الجمهورية الجزائرية الديموقراطية الشعبية

People's democratic republic of Algeria

University Setif 1 Farhat Abbas

Faculty of Natural and Life Sciences

DEPARTMENT OF ECOLOGY AND ENVIRONMENT

N°...../SNV/**2026**

Final research dissertation for

Master's degree in:

Field: Ecology and Environment

Speciality : Ecology

Presented by :

Fenouche Imane

Community Awareness, Preparedness and Response Capacity of Forest Fires in Algeria

Publicly defended on 23/06/2026

Jury members:

President: **Dr. Khaznadar Mouna** **MCA-UFA Sétif 1**

Examiner: **Ghit Karima** **MCB-UFA Sétif 1**

Supervisor: **Dr. Moghli Aymen** **MCB-UFA Sétif 1**

2025/2026

Content:

Acknowledgment…….……III

Dedication……..……...IV

الملخص…….……VIII

Abstract……..……...IX

Resumé……..……X

List of figures……..……..…XI

List of tables……..……..XII

List of abbreviations……...……....XIII

General Introduction……..……..…1

Chapter I: Bibliographic part……..…5

I.1. The fire hazards in the Mediterranean landscapes……...……..…6

I.2. Forest and wildfires situation in Algeria……...……...7

I.3. The main causes of forest fires…….……...…….9

I.3.1. Natural causes …….……...……9

I.3.2. Human causes……..……...…9

I.3.3. Socio-Economic Factors……..…….……9

I.4. Impact of forest fires on ecosystems….……..…….……9

I.4.1. Ecological and environmental impact….……...……..……..9

I.4.2. Socio-Economic impact……...……..…..12

I.5. Community awareness and prevention…….……..……13

I.6. Preparedness and response capacity…….……..15

I.7. Survey-based assessment of community awareness and capacity……..……...16

I.8.Objectives and hypotheses…….…16

Chapter II : Materials and Methods…….....….18

II.1. Study area …….……..…….19

II.1.1. Location ……..……...19
II.1.2.Natural Vegetation…….....19
II.1.3. Climate…….……..……21
II.1.4. Soils……..…….…….22
II.2. Methods……..……..…….22
II.2.1. survey diffusion……..……...…….23
II.2.2. Data analysis……..…….23
II.2.3. Limitations of the study methodology……..……..26
Chapter III: Results and discussion ……..……...…....……...…26
III.1. Spatial distribution of survey respondents ……..27
III.2.Composite indices of community awareness, preparedness and response capacity ……..…….……..……..31
III.3. Awareness and Knowledge Index (AKI)…….…..…….……...24
III.4. Risk Perception and Attitude Index (RPAI)……..…….34
III.5. Preparedness Index (PI)…….…….….36
III.6. Response Capacity index (RCI)…….…….39
III.7. Experience Severity Index (ESI)…….……..…..…41
III.8. Relationships among the composite indices……..….....…43
III.9. Wildfire resilience index (WRI)…….…….49
Chapter IV : General Discussion……...……..…..……....….....52
Conclusion……..……...……..…….57
References ……..……...……..60

الملخص

تمثل حرائق الغابات أحد أهم التهديدات البيئية في الجزائر، خاصة في المناطق الشمالية التي تتميز بوجود أنظمة بيئية غابية واسعة .و لتقييم مستوى وعي المجتمع والاستعداد و قدرات الاستجابة تجاه حرائق الغابات في الجزائر تم الاعتماد على الاستبيان الالكتروني حيث وزع على مشاركين من عدة ولايات جزائرية، وتم تحليلها باستخدام مجموعة من المؤشرات التي تقيس مدى الوعي والمعرفة و إدراك المخاطر والاستعداد والقدرة على الاستجابة مع الخبرة السابقة مع الحرائق .تشير النتائج التي توصلنا إليها أن المشاركين يمتلكون مستوى متوسطا من الوعي وإدراك المخاطر في حين كانت قدرات الاستجابة العملية والخبرة المباشرة مع الحرائق اقل نسبيا وذلك لكون اغلب المشاركين من مدينة سطيف .كما تؤكد هذه الدراسة على أهمية تعزيز برامج التوعية والتدريب وتحسين التنسيق بين الجهات الأمنية المعنية والمجتمعات المحلية بما يساهم في رفع مستوى الجاهزية والحد من آثار حرائق الغابات مستقبلا وتعزيز صمود المجتمعات المحلية في مواجهة هذه الظاهرة المتزايد.

الكلمات المفتاحية: حرائق الغابات, وعي المجتمع , الاستعداد, القدرة على الاستجابة, ولاية سطيف, الوقاية من الحرائق, الجزائر.

Abstract

Forest fires represent one of the most significant environmental threats in Algeria, particularly in the northern regions characterized by extensive forest ecosystems. To assess the level of community awareness, preparedness, and response capacity regarding forest fires in Algeria, an online questionnaire was distributed to participants from several Algerian provinces. The collected data were analyzed using a set of indices measuring awareness and knowledge, risk perception, preparedness, response capacity, and previous wildfire experience. The results indicate that participants generally demonstrated a moderate level of awareness and risk perception. However, practical response capacity and direct experience with forest fires were relatively lower, which may be explained by the fact that most respondents were from Setif Province. This study highlights the importance of strengthening awareness and training programs, as we'll as improving coordination between the relevant authorities and local communities. Such efforts can contribute to enhancing preparedness, reducing the impacts of future forest fires, and increasing community resilience to this growing environmental challenge.

Keywords: Forest fires, Community awareness, Preparedness, Response capacity, Setif Province, Fire prevention, Algeria.

Résumé

Les incendies de forêt représentent l'une des menaces environnementales les plus importantes en Algérie, en particulier dans les régions du nord caractérisées par de vastes écosystèmes forestiers. Afin d'évaluer le niveau de sensibilisation, de préparation et la capacité de réponse de la population face aux incendies de forêt en Algérie, un questionnaire en ligne a été diffusé auprès de participants issus de plusieurs wilayas du pays. Les données recueillies ont été analysées à l'aide d'un ensemble d'indices mesurant le niveau de connaissance et de sensibilisation, la perception du risque, la préparation, la capacité de réponse ainsi que l'expérience antérieure des incendies de forêt. Les résultats obtenus montrent que les participants présentent un niveau moyen de sensibilisation et de perception du risque. En revanche, la capacité de réponse pratique et l'expérience directe des incendies demeurent relativement faibles, ce qui peut s'expliquer par le fait que la majorité des répondants provenaient de la wilaya de Sétif. Cette étude souligne également l'importance de renforcer les programmes de sensibilisation et de formation, ainsi que d'améliorer la coordination entre les services compétents et les communautés locales. Ces actions permettraient d'accroître le niveau de préparation, de réduire les impacts futurs des incendies de forêt et de renforcer la résilience des populations face à ce phénomène en constante augmentation.

Mots-clés : Incendies de forêt, sensibilisation communautaire, préparation, capacité de réponse, wilaya de Sétif, prévention des incendies, Algérie.

GENERAL INTRODUCTION

Forests are among the world's most valuable terrestrial ecosystems and provide a wide range of provisioning, regulating, supporting, and cultural ecosystem services. These include the production of timber, food, and fuel; water regulation and soil conservation; nutrient cycling and carbon sequestration; biodiversity conservation; climate regulation; ecotourism; and cultural and spiritual values (Aznar-s et al., 2018) Forests also have substantial economic and social value, supporting the livelihoods of millions of people worldwide through the provision of raw materials, employment opportunities, and ecosystem-based goods and services(FAO,2020). However, these ecosystems are increasingly threatened by both natural and human-induced disturbances, including overexploitation, land degradation, drought, invasive species, and wildfires.

In recent decades, both the frequency and intensity of wildfires have increased significantly (IPCC,2021). Reports from the UNEP (2022) indicate that these increasing trends are driven by a combination of natural and anthropogenic factors, including land-use changes, and climate change. According to the IPCC (2019) The latter have emerged as one of the major drivers of the increasing risk of wildfires. Rising temperatures, prolonged drought, and extreme weather conditions contribute to vegetation drying, thereby increasing fuel flammability and enhancing fire ignition and spread potential (IPCC,2019).The IPCC (2021) highlights strong evidence linking climate change to the growing occurrence and severity of wildfires worldwide. Consequently, many regions (e.g., the Mediterranean basin) are experiencing more frequent, larger, and more severe fire events than in the past, posing substantial challenges for ecosystem resilience, human safety, and land management.

In recent years, there has been growing global emphasis on the role of communities in disaster risk reduction, particularly in fire-prone regions. Community-Based Disaster Risk Reduction (CBDRR) has emerged as an important approach that promotes the active participation of local stakeholders in identifying hazards, assessing vulnerabilities, and implementing mitigation and preparedness measures. This approach aims to strengthen local capacities and improve resilience by directly involving communities in prevention planning, early warning systems, and emergency response strategies (Piece, 2012 ; UNDP,2010). Evidence shows that community engagement can significantly reduce fire incidence, improve response time, and limit fire spread, especially in rural and forested landscapes where institutional response may be delayed (FAO, 2011; UNDRR, 2019).Furthermore, awareness campaigns, training programs, and participatory fire management initiatives contribute to behavioral changes that reduce risky practices such as agricultural burning, unattended fires, and improper waste

disposal. Prepared communities are also more likely to develop local fire brigades, establish communication networks, and coordinate with authorities during emergencies. These collective actions enhance adaptive capacity and reduce vulnerability to increasingly frequent and severe wildfires under climate change conditions (IPCC, 2021). Therefore, improving community awareness, preparedness, and response capacity is essential for effective wildfire risk reduction and for strengthening the resilience of socio-ecological systems in fire-prone regions.

In the Mediterranean Basin, Algeria is considered one of the countries most affected by wildfires, particularly in its northern forested regions characterized by dense vegetation, steep terrain, and strong human pressure. Over the past decades, wildfire activity in Algeria has increased in both frequency and severity, causing substantial ecological, economic, and social impacts. Large fire events recorded in recent years have resulted in extensive forest loss, damage to infrastructure, and, in some cases, human casualties, highlighting the growing vulnerability of forest landscapes and rural communities. In this context, community awareness, preparedness, and response capacity become critical components of wildfire risk reduction in Algeria. Many fires originate near inhabited areas, agricultural lands, and the wild land–urban interface (WUI), where human activities play a central role in both ignition and early suppression. Therefore, informed and prepared local communities can significantly contribute to reducing fire occurrence through safer land-use practices, early detection, and rapid alert to authorities.

Despite the increasing occurrence of forest fires in Algeria and the growing recognition of community participation in wildfire risk reduction worldwide, limited research has evaluated the level of public awareness, preparedness, and response capacity of Algerian communities. Understanding these aspects is essential for identifying existing gaps and developing effective community-based wildfire management strategies adapted to local socio-ecological conditions. In this study, our main research objective is the assessment of the Algerian community awareness; preparedness, and response capacity. For this we asked the following question:

I. What is the level of community awareness regarding forest fires in Algeria ?
II. How prepared are local communities to prevent and respond to forest fires?
III. What are the main factors affecting community response capacity?
IV. What are the limitations of current awareness and preparedness strategies?

The document is divided into four chapters where the first chapter describe, through review research, the problematic of forest fires in Algeria, and the basic concepts of community

awareness, preparedness and response capacity toward forest fires. The second chapter describes the material and methods used to respond to our research questions. The third chapter results and discussion and a fourth chapter provide possible solutions and suggestions based on our results.