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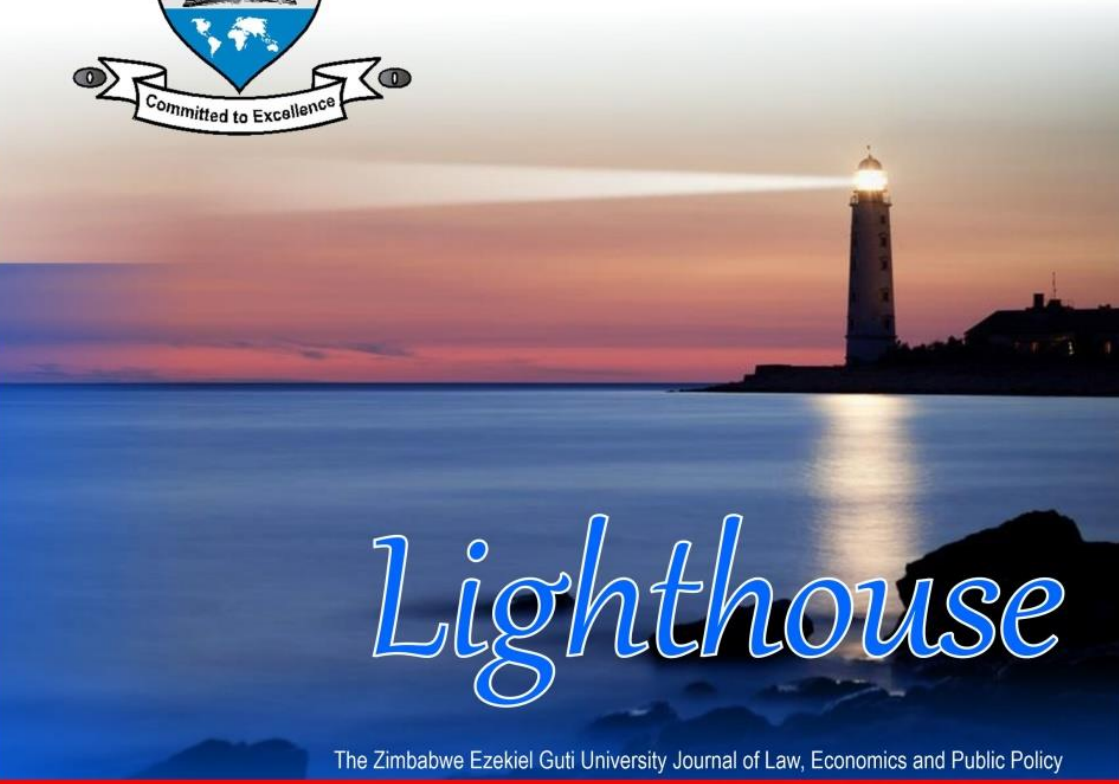

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The Perennial Problems of Forest Fires in North America and Australia: Lessons for Policy-making and Design

NOTION MANZVERA[1], BEATRICE HICKONICKO[2] AND NYASHA NDEMO-MASIMBARASI[3]

Abstract

The article is based on a study that discusses the perennial problems of forest fires in North America and Australia, presenting lessons for policy-making and design. Wildfires present problems in the North American (the United States and Canada) and Australian regions as they continue to cause huge losses in ecosystems, vegetation and loss of human life. The problem in the study is that the bushfires continue to claim human life and indigenous ecosystems causing the invasion of the landscape by flammable invasive plants that worsen the bushfires leading to the increase of climate change. The study uses a qualitative approach with a bias towards a case study research design. The research employs secondary information as the data collection method. Thematic analysis is used as the data analysis method. The study findings reveal that the impacts of forest fires are on the ecosystems and the hydrological systems that are affected, worsening climate change. The study concludes that the responses to forest fires have shown a lack of preparedness and eagerness to erase the industrial cities in favour of smart cities in the rebuilding. The study recommends the systematic technological integration of machines in risk disaster management.

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Keywords: flammability, climate change, smart cities, ecosystems, disaster management, hydrological cycle

INTRODUCTION

Severe air pollution generated by forest fires across the globe is becoming an increasingly frequent public health management problem (Johnston *et al*. 2014). As climate change increases, conditions favourable to severe fires, population living in fire prone areas are expanding, especially on the urban fringes. Deliberate landscape burning is conducted to protect property and infrastructure from extreme events (Flannigan *et al.,* 2009; Mooney *et al.,* 2016; Calkin *et al.,* 2019). The North American boreal forest has been described as a biome that frequently burns in natural lightning-ignited forest fires (Lloret and Zedler, 2009). Prior to the mid-19th century, fire cycles have varied from 30 to 130 years in Canada's boreal forests (Chen *et al.,* 2010). The general view is that climate dictates that the areas burned annually, at least in remote areas such as the boreal forests of North America (Wallenius *et al.,* 2011). It has been suggested that as a consequence of climatic warming, fires have and will continue to become more frequent. It could be the reason for the increase in the area burning annually, as seen in the fire statistics (Flannigan *et al.,* 2006; Soja *et al.,* 2023). Climate change has led to warmer conditions and high-risk fire weather in Australia and North America.

There is a small body of public health addressing the health impacts of the severe forest fire smoke (Johnston *et al.,* 2014). Public health officials often need to generalise from the wider urban particulate air pollution and health literature to guide major decisions about public health protection, that is, whether or not to evacuate a community in response to sever smoke (Page *et al.,* 2008). However, there is an oversight in this approach as particulate air pollution and forest fire smoke have different compositions and different duration

and severities of exposure (Chen *et al.,* 2019). Smoke includes hundreds of aerosolised compounds of both elemental and organic numerous carbon organic and inorganic gases and other toxins, including metals and free radicals (Naeher *et al.,* 2007). Through time, these chemicals mix, depending on combustion conditions and, as compounds react with each other, great public health threats emerge. The extreme pollution from severe forest fires contribute to hospital admissions, exacerbations of respiratory illnesses and excess mortality over large demographic areas (Delfino *et al.,* 2009; Do Carmo *et al.,* 2013). There are health outcomes associated with forest fires which can create long-term problems for communities exposed to prolonged pollutants from the fires.

Spies *et al.* (2018) asserts that perennial forest fires continue to present challenges as larger and more intense wildfires cause prolonged smoke, affecting human health, causing chronic soil erosion and mass wasting, degrading water supplies and loss of cultural and natural resources. Prolonged forest fires cause increased greenhouse gas (GHG) emissions and reduced carbon storages (Chen *et al.,* 2017). The greatest impact of the uncharacteristically frequent fires is the transition from native sagebrush-perennial grass communities to invasive, non-native annual highly flammable grasslands (Crist *et al.,* 2023). These community transitions are permanent, owing to low probability of re-establishing native perennial plants in non-native annual grass-dominated communities (Balch *et al.,* 2013). The problem in the study is the impacts of climate change and human actions that cause forest fires in the Australian (State of Victoria, New South Wales, Queensland) and North American (United States and Canada) forests. The forest fires create various problems from vegetation to human health outcomes and associated environmental effects. It is against this background that the study looks into the wildfires' impacts on both the environment and human life.

The research examines the perennial impacts of wild forest fires in the North America (the United States and Canada) and Australia (State of Victoria, New South Wales, Queensland), human life. The study analyses perennial impacts of the wild forest fire on the environment and wildlife. Perennial forest fires expose human, the environment and wildlife to challenges that can cause irreversible change. The study is significant as it can add to existing literature the impacts of forest fires on human health and psychological impacts which can likely emerge. The research can also add important aspects and analysis on permanent problems which perennial wildfires can bring to the environment. The study is important in that it brings lessons to policy frameworks on forest fires. The study outline starts with an introduction, conceptual framework, a literature review, followed by the methodology. The study then presents the findings, discussion of the findings and, finally a conclusion and recommendations. It is against the backdrop of the human and environmental problems associated with the forest fires that the study undertakes to provide a deeper an understanding on the topic and lessons for policy-making and design.

CONCEPTUAL FRAMEWORK

The study uses the concept of disaster risk. The term 'disaster' is conceptualised as event concentrated in time and space during which social systems undergo severe losses to an extent that the fulfilment of its essential functions is hindered (Chen *et al.,* 2015). For the poor, unpredictable disaster variables such as forest fires, present a risk that can critically restrict options and so limit livelihoods, creating lasting psychological impacts (IPCC, 2021). Bushfire disasters are intertwined with various variables such as climate change and availability of flammable regiments of vegetation. The disasters from bushfires affect various sectors of society and its institutions. Livelihoods, ecosystems and wildlife are impacted, affecting sectors such as tourism and destroying the survival of endangered species (Diakakis *et al.,* 2021).

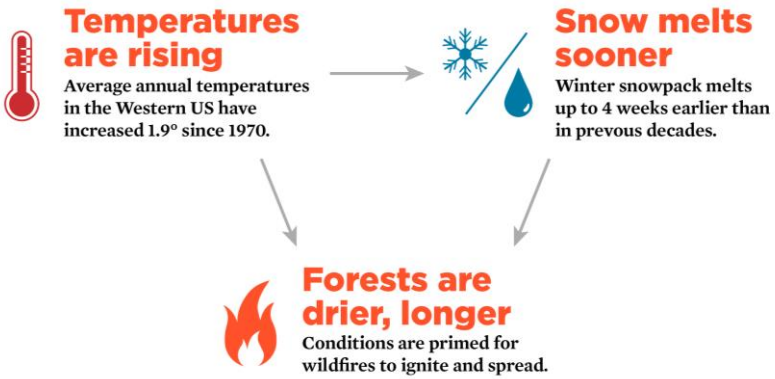
Disasters are economic burdens for the government, impacting the country's social security and exacerbating poverty, leading to the creation of welfare states (Dorsouma, 2023). Disaster risks undermine sustainable development as they result in the loss of life, vegetation and cause health complications, leading to the over-burdening of healthcare systems (Mavhura, 2019). Disasters result from insufficient capacity to reduce the potential negative impacts of hazards (Benson, 2016). This perspective involves varying magnitudes of variability, some groups of people in some nations suffer increased damages and loss when faced with similar shocks that some countries reduce through preparedness and capacity-building. It can then be argued that disasters from forest fires require preparedness and understanding of what has worked elsewhere to build capacity against disasters.

Climate change is creating hotter and drier conditions around the globe which increase the frequency and severity of fires (Ryan *et al.*, 2021). In Australia in the Black Summer of 2019-2020, bushfire seasons were marked by extreme heatwaves, droughts and massive lightning that started the fires (Bowman *et al.*, 2021). These fires affect the livelihoods of people and the national economy as the tourism sector also suffers. Bushfires affect social systems as these lead to displacement of people and communities (Murphy *et al.*, 2013). The bushfires affect social systems through the provision of social protection and the need for the restoration of communities and repeated fire occurrences in the same area disrupt livelihoods and traditional ways of life (Fule *et al.*, 2020).

CONCEPT OF CLIMATE CHANGE AND BUSHFIRES

The conceptual framework is on how climate change risks and disasters cause bushfires. The framework shows how the bushfires affect social systems by crippling communities' ways of life. They affect countries by impacting the social protection for poor communities affected by the fires. It can then be argued that there is

a relationship between disaster risks and bushfires as they push communities to avert the risk by digging into their social security.



LITERATURE REVIEW

This section of the study presents the history of the forest fires in the North America and Australian regions to show the impact they have had on the environment, wildlife and human lives.

Fire is the major stand-renewing agent for much of the circumboreal forest zone, greatly influencing structure and function (Flannigan *et al.*, 2006). Current estimates are that an average of 5-15 million hectares burn annually in boreal forests, primarily in Siberia, Canada and Alaska and there is a growing global awareness of the importance and vulnerability of this region with respect to future climate change (Stocks *et al.*, 2002). Fire activity is strongly influenced by four factors: weather or climate, fuels, ignition agents and human activities (Johnson 1992; Swetnam 1993). Climate and associated weather are dynamic due to changes in the earth's orbital parameters, solar output and atmospheric composition (Chen *et al.*, 2017). The earth has been warming as a result of increases of radiatively active gases, carbon dioxide methane, in the atmosphere

caused by human activities (IPC, 2001). The warming has profound impacts on fires as it can cause increases in the burning of forest areas in the boreal forest.

In North America, plant invasions have been found to be one of the main causes of fire regimes recognised as a threat to biodiversity and other natural resources (Brooks *et al.,* 2018). In the desert regions of North America, invasive plants have altered fire regimes that, in many cases, have resulted in large-scale conversions of native plant communities to invasive plant dominance (D'Antonio and Vitousek 1992; Brooks *et al.,* 2004). Transformation to exotic annual grass dominance is affecting not only native plant species, but also human safety in the wildland-urban interface due to increased fire frequency and production of ecosystem services such as forage (Davies *et al.,* 2011). Bradley and Webb (2013) estimate that aboveground carbon storage decreases 3 -to 30-fold with conversion of sagebrush plant communities *Artemisia spp*. is an obligate and facultative wildlife species that utilise these plant communities as habitat. The disappearance of native plant species leads to the emergence of the exotic plants that fuel fires in the forests in North America, resulting to loss of ecosystem and carbon sequestration chances.

In sagebrush communities, maintenance of established perennial bunchgrasses has been shown to play an important role in limiting annual grass expansion (Chambers *et al.,* 2011). Large-scale efforts unfold every year to restore perennial grasses following fires, particularly on low-elevation sites, typified by Wyoming big sagebrush (*A. tridentata ssp*. Wyomingensis Beetle and Young) plant communities (Boyd *et al.,* 2020). The US Department of Interior (USDI) budgets for these expenditures have been US$14-90 million annually and total annual wildland fire appropriations, including suppression and fuels management, are measured in billions of

dollars (USDI, 2012). These figures are poised to increase as grasses continue to expand, especially under future climate scenarios of drier and warmer conditions, fires will become more frequent (Fule *et al.,* 2020). Fires cost billions of dollars in controlling them and the post-disaster restoration also costs huge sums of money that makes them costly for countries in North America. Most of the focus of the impacts of these fires have been on the ecosystem and the wildlife. These also have impacts on human lives and habitation as large fumes cause respiratory problems for communities living in huge forests.

Australia is the most fire-prone continent and country on earth. In any year, numerous fires burn hundreds of thousands to millions of hectares of savannas, grasslands, bushland and forests (Bryant, 2008; Bowman *et al.,* 2021). There is a concern that climate change is diminishing the capacity of fire-adapted vegetation to recover following wildfires (Davis *et al.,* 2021). Climate change can increase the frequency and severity of wildfires due to hotter and drier conditions which also reduces the post-fire recovery due to lower vegetation recruitment and growth (Enright *et al.,* 2015). Climate-driven changes to historical fire regimes may lead to ecological transformations on a broad scale, including ecosystem replacement, reduced carbon storage and changed nutrient and hydrological cycles (Bowman *et al.,* 2020). These ecologically transformative fires often involve complex interactions between different types of disturbances, potentially increasing landscapes flammability and fire occurrence (Keeley *et al.,* 2019).

In Australia, for instance, logging has rendered landscapes more prone to severe fires (Willis, 2005; Lindenmayer *et al.,* 2020). The enormous east coast 2019-20 fires in native Eucalyptus forests resulted in canopy scorch and consumption (Bowman *et al.,* 2021; Poulos *et al.,* 2018). Wildfires have been the cause of damages to the ecosystems in the Aboriginal areas. This has led to human and wildlife suffering.

Wild fires are a common natural disaster in Australian Eucalyptus forests to which flora and fauna are highly adapted (Murphy *et al.,* 2013). Eucalyptus forests are renowned for their tolerance of frequent fires because of post-fire resprouting and prolific seedling (Poulos *et al.,* 2018). Most Eucalyptus species have well-developed adaptations to resist and recover vegetatively and sexually from fire, although there are a few obligated-seed species, typically of wet forest nature (Bowman *et al.,* 2021). The wild fires are damaging the Australian forestry, causing losses in resources through damage control measures and post-disaster recovery efforts that continue to cost billions of dollars for governments and communities. The wild fires are exposing hydrological cycles to changes due to increase of drier conditions, which can lead to more climate change and wild fires that can impact the environment and life within North America and Australia.

RESEARCH DESIGN AND METHODOLOGY

This section presents the research methodology, encompassing the study design, data collection methods and data analysis methods. The study used a qualitative research methodology. The appeal of the qualitative research approach in the study is its non-numerical data assessment that garners ideas and insights that the study required in terms of apathy (Wang *et al.,* 2017). The study had a bias towards a case study research design. It required the capturing of complex and inimitable portent, i.e. the perennial problems of forest fires in North America and Australia, presenting lessons for policy-making and design the multiple perspectives and dimensions of phenomenon (Zainal, 2016).

The data were collected using secondary information: Google Scholar articles, newspaper articles and website information. The advantage of using secondary information is that it allows for longitudinal analysis of trends in the areas of study. As noted by Pederson *et al.*, (2020), secondary data helps answer both descriptive and analytical

questions, therefore, the approach provides answers to the research questions.

The study uses thematic data analysis for the study findings and understanding their meaning while categorising them. As noted by Dawadi (2020), the allure of thematic data analysis is that it is easy to learn as it does not require advanced statistical knowledge or detailed theoretical knowledge.

FINDINGS

This section presents the findings of the study and the case study of the recent wild fire in the United States of America, to understand the impacts of the wild fires on communities and environments. The World Wildlife Fund (WWF) Australia (2021) asserts that the 2019-20 Australian bushfire season or Black Summer, was one of the most intense and catastrophic fire seasons recorded in Australia (State of Victoria, New South Wales, Queensland). North America is the third largest continent on earth, after Asia and Africa. It is home to 23 countries extending from the Alaskan islands chain in the northwest to Panama in Central America, with 592 million people (Worldometer, 2025). These two regions have been greatly affected by bushfires, causing impacts on social systems of the countries affected.

Kiely *et al*. (2024) observe how during the Black Summer, up to 19 million hectares were burnt, with 12.6 million hectares, primarily forests and woodlands and a huge number animals were impacted by the blazes. The fire started between October 2019 and February 2020. Hundreds of fires burned in the south-east Australia, affecting 3.5 million people, peaking in December and January (Wintle *et al.*, 2020). Brew *et al*. (2020) note that the Australian 2019-2020 bushfires were unprecedented in both their extent and intensity, causing a catastrophic loss of habitat, animal and human life. The severity of the 2019-2020 bushfire was prompted by a decrease in

rainfall and increase in temperatures (Oldenborgh *et al.,* 2020). This has greatly affected the tourism sector in terms of social systems as the ecosystem and all the inhabitants are affected.

In addition, Parks *et al*. (2018) observe how wild fires have become more frequent and bigger across the western United States, affecting many ecosystem processes such as vegetation succession trajectories, carbon emissions and nutrient cycles. Li *et al*. (2021) note that the increase of fire activities on the North American landscapes has impacted land cover, resulting in loss of native habitats and increases in plant invasion. Fuhlendorf *et al*. (2017) observe how sagebrush ecosystems that provide critical habitats for sagebrush-associated wildlife species (e.g. sage grouse), have been reduced by fire activities over the years due to increasing land area damage. Parks and Abatzolglou (2020) have observed how one of the greatest long-term problems created by the bushfires in North America has been soil burn. Fires in North America affect the ecosystem greatly, impacting wildlife, tree and vegetation species. Exotic invasive plants can fuel the fires and, also some of the grass acts as fuels to the fire.

The immediate impact of the bushfires included the destruction of almost 6 000 buildings and the deaths of 37 people and a huge number of other terrestrial vertebrates (Arnold *et al.,* 2021). Oldenborgh *et al*. (2020) observe how there have been 34 fatalities as a direct result of the bushfires and the resulting smoke caused hazardous air quality adversely, affecting millions of residents in the affected areas. Kiely *et al*. (2020) note that wild fire smoke exposure is associated with terminal respiratory illnesses and morbidity on people in Australia. *The Washington Post* of 1 December 2020 carries a story that in New South Wales, the long-term effects of the wild fires of 2019-2020 saw a spike in emergency room visits for asthma and breathing problems, as the fires exacerbated the vulnerability of people with pre-existing health challenges. Brew *et al*. (2020) state that people continue to be affected by the fires psychologically as

the losses of property and life continue to raise mental health issues after wild fires. The long-term problems caused by bushfires in Australia have been mental health challenges, the continuation of loss of human life and the exacerbation of the respiratory challenges for people due to the inhalation of smoke.

CFA (2021) asserts that the 2019-20 Victorian bushfires resulted in the loss of lives, more than 400 homes and 6 800 livestock and forestry resources, such as native timber assets, critical animal habitats and water catchments. The bushfires continue to cause loss of wildlife in Australia and this has also caused the loss of indigenous ecosystems, being replaced by exotic ecosystems that worsen wild fires (Godfree *et al.,* 2021). Brew *et al.* (2020) observe how wild animals lose their lives in wild fires and livestock continue to be lost in Australia after every wild fire as bushfires are having an economic impact, including substantial insurance claims. The wild fires long-term problem is that bushfires wildlife and livestock are lost, affecting tourism and agriculture in Australia.

The Black Summer bushfires of 2019-2020 in Australia cost billions of dollars through the restoration of the environment, insurance claims and tourism revenue lost (Ahmed *et al.,* 2023). *Prevention Web* of 13 December 2021 carries a story that the bushfire cost Australian agriculture $5 billion, the cost included the building of more fire-resilient farm structures. The National Emergency Management Agency of 24 August 2024 carries a story that the Australian Government announced the Black Summer Bushfire Recovery Grants Programme with a $2.2 billion fund to help in the recovery and build-back process

The Australian Public Service Commission (2022) observes that the government was coordinating the logistics of large evacuations, protecting the health and safety of communities and providing financial assistance. Parrott *et al.,* (2021) allude that the

Government of Australia used the zoo-based conservation in the wildlife triage: rescue, welfare of endangered species and fundraising during and after the fires. Brown (2021) observes that the Government of Australia responded through the development of triage protocols: emergency response kits, emergency enclosures and expanded new captive breeding programmes. The government responded through restoration and care provision methods to help the affected communities and wildlife. Ryan *et al*. (2021) observe how the government responded with policies that manage bushfires such as the land management policy, firebreaks and restrictions on outdoor fires.

Furthermore, the bushfires had an impact on social systems in North America, with tourism sector and livelihoods suffering the most. Parks *et al*. (2014) argue that soil burns affect wildlife as habitats for most animals are destroyed, affecting the tourism sector with huge losses for the North American region. Mueller *et al*. (2020) allude that in Canada, fire has had impacts on the economy, as every year there is need for evacuations costing CDN $283 million. Disaster Philanthropy (2024) observes that in California, a fire damaged 1 433 properties in 2024, causing injuries to emergency workers and civilians. The loss of property due to fires in North America is coupled with health impacts of smoke inhalation by the people. This affects the social policy as the countries end up facing the need to intensify social security against the losses from bushfires and natural disasters.

THE CASE OF LOS ANGELES

Los Angeles is the second most populous city in the US, after New York City, with a population of millions people located in California (Macrotrends 2024). The BBC News (9 January, 2025) carries a story on wild fires ripping across Los Angeles, leading to 10 deaths, burning down hundreds of buildings and prompting evacuation orders for tens of thousands across the county. The *Financial Review* (9 January, 2025) has a story that Los Angeles has been plunged into its worst

natural disaster in decades as wild fires, driven by a hurricane-strength wind impacted its economic to the tune of around US$92 billion. *The Sydney Morning Herald* (11 January, 2025), reports that houses and 11 people in Malibu have been lost to the fire. The impacts of the fires in Los Angeles have been economic losses, human life loss and the loss of vegetation and carbon sequestration in the area.

The Sydney Morning Herald (*ibid.*) has a story that the impact of the fire in Los Angeles is the psychological scars that people will have to live with due to the losses and the false evacuation messages sent by an automated alert system that the authorities have promised to solve. AccuWeather (2025) observes that insurers are bracing for billions of dollars in potential claims. The US President, Joe Biden, declared the fires a major disaster and the US government would reimburse 100% of the recovery for the next six months. BC of 11 January 2025 has a story that the warning system has been automatically sending evacuation messages to people that are far away from the danger of the fire. This shows the challenge presented by the use of technology in disaster and risk management, indicating complications in actor-network relations.

The Financial Review (9 January, 2025) says that there has been a lack of preparedness in the US as fire fighters reported fire hydrants running out of water. *Info Wars* (11 January, 2025) carries a story that the shortcomings in the Los Angeles fire incident is not about lack of preparedness but industrial sabotage based on administrative terrorism as have been seen in Australia and Germany where globalists have influenced policies of post-industrial society, leading to the burning of the houses that employed the masses of people, meaning the impact of the wild fire is loss employment for poor people. The BBC News (9 January, 2025) reports that there has been uproar against the city's unpreparedness and treatment of delicate issues, such as the threat of loss of life and property as false alerts,

continue to be sent to people further traumatising them. The BBC (11 January, 2025) has it that even working fire hydrants would not have worked on the fire as they were carried by a hurricane that was moving fast. The CNN (11 January, 2025) carries a story that the wind speed of the fire prevented the city from deploying crucial aircraft that could have dropped water and fire hydrants. *Info Wars* (11 January, 2025) avers that the failure to switch off power by the Los Angeles authorities shows incompetence as the power lines increased the spread of the fire and the lack of releasing of water from the other reservoirs, instead of allowing it to go into the sea.

The findings of the study show that the forest fires cause turmoil and losses to vegetation, economic losses through the destruction of property, loss of wildlife and human life. The biggest loss that is caused by the wild fires is the loss of community solidarity as most societies face psychological and traumatic effects of these fires, causing people to disperse from disaster prone areas.

DISCUSSION

The study findings present the impacts of forest fires in Australia and North America. The study findings reveal that the forest fires' perennial problems are the destruction of vegetation as millions of hectares are burnt, reducing habitats of wildlife and burning the animals in the process. The fires destroy the vegetation, leading to the emergence of invasive plants that act as fuel to future fires due to their flammability. The tourism sector suffers more from the problems caused by fires as wildlife and vegetation, which attract tourists are lost in the process. The bushfires had a significant impact on the tourism industry during the Christmas season when industry is at its peak. Concurrent with the findings of the study are Li *et al*. (2022), who observe how wild fires impact the vegetation, causing challenges in the availability of native vegetation. The policy-making and design that can be made to help restoration in areas that bushfires affect is for country policy framework to push tourist and

visitors to visit the affected areas to fund the restoration and build-back.

The findings reveal that the bushfires; long-term problem is the emergence of diseases such as respiratory ailments and terminal illnesses for the elderly and younger populations are also affected. The emergence of the respiratory problems among the elderly burdens the country's healthcare system. The loss of property and family members can create psychological problems for people. Mental health challenges emerge from the bushfires, leading to countries losing billions of dollars in mental health provision to the victims. Lessons from this, is for health systems to be prepared every day for situations such as bush fires. Policy framework can be created around relief and recovery strategies, while strengthening resilience through equipping health care systems and fire departments with staff who can perform the task, rather than budget cuts, as this can cause psychological scars. The countries at the risks of bushfires can implement policy intervention to mitigate wild fire risks and protect public health.

The article reveals that the long-term impact of bushfires has been economic due to the loss of livestock and property. Bushfires create losses for insurance companies and citizens losing their uninsured properties. Wild fires expose families to vulnerabilities which they cannot spring back from. The study findings reveal that the US Government promised to reimburse its people the losses from the disasters. Findings indicate that bushfires' long-term impacts are economic losses for which governments must take steps to reconstruct people's lives. From the study, it is revealed that wild fires in recent times in the US have shown a lack of preparedness by the cities and the federal government, as there was a time that the fire hydrants failed to provide water due to the lack of power due to the power outage to protect firefighters. The failure of the warning

system presents the challenge on the use of technology disaster-risk management. The lesson that can be drawn is that the fire was travelling so fast in the US and the use of technologies such as planes and water carrying drones was not possible in this case, as there was no visibility. Firefighters could have also been lost or increased the number of lives lost.

The policy lessons from the fires are that countries that rely on nature-based tourism can prepare policies that set aside funding for technologies to help in the bushfire firefighting to preserve jobs and protect endangered vegetation and wildlife species. The policy implications of these findings are that people in communities that are susceptible to wild fires, must implement smart logistics through the use of renewable fuels, instead of fossil fuels that drive climate change. Lessons from the forest fire that can be drawn and implemented into the policy framework, include practical advice to people on how they can protect themselves from smoke exposure and provision of appropriate masks. The policy framework should improve on the availing of mental health on impacts of wild fire.

The discussion of the study shows that long-term impacts of wild fires are the destruction of vegetation, which can exacerbate climate change and future fires, as this causes the disappearance of native vegetation and replaced by flammable exotic species. The study discussion shows that bushfires cause loss of lives and terminal respiratory problems on people, especially the elderly and children. The study has shown that there is a lack of preparedness on bushfires as countries continue to grapple with containing wild fires every time they occur.

CONCLUSION AND RECOMMENDATIONS

The study concludes that wild fires are a result of nature and nothing can be done to stop them, but policies can be crafted to reduce their

impacts on the ecosystem and the wildlife. The impacts of the fires remain permanent in the memories of the victims and the reduction of the endangered wildlife and ecosystems, signifying the need for policies and mitigation strategies that reduce the impacts of fires. In a nutshell, one can say that the lack of preparedness to act to reduce the impacts of the wild fires is part of the UN popular agenda 2021 for a post-industrial society that has been characterised by defunding and de-industrialisation and, therefore, defunding for the fire departments.

Local governance in various cities affected by wild fires, exhibit dictatorial aspects by those in power as they have defunded and derailed the response systems to be under-performing in face of catastrophe. From incidents in the post-fire events, it it can be concluded that the lack of preparedness in the response to the fire shows intentional sabotage and negligence as indicated by the draing of the reservoirs and defunding of the fire departments, in the replacement of the industrial societies with smart cities. These averments show the failure of a system leading to lasting impacts on the environment, human lives and wildlife. In conclusion, the failure of the warning system presents a challenge for the human and machine relationship. This failure has policy implications on the safety of the use of artificial intelligence (AI) and other technological advancements in disaster management as it is creating psychological impacts on traumatised people.

The study advances the understanding of what has worked and failed during wild fires. The research recommends the creation of policies that fund rapid response and the opening of the reservoirs to affected areas. The study recommends the reduction of forests to reduce the spreading of wild fires. The study further recommends the federalisation of responses to wild fires to reduce local governance shortcomings. The study directs future studies to look into the use of drone technologies in the fire-fighting.

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