting and frequently defined in terms of informing the public about forest fires is the application of backfire. "Backfire" is a fire that is started by experienced personnel in a planned manner in the opposite direction of the wind towards the fire that is advancing on lines such as fire safety roads, streams and access roads in order to eliminate the flammable load along the line of the fire. This method is a method used especially in large fires and in cases where residential areas and facilities are at risk, to extinguish and control the fire by eliminating the flammable load in the path of the fire. Roads also help fire management by facilitating fire observation and prevention operations, supporting access to and exits from fire areas, providing safer places for the terrestrial extinguishing organization to intervene in the fire, and enabling conscious fire operations such as backfire or controlled burning with indirect tactics. (Thompson et al., 2021) In order for these applications to be carried out quickly and correctly, it is necessary for technical staff and other personnel to be trained, experienced and have sufficient equipment (Bilgili et al., 2021). However, it is necessary to raise awareness of the importance of forest fire break roads and fire lanes among people who directly and indirectly benefit from the products and services provided by

forests and to increase their awareness about the importance of forest fire break roads and fire lanes. In this context, this study aims to determine society's level of knowledge about forest fires, break roads and fire lanes, which play an important role in preventing and combating forest fires and increase public interest in the subject. Thus, by increasing the level of knowledge of society about forest fire break roads and fire lanes, it will be possible to use these facilities effectively with proper planning and management.

2. Material and Methods

Kastamonu central district and rural neighborhoods of the central district were selected as the study area (Figure 2). Kastamonu province is located in the western part of the Black Sea region of Turkey. The total Kastamonu central district population is 152.011. The framework of the research was created as follows H1: The hypothesis of the research is that the knowledge and perception levels of the people of Kastamonu Central district about forest fire safety roads and lanes vary according to demographic structure and H0: The knowledge and perception levels of the people of Kastamonu Central district about forest fire safety roads and lanes do not differ according to demographic structure.

The study's data were obtained through surveys prepared to determine the purpose of the study. Apart from this, some secondary data sources were also utilized. The questions aim to determine the demographic structure of the participants and their level of knowledge about forest fires and forest fire break roads and fire lanes. The survey application was carried out as a face-to-face interview method. The face-to-face survey method is accepted as a method that provides a very high response rate and speed in answering, and also allows observation (Ayyıldız and Toksoy, 2002).

The population of the research area is 152.011 people, according to 2023. The sample size for the survey was found by using the formula $n = (Z^2 \times N \times P \times Q) / [(N \times E^2) + Z^2 \times P \times Q]$ (Kurtuluş, 1982; Orhunbilge, 1997; Yavuz, 2007) In the formula; n; Number of people to be surveyed, Z; Confidence coefficient (95%→1.96%) N; Main mass subject to sampling (376377) P; Probability of presence of the characteristic to be measured in the main mass, Q; 1-P E; Accepted sampling error (0.1). To calculate the maximum number of surveys, the Q value was taken as 0.5. Accordingly, the sample size was determined to be 97 people. In the research, the villages in the central district of Kastamonu were considered rural areas. In this context, 39 surveys were conducted in the city center, and 58 surveys were conducted in rural areas by proportioning the number of surveys to the Kastamonu central district and rural neighborhoods of the central district population.

It was determined that the data obtained from the survey did not show a normal distribution. In this case, to determine the differences between the groups, Chi-Square, which is a non-parametric test, correlation in cases of relationships with each other, and Likert Scale, which is a perception scale, were analyzed. During the survey application phase, a preliminary interview was conducted with the participants, and necessary explanations were made in general.

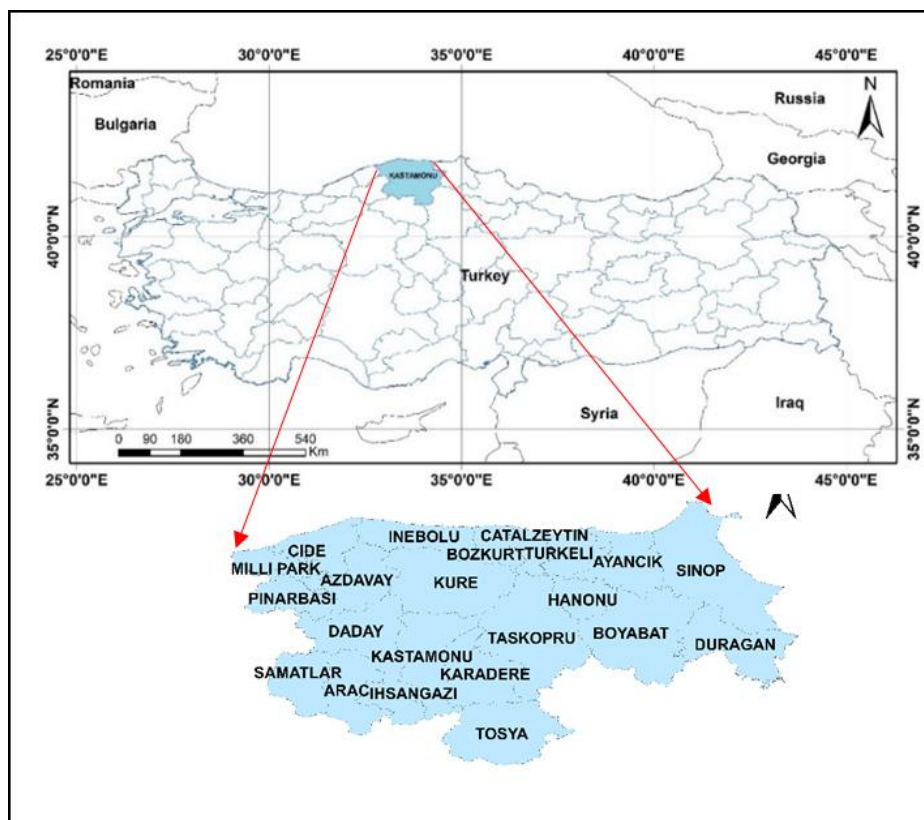


Figure 2. Geographical location of Kastamonu Province

Table 1. Some information on the individuals participating in the survey

Gender		Age groups					Education				
Female	Male	18-24	25-34	35-44	45-64	65 over	Literate	Primary school	Middle school	High school	University
44	53	10	18	10	42	17	3	36	14	12	32

3. Results and Discussion

3.1 Economic, sociological and demographic characteristics of the participants in the study

To determine the level of knowledge of society about forest fire break roads and fire lanes, which play an important role in preventing and fighting forest fires, 45% of the participants were female, and 55% were male. When the age ranges were analyzed, 10 people (10%) between the ages of 18-24, 18 people (19%) between the ages of 25-34, 10 people (10%) between the ages of 35-44, 42 people (43%) between the ages of 45-64, and 17 people (18%) over 65 participated in the study. Regarding educational status, it was determined that 3 people (3%) were literate, 36 people (37%) were in primary school, 14 people (14%) were in secondary school, 12 people (12%) were in high school, and 32 people (33%) were university level.

The study assessed societal awareness and knowledge of forest fire break roads and lanes in forest fire prevention. A chi-square test was used to analyze differences between the Kastamonu central district and the rural neighborhoods of the central district. As a result of the analysis, it was determined that

there was generally no significant difference between individuals participating from Kastamonu central district and rural neighborhoods of the central district. But just “What are the Causes of Forest Fires?” In the question, it was determined that there was a statistically significant difference between the Kastamonu central district and the rural neighborhoods of the central district ($p < 0.05$, bold colored part in p column). As a result of the analysis conducted in the Kastamonu central district, 84.6% of participants stated that the cause of fires was temperature, while 100% of participants living in the rural neighborhoods of the central district stated that it was people-caused (Table 2).

3.2 Evaluations on public perceptions regarding forest fire break roads and fire lanes

The findings of the study on awareness and knowledge of firebreak roads and lanes in forest fire prevention among Kastamonu central district and rural neighborhoods of the central district residents are presented below. First, this section gives perceptions and opinions about forest fire break roads and fire lanes (Table 3).

Table 2. The relationship between the place where the survey (Kastamonu central district and rural neighborhoods of the central district) was conducted and other variables

Survey question	Place where the survey was conducted (Kastamonu central district and rural neighborhoods of the central district)	P
What are the causes of forest fires?	Kastamonu central district -Temperature	0.004
	Kastamonu central district - People	0.032
	Kastamonu central district	Terror 0.871
	Rural neighborhoods of the central district	
Do you have information about forest fire break roads and fire lanes?	Kastamonu central district	0.579
	Rural neighborhoods of the central district	
Are forest fire break roads and fire lanes installed in places with high fire risk?	Kastamonu central district	0.354
	Rural neighborhoods of the central district	
Can a different application be made instead of building forest fire break roads and fire lanes?	Kastamonu central district	0.683
	Rural neighborhoods of the central district	
Are forest fire break roads and fire lanes harmful to forests and nature?	Kastamonu central district	0.263
	Rural neighborhoods of the central district	

Table 3. Perceptions and opinions on forest fire break roads and fire lanes by profession groups

Profession groups	Do you have information about forest fire break roads and fire lanes?		Are the maintenance and standards of forest fire break roads and fire lanes? Important?		Are forest fire break roads and fire lanes successful in firefighting?		Are forest fire break roads and fire lanes installed in places with high fire risk?					
							Yes		No			
	N	%	N	%	N	%	N	%	N	%	N	%
Farmer	2	18,2	9	81,8	11	100	11	100	11	100	0	0
Trade	0	0	3	100	3	100	3	100	3	100	0	0
Forest worker	2	50	2	50	3	75	4	100	3	75	1	25
Retired	0	0	12	100	10	83.3	12	100	10	83.3	2	16.2
Officer	0	0	15	100	14	93.3	15	100	14	93.3	1	6.7
Student	3	42.9	4	57.1	7	100	7	100	7	100	0	0
Housewife	4	11.8	30	88.2	34	100	34	100	34	100	0	0
Other	4	36.4	7	63.6	10	90.9	11	100	10	90.9	1	9.1
Total	15	15.5	82	84.5	97	100	97	100	92	94.8	5	5.2

Table 3 shows that 84.5% of participants lacked knowledge of firebreak roads and lanes, while 15.5% were informed according to occupational groups. However, it was determined that there was no statistically significant difference between occupations. It is seen that 50% of the forest laborer occupational group has and needs more information. Interviews revealed that forest workers involved in the creation of firebreak roads and lanes are knowledgeable on the subject. However, forest workers not employed in this field do not know the subject. Based on this table, people need information about forest fires, breaking roads, and fire lanes. In the study conducted by Kuklina et al. (2022) and Emiroğlu and Bayır (2022), it is stated that people have insufficient knowledge about the importance and effects of forest fire break roads and fire lanes, and the issue is not sufficiently kept on the agenda. The results obtained agree with the study of Bilgili et al. (2021) and support the results of this study.

All participants answered 'important' to the question 'Are Maintenance and Standards of Forest fire Break Roads and Fire Lanes Important?'(Table 3). "Notably, a difference emerged in responses after participants were informed about firebreak roads and lanes during the survey. "There were different approaches as to why it is important. The two most frequently mentioned approaches were that the road would become forested without maintenance and that the road would deteriorate due to reasons such as animals or natural disasters (72%). Participants also

stated that if the forest fire break roads and fire lanes, which are used to slow down the fire speed, are inadequate, the fire can quickly spread across. In the study conducted by Demirtaş and Çiçek (2011), which had similar findings, the majority of the public recognized the importance and effectiveness of forest fire break roads and fire lanes. However, some participants stated that the maintenance of forest fire break roads and fire lanes is inadequate and should be checked regularly. Laschi et al. (2019) stated in their study that the construction and maintenance features that should be taken into consideration in order to ensure the continuity of an effective forest road network and fire roads against fires are extremely important. Also, they expressed that a not well-maintained forest road is not an efficient forest road, and it represents a useless economic and environmental cost.

As shown in Table 3, all participants responded 'successful' to the question, 'Are Forest fire break roads and fire lanes successful in protecting forests from fire?'. Although no statistically significant difference was found between different professional groups in their responses, this uniform agreement indicates a general understanding and acknowledgment of the effectiveness of these infrastructures. This outcome suggests that informational and awareness-raising efforts regarding forest fire prevention have been effective, as participants from various occupational backgrounds recognize the critical role of firebreak roads and lanes in forest protection.

94.8% of the individuals participating in the study think that forest fire break roads, and fire lanes should be planned where the risk of fire is high. The rate of those who disagree with this is 5.2%. Due to cost, maintenance challenges, and ecological impact, it is more feasible to prioritize areas with high fire potential for firebreak roads and lanes. Those who answered 'no' argue that forest fire break roads and fire lanes, adversely affecting the forest ecosystem by causing fragmentation. The participants also pointed out that no forest fire break roads and fire lanes in areas with high fire risk, but they are difficult to access due to their topographical structure.

3.3 Social responsibilities and awareness

Questions were also asked to determine the participants' level of knowledge about forest fires. The distribution of the answers to the question about the causes of forest fires is given in Table 4.

Table 4. What are the causes of forest fires?

Causes of forest fires	N	Percent (%)
Temperature	66	39.5
People	94	56.3
Terror	7	4.2
Total	167	100

As seen in Table 4, in the question 'What is the reason for the outbreak of forest fires?', among the answers of temperature, human, and terrorism, human (56%) is the most prominent answer, followed by temperature (39%). As can be understood from this, the participants think that humans are the most influential factor in forest fires. For this reason, it should be ensured that the effects of people causing fires should be reduced by focusing on education and awareness activities on the human factor, which is seen as the most important cause of forest fires. In this way, it can be ensured that people know the actions and sanctions for causing forest fires specified in the forest law numbered 6831 against factors such as not leaving garbage in forests, disposing of flammable wastes correctly, and making controlled fires. Özden et al. (2012) examined the causes of forest fires in Antalya Forestry Regional Directorate. As a result, as in the country as a whole, 44.6% of the causes of forest fires in Antalya Forestry Regional Directorate are negligence, carelessness and accidents, 34.2% are intentional. That is, they stated that the vast majority of them are human induced. When the reasons that push people to burn forests are examined, rural poverty, high land yield in some regions, need for new land for agricultural activities, need for land for tourism facilities and extensions, carelessness, imprudence, hostility, and human behavioral patterns are seen. Moreover, these areas can be designed as education and behavior change areas that will raise people's awareness about forests in general and forest fires in particular and can be offered to the public (Coşgun et al., 2023).

Table 5. What are the causes of forest fires by profession groups?

Professional groups	Participants' answers		
	People	Temperature	Terror
Farmer	11	3	0
Trade	3	2	0
Forest worker	4	4	0
Retired	11	4	2
Officer	14	13	0
Student	6	4	1
Housewife	34	26	2
Other	11	10	2
Total	94	66	7

The factors considered by the participants as the causes of forest fire break roads are given in Table 5. According to this table, the high number of housewives among the occupational groups is because they are women. In this context, women are thought to be more aware of climate change and human-caused fires than men.

The relationship between occupational groups in the selection of human and temperature factors as the cause of forest fires was determined by Chi-square analysis (Table 6).

Table 6. The relationship between professional groups in the selection of people and temperature as the cause of forest fires (Chi-square Analysis)

Within Professional Group	People		Temperature				Total	
			Yes		No			
	N	%	N	%	N	%	N	%
Farmer	11	11.7	3	4.5	8	25.8	11	11.7
Trade	3	3.2	2	3	1	3.2	3	3.2
Forest worker	4	4.3	4	6.1	0	0	4	4.3
Retired	12	11.7	4	6.1	8	25.8	12	11.7
Officer	15	14.9	13	19.7	2	6.5	15	14.9
Student	7	6.4	4	6.1	3	9.7	7	6.4
Housewife	34	36.2	26	39.4	8	25.8	34	36.2
Other	11	11.7	10	15.2	1	3.2	11	11.7
Total	97	100	66	100	31	100	97	100

Table 6 shows that the fact that the participants think that the cause of forest fires is human induced is unrelated to their profession. Only 3% of the participants did not specify the human factor as the cause of forest fires. While 32 participants stated it was related to temperature, 68% did not mention temperature. There is a statistically significant difference between the occupational groups and thinking that temperature is influential among the causes of forest fires. As shown in the table, the majority of homemakers attribute forest fires to temperature, likely due to their greater sensitivity to climate change, given their dependence on nature for their livelihood. In addition, Arora-Jonsson (2011) conducted a study titled 'Women, Gender, and Discourses on Climate Change. Global Environmental Change' by Arora-Jonsson, S. (2011) states that women are more vulnerable to the effects of climate change and therefore have more awareness. Participants were asked about the feasibility of a different application instead of building forest fire break roads and fire lanes in combating and preventing forest fires (Table 7).

Table 7. According to occupation, are any methods applied in fighting and preventing forest fires?

Professional group	Can a different application be made instead of building forest fire break roads and fire lines?				Total	
	No		Yes		N	%
	N	%	N	%		
Farmer	10	90.9	1	9.1	11	100
Trade	3	100	0	0	3	100
Forest worker	3	75	1	25	4	100
Retired	12	100	0	0	12	100
Officer	15	100	0	0	15	100
Student	5	71.4	2	28.6	7	100
Housewife	33	97.1	1	2.9	34	100
Other	8	72.7	3	27.3	11	100
Total	89	91.8	8	8.2	97	100

According to Table 7, 91.8% of the participants stated that only forest fire break roads and fire lanes could be used to fight forest fires, while 8.2% stated that other methods could be used. Analysis of occupational groups reveals a statistically significant difference in views on firebreak roads and lanes as a sole method for combating forest fires ($p < 0.05$). As seen in the table, students and those in other occupational groups have information about forest fire break roads and fire lanes. This is due to students and other occupational groups being more active on social media and having closer ties to the social environment, allowing them to access more information on current issues (Cesur and Bulut, 2023; Öner and Koruklu, 2020). Participants reported that individuals in other occupational groups are informed about firebreak roads and lanes due to their voluntary involvement in firefighting in recent years. For this reason, it is thought that they learned while helping fire-extinguishing efforts (their awareness increased).

Table 8. Are forest fire break roads and fire lanes harmful to forests and nature

Survey question	Likert scale mean
Forest fire break roads and fire lanes fragment the habitat of animals.	3.63 \cong 4
Forest fire break roads and fire lanes spoil the visual landscape/scenic beauty.	3.97 \cong 4
Forest fire break roads and fire lanes transform forests into a fragmented structure.	3.97 \cong 4
Forest fire break roads and fire lanes, reducing the durability of forests and causing damage to wind, tornadoes, etc., making them more vulnerable to disasters.	3.79 \cong 4

The participants were asked whether forest fire break roads and fire lanes damage forests and nature, and, if so, what these damages might be (Table 8). According to the 5-point Likert scale analysis result, it was evaluated as 1: I disagree, 2: I partially disagree, 3: I am undecided, 4: I partially agree, 5: I agree. The participants partially accepted that forest fire break roads and fire lanes harm nature (3.84 \cong 4). However, they also stated that forest fire break roads and fire lanes should be built in areas with high fire risk. As it can be understood from here, people are aware that the effects of forest fires on roads and fire lanes on nature, so they have adopted the idea that they should not be built in every area.

4. Conclusion and Recommendations

As a result of the study, the H0 hypothesis was accepted as correct. The public's knowledge of forest fire break roads and fire lanes could be more robust. The participants stated that they need more knowledge about what these facilities are, how they function, and their effectiveness in terms of fire prevention. However, they also underlined that raising awareness of the participants would lead to practical results in the correct planning of forest fire break roads and fire lanes.

On the other hand, the study also shows that society knows that forest fire break roads and fire lanes can harm nature when built in the wrong places. Participants stated that no wrong constructions should damage the forest ecosystem, destroy natural habitats, or negatively impact biodiversity. Considering these results, forest fire break roads and fire lanes can be helpful with proper planning and site selection. For this reason, various measures should be taken to protect the natural environment and minimize negative impacts while constructing such roads. In this way, the protection of natural areas can be ensured along with adequate fire safety measures.

This study has shown that increasing society's knowledge level is important. Training programs, campaigns, and informative materials can be organized to inform the public, raise awareness, and explain the functions of forest fire break roads and fire lanes. The General Directorate of Forestry should also include the subject of these issues in the training or seminar programs. In addition, a meticulous planning and management process is required to ensure that these structures do not damage nature. Authorities must ensure that forest fire break roads and fire lanes are designed harmoniously with natural areas and are effectively maintained.

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