

Climate Changed

Adapting to the
Intensifying Threat of
Climate Change and
Fire Seasons.

**34**

lives lost

3,997,732

ha burned

2,051

livestock lost

66structures
destroyed**22**vehicles
destroyed**2,750**number of times
firefighting
teams were
dispatched

WILDLAND FIRES IN A CHANGING CLIMATE

As October came to an end, so did the 2024 winter fire season across South Africa's northern provinces, bringing a close to a period of intense fire activity and reflection. This season was characterised by record-breaking incidents where prolonged dry spells and rising temperatures intensified fire behaviour. Climate change is increasingly shaping South Africa's fire seasons, with warming trends and shifting weather patterns creating drier, more fire-prone conditions. This shift not only extends the fire season but also increases the frequency and intensity of fires, stressing the need for urgent action and adaptation.

The Working on Fire-Kishugu Joint Venture has been at the forefront of joint-organisational efforts to combat these escalating fire risks. Through our Integrated Fire Management Solutions, extensive resources, training, and strategic partnerships, we strive to mitigate fire impacts and build resilience in affected communities.

In this publication, we reflect on the lessons learned from the winter fire season, explore the science behind changing fire behaviour, and share how our teams are adapting to a rapidly evolving landscape. Join us in our commitment to save lives, and protect property, and the environment in the face of climate-driven fire threats.

Reflecting on South Africa's 2024 Winter Fire Season IN THE AGE OF CLIMATE CHANGE

Historically, South Africa's fire seasons are defined by rainfall, with a Winter Fire Season in the northern provinces and a Summer Fire Season in the Western Cape and western Eastern Cape. However, climate change is disrupting these patterns, with fires igniting earlier, lasting longer, and growing more intense. The July 2017 Knysna fires, one of the most severe winter wildfires in a province that usually faces a Summer Fire Season, exemplify how shifting climate conditions are altering traditional fire seasons.



The Influence of Climate Change on Fire Behaviour

Rising global temperatures, prolonged droughts, and erratic rainfall have dramatically altered fire dynamics. According to the IPCC, “Southern Africa has experienced a 1.5°C increase in average temperature since the early 20th century,” a higher rate than in many regions. Warmer temperatures dry vegetation more quickly, creating ample fuel for fires. Droughts in northern provinces like Mpumalanga and Gauteng further exacerbate this, reducing moisture levels and increasing fire risk (IPCC, 2021).

The Escalating Scale of Wildfires

In 2024, South Africa’s winter fire season saw unprecedented fire activity, with the Working on Fire-Kishugu Joint Venture responding to 2,354 incidents. This season also saw 34 tragic fatalities among firefighters and civilians. Mpumalanga recorded 477 fires, KwaZulu-Natal 390, and Limpopo 378.

South Africa’s experience mirrors a concerning global trend. UNEP warns that climate-driven increases in wildfire frequency and intensity form part of a worldwide pattern. Without action, wildfire frequency could double by the year 2100. Canada’s 2023 fire season burned over 17.5 million hectares, displaced 230,000 people, and generated smoke pollution reaching Europe. Fires in Greece, Algeria, and Hawaii caused additional fatalities, with Canada’s fires emitting an estimated 420 megatons of CO₂ - 27% of 2023’s global wildfire emissions (Natural Resources Canada, 2023).

The expansion of South Africa’s wildland-urban interface (WUI) has increased vulnerability to fires. Insufficient prescribed burns, essential for managing fuel loads, further elevate risks. UNEP stresses that “controlled burning is essential for reducing fuel loads in high-risk areas,” though regulatory and logistical challenges limit its use (UNEP, 2022).

From Suppression to Prevention

Mitigating these risks requires shifting from a suppression-focused approach to one prioritising prevention and resilience. The Wildland Fire Mitigation and Management Commission states, “investment in resilience strategies, advanced data analysis, and community engagement is essential for minimising fire impacts in a warming world” (Nature, 2023). South Africa’s WOF Programme champions these preventive methods, using Integrated Fire Management Solutions (IFMS) to conduct controlled burns, engage communities, and train locals to bolster resilience.

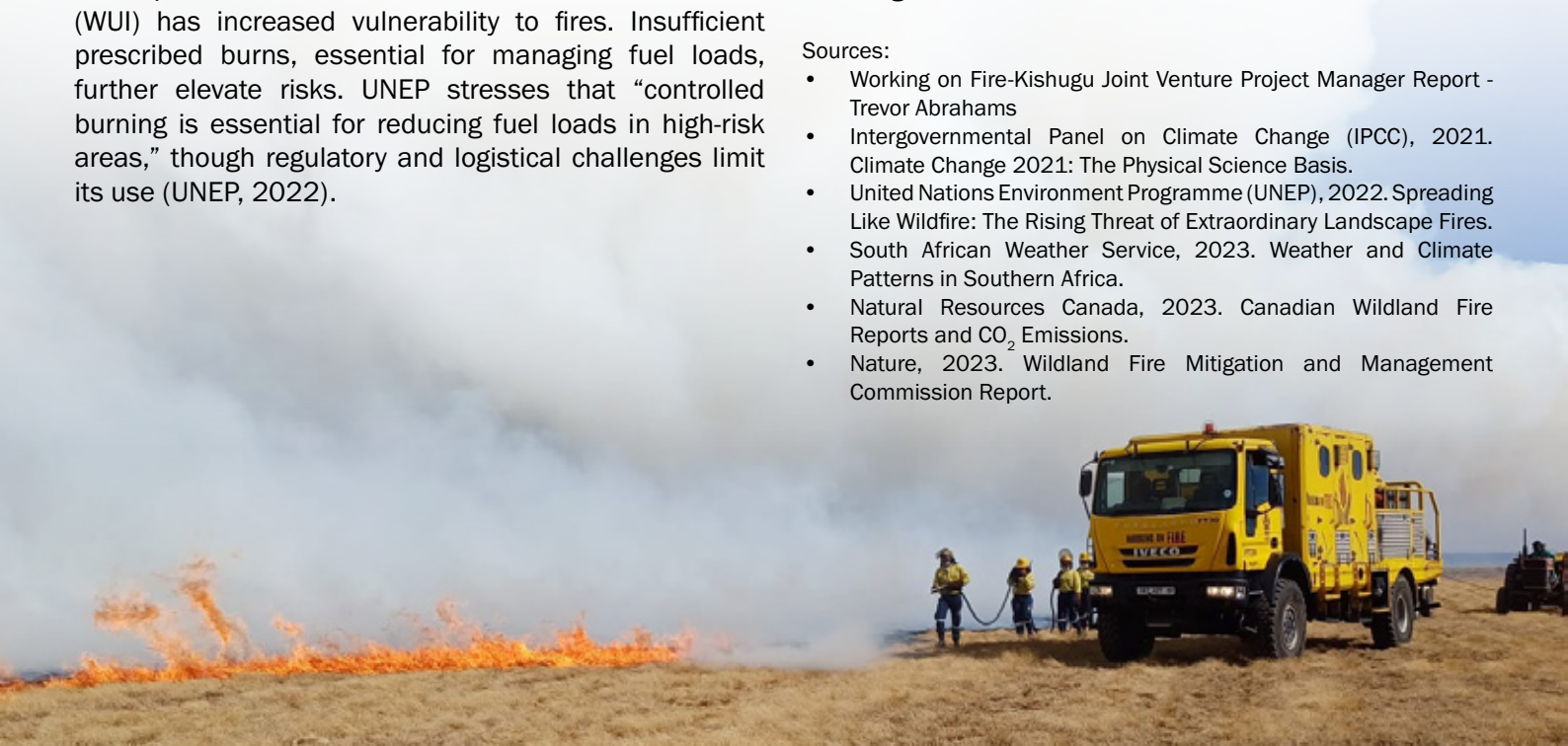
However, gaps persist in evacuation protocols and predictive technologies. Countries like Canada and the U.S.A use advanced fire modeling systems for better risk assessment and planning, yet such systems remain underutilised in South Africa. The National Institute for Disaster Management emphasises that “investment in predictive modeling and community strategies would significantly enhance South Africa’s preparedness and response to climate-driven fire risks.”

Urgent Action for a Changing Landscape

As climate change heightens fire risks, the Working on Fire-Kishugu Joint Venture is leading a shift toward prevention, community education, and policy reform to tackle escalating wildfire threats. In this era of intensified fire activity, collaboration through policy updates, research, and funding is essential. UNEP warns, “disaster fires are a global crisis unfolding,” emphasising the urgent need for coordinated action to mitigate climate-driven fire challenges worldwide.

Sources:

- Working on Fire-Kishugu Joint Venture Project Manager Report - Trevor Abrahams
- Intergovernmental Panel on Climate Change (IPCC), 2021. Climate Change 2021: The Physical Science Basis.
- United Nations Environment Programme (UNEP), 2022. Spreading Like Wildfire: The Rising Threat of Extraordinary Landscape Fires.
- South African Weather Service, 2023. Weather and Climate Patterns in Southern Africa.
- Natural Resources Canada, 2023. Canadian Wildland Fire Reports and CO₂ Emissions.
- Nature, 2023. Wildland Fire Mitigation and Management Commission Report.





ECONOMIC & AGRICULTURAL IMPACTS

of the 2024 Fire Season in Mpumalanga

South Africa's extended 2024 winter fire season has heavily affected the agricultural sector, particularly in Mpumalanga, who according to our records, have the highest fire activity. Wildfires have devastated resources and livestock, with Mpumalanga Umbrella Fire Protection Association Chairperson, Andre Scheepers, estimating a loss of nearly R21 billion. In addition to these financial losses, wildfires have disrupted regular farming operations, straining labour, equipment, and time resources.

Mpumalanga Disaster Declaration and Its Implications

In July 2024, the Mpumalanga Provincial Government declared fire-affected areas a provincial disaster in response to severe wildfires across the province. This declaration allows for the reprioritisation of budgets to provide immediate relief to impacted farmers and communities, as outlined in the Disaster Management Act. Comprehensive damage assessments will guide recovery efforts, with additional funding sought from the National Disaster Management Centre if necessary. This action by this province highlights the urgent need for proactive fire management strategies to mitigate future disaster risks.

Challenges in Firefighting Efforts

This season has presented unusual challenges, primarily due to extreme weather conditions. Winds up to 100 km/h severely limited firefighting effectiveness, as runaway fires overwhelmed existing firebreaks. As Agri SA Mpumalanga Executive Manager, Robert Davel explained, "Strong winds made it almost impossible to rely on firebreaks, as fires became uncontrollable under such conditions."

Proactive Measures for Future Resilience

Despite these obstacles, some landowners have successfully mitigated fire spread through well-planned prescribed burns. Davel advocates for a public campaign to promote fire prevention best practices, highlighting the importance of greater awareness and preparedness among landowners to help reduce future fire risks.



Gearing Up for an INTENSE SUMMER FIRE SEASON

As the South African Weather Service (SAWS) warns of an exceptionally hot summer, the Working on Fire-Kishugu Joint Venture (WOF-Kishugu JV) is preparing for a challenging Summer Fire Season, particularly in the Western Cape and the western region of the Eastern Cape. The forecasted high temperatures, exacerbated by a La Niña event, are expected to lead to more frequent and severe wildfires in these regions. These areas will officially enter their fire season on 1 December, bracing for extreme conditions that have already impacted surrounding areas during the winter months.

La Niña is characterised by cooler sea surface temperatures in the central and eastern Pacific Oceans, which influence global weather patterns. According to the National Oceanic and Atmospheric Administration (NOAA), La Niña typically brings increased rainfall to some areas while causing drier conditions in others. In South Africa, this phenomenon often results in above-average rainfall during the summer months, particularly in the eastern parts of the country. However, it can also lead to prolonged dry spells and higher temperatures in the Western Cape and the western Eastern Cape, creating ideal conditions for wildfires.

The recent rainfall linked to La Niña has intensified the fire risk. While the Western Cape experienced significant flooding during the winter, the Eastern Cape also faced fire-related challenges. The rainfall has also contributed to increased fuel loads, especially in fynbos vegetation, which is highly flammable. While rainfall is crucial for replenishing ecosystems, it can also lead to denser growth, further increasing the risk of intense fires during the hot, dry summer months. While rainfall is vital for ecosystems, it can create a hazardous fuel buildup, particularly in fynbos areas. This buildup can result in more difficult-to-control fires, highlighting the critical need for effective fire prevention strategies.

Given that much of the Western Cape is characterised by an urban interface, where residential areas adjoin natural vegetation, fire prevention methods are even more crucial. The proximity of homes to flammable vegetation increases the risk of wildfires threatening communities. The WOF-Kishugu JV is prioritising community awareness and engagement in fire prevention strategies, including

creating defensible space around properties, clearing vegetation, and implementing controlled burns to reduce fuel loads.

With an expected increase in thunderstorm-induced ignitions and relentless heat waves pushing the Fire Danger Index to critical levels, the WOF-Kishugu JV has prepared its crews for the challenges ahead. Understanding the physical and emotional resilience required to combat these extreme fires, we have ensured that ground and aerial crews undergo comprehensive annual refresher training. Delivered by the Kishugu Training Academy for the ground crews, this training emphasises stamina for long, arduous hikes, extended hours, and intense firefighting under high-risk conditions.

Dr. Christien Engelbrecht, the lead scientist for SAWS's long-range prediction team, notes that the summer season will bring "higher-than-normal" temperatures, with severe storms and damaging winds expected to further complicate firefighting efforts. "The interplay between extreme heat and the possibility of thunderstorms can create perfect conditions for fires to ignite," Engelbrecht explained (SAWS, 2024).

As climate change continues to reshape global weather patterns, the likelihood of large, multi-day fires in both the Western Cape and the western Eastern Cape has never been higher. These fires pose significant threats to natural habitats and communities, necessitating vigilance and preparedness. Through thorough training, support, and joint-organisational coordination, the WOF-Kishugu JV aims to save lives, livelihoods, and protect the environment during what is anticipated to be a daunting fire season.





PREPAREDNESS

in the Face of Intensifying Wildfires

With the increasing frequency and severity of wildfires driven by climate change, South Africa is facing longer, more destructive fire seasons. Combating these fires is not only costly but also perilous, demanding highly skilled firefighters and advanced aerial resources.

Insights from the 20th WOF Fire Management Symposium

The Working on Fire 20th Anniversary Symposium, held at Kruger National Park, convened leading fire management experts, scientists, and policy-makers to discuss strategies for managing wildfires in a rapidly changing climate. International voices, such as Kim Connors, Executive Director of the Canadian Interagency Forest Fire Centre, emphasised the importance of community resilience and cross-agency collaboration in tackling wildfire risks. Local experts highlighted key areas for improvement, including the need for updated evacuation protocols, more sophisticated technologies, and enhanced public awareness to bolster community preparedness.

This symposium highlighted the significance of coordinated efforts between municipalities, conservation agencies, and forestry organisations. These partnerships are essential to align with global fire management standards and protect both human communities and biodiversity from the escalating threat of wildfires.





Aerial Firefighting is Critical for Swift Action

At the recent 14th Fire Symposium hosted by Nelson Mandela University, Frank Smook, Responsible Person for Flight Operations at Kishugu Aviation, discussed the crucial role of aerial firefighting in wildfire management. Kishugu Aviation operates a fleet of about 35 aircraft, including Single Engine Air Tankers (SEATs) and helicopters, which are vital for quick response in hard-to-reach areas. Smook highlighted the potential of nighttime aerial firefighting, an emerging technique that requires advanced technology like Night Vision Goggles (NVGs) and infrared equipment. This innovation reflects the WOF-Kishugu JV's commitment to exploring all available methods to combat wildfires effectively.

Advanced Training for Modern Wildland Firefighting

A cornerstone of the WOF-Kishugu JV's fire management strategy is its specialised training programmes. Jeanette Relling, Quality Assurance Manager at Kishugu Training Academy (KTA), detailed the academy's modular training approach, designed to cater to the diverse needs of fire management professionals. The training covers essential roles, including incident commanders and fire behaviour analysts, with pathways for career development within wildland firefighting.

As urban expansion encroaches on fire-prone areas, the demand for specialised training is more urgent than ever. In addition to training professional firefighters, KTA programmes extend to landowners, lodge staff, and local communities, building a skilled network capable of preventing and responding to fires effectively.

Integrating Technology in Fire Management

The integration of cutting-edge technology in effective fire management is essential. Simulation-based learning and virtual reality (VR) are used to provide firefighters with safe, realistic training scenarios. Additionally, tools like drones and Geographic Information Systems (GIS) significantly enhance situational awareness during active fire incidents, allowing real-time fire mapping and data collection. Thermal imaging drones, in particular, provide invaluable data, improving coordination between aerial and ground teams.

Prioritising Health, Safety, and Community-Based Training

As fire seasons intensify, the health and safety of firefighters and the communities they serve are paramount. Relling emphasised the importance of Personal Protective Equipment (PPE), heat stress management, and mental resilience as core components of training programmes. Community-based initiatives, particularly in rural areas, are also essential for building local capacity and reducing reliance on formal firefighting teams. KTA's school-based fire awareness programme's and the WOF-Kishugu JV Fire Awareness Department instill a culture of fire safety from a young age, equipping future generations with the tools to manage fire risks effectively.

A Future-Forward Vision for Fire Management

Looking to the future, we are committed to aligning with global fire management standards and adopting sustainable practices. Partnerships with international fire management organisations, including those from Canada, Australia, and the U.S.A, ensure that South Africa remains at the forefront of wildfire management. By investing in prevention, preparedness, and innovative training methods, the WOF-Kishugu JV is building long-term resilience within South Africa's fire management framework. This comprehensive approach guarantees that, as fire seasons lengthen and intensify, we are prepared to save lives and protect the environment.



FIREFIGHTERS ON THE FRONTLINES:

Guardians Against
the Flames of
Climate Change

The importance of trained wildland firefighters cannot be overstated. These frontline climate change warriors possess the essential skills, knowledge, and physical resilience required to protect ecosystems, communities, and infrastructure. Without their expertise, the consequences of wildfires could be catastrophic, leading to loss of life, displacement, and devastating biodiversity loss.



WOF-Kishugu JV Addressing Wildfire Risks

The Working on Fire - Kishugu Joint Venture (WOF-Kishugu JV), with its extensive resources of over 5,000 firefighters stands as a pivotal force in wildfire risk management. This collaborative initiative has trained and deployed thousands of skilled firefighters, both locally and internationally. WOF-Kishugu JV's approach integrates prevention, community education, and post-fire rehabilitation through the Integrated Fire Management System (IFMS). This strategy has positioned South Africa as a global leader in wildland fire management, with successful deployments to countries like Canada, Chile, and Indonesia.

The Growing Demand for Skilled Firefighters

As climate change accelerates extreme weather patterns, including prolonged droughts and intense heat waves, the demand for skilled wildland firefighters is growing. The WOF-Kishugu JV projects a need for an additional 17,000 trained firefighters to keep pace with the increasing frequency and severity of wildfires in South Africa. In response, training programmes are evolving, focusing on

rapid response, a deeper understanding of fire behaviour, and the integration of modern technologies like drones and satellite data to improve firefighting tactics.

However, challenges remain. The full QCTO Occupational Certificate: Firefighter (SAQA 98991), which is the only SAQA-accredited qualification for wildland firefighting, is primarily geared towards structural firefighting. The lengthy 10-12 month programme, including a mandatory 10-week worksite component, can be a challenge for employers in terms of costs and productivity. Moreover, Wildland Firefighter is not yet officially recognised as a formal occupation in South Africa, leaving many employers to appoint staff with minimal firefighting training.

To address this gap, Kishugu Training Academy offers more accessible alternatives, such as the SAESI NFPA 1140 Wildland Firefighter 1 and 2 courses, and Wildland Fire Officer 1 and 2. These internationally recognised certifications provide a quicker and more efficient pathway for aspiring wildland firefighters, with Wildland Firefighter 1 taking just 10 days to complete, provided candidates meet the entry-level qualifications like Grade 12, First Aid Level 3, and Hazmat Awareness. This programme equips novice firefighters with the essential skills to operate confidently and safely on the fireline under experienced supervision.

Adapting to Climate Change and the Evolving Roles for Firefighters

As wildfires increasingly encroach on urban areas, firefighters are expanding their skill sets. Structural firefighting training is becoming essential to protect homes, commercial properties, and infrastructure from fire damage. With more extreme weather events predicted, firefighters may also need to broaden their emergency response capabilities. This includes rope rescue techniques for flood situations and confined space training for rescuing individuals from collapsed buildings.

Enhancing competencies in Incident Command Systems (ICS) tailored to South African conditions, along with updating current Incident Management Team (IMT) structures, is crucial for maintaining effective operations during fire events.

Diversification of Skills to Prepare for a Range of Emergencies

The rising frequency of climate-related disasters demands that wildland firefighters diversify their skill sets. Firefighters are now being trained for roles beyond fire suppression, including flood response, building rescues, and emergency medical assistance. This broadening of skills ensures that firefighters are well-prepared to respond to a variety of disaster scenarios, positioning

them as vital resources in protecting communities from a wide range of climate-induced risks.

Success Stories Highlighting the Value of Training

The value of comprehensive firefighter training is evident in several of our recent domestic and international deployments. In 2023 and 2024, our firefighters were deployed to Canada during some of the country's most severe wildfire seasons. Their expertise in managing large-scale fires and coordinating multi-agency efforts played a crucial role in preventing the spread of flames threatening both rural and urban areas.

In South Africa, the rapid response in 2022 to wildfires in the Cape Winelands saved thousands of hectares of vineyards, averting significant economic damage. These successes reinforce the critical need for continuous investment in firefighter training and preparedness, ensuring that communities are equipped to manage the growing threat of wildfires.

The Indispensable Role of Wildland Firefighters

As climate change intensifies its impact on our ecosystems and communities, the role of trained wildland firefighters has never been more crucial. Their expertise in fire suppression and emergency response ensures the protection of lives, property, and the environment, making them invaluable guardians against the escalating threat of wildfires.



A CALL TO ACTION

The recently concluded COP29 in Baku, Azerbaijan (11–22 November 2024), shone a spotlight on wildland fires as a growing global challenge exacerbated by climate change. With record-high global temperatures and extreme weather events disrupting lives worldwide, the conference stressed the urgent need to advance concrete solutions to tackle the climate crisis. Key discussions emphasised climate finance, with commitments to mobilise trillions of dollars to reduce emissions, protect livelihoods, and support countries' Nationally Determined Contributions (NDCs) ahead of their 2025 update deadline.

This deadline is critical under the Paris Agreement, where countries are required to submit updated climate action plans that incorporate new targets and strategies. These updated NDCs must reflect increased ambition to limit global warming to 1.5°C above pre-industrial levels, informed by the First Global Stocktake conducted in 2023, which assessed progress and identified gaps in meeting the climate goals

South Africa's delegation, led by the Department of Forestry, Fisheries, and the Environment (DFFE), called for stronger financial mechanisms to enable developing nations to implement ambitious climate actions, including adaptation strategies such as wildfire risk management. Minister Dion George highlighted the devastating impacts of climate change on South Africa, including severe wildfires, droughts, and floods, and reiterated the need for accessible and predictable funding.

The United Nations Framework Convention on Climate Change (UNFCCC) acknowledged wildfires are increasingly driven by climate change, highlighting the importance of embedding fire risk management into climate adaptation strategies. This approach aligns with the WOF-Kishugu JV which implements the WOF Programme funded by DFFE, which integrates wildfire response and resilience-building efforts to protect communities and the environment. Collaboration among governments, the private sector, and civil society remains critical to ensuring communities are equipped to address the escalating risks posed by wildfires.

Sources:

UNFCCC COP29 updates and outcomes

Department of Forestry, Fisheries and the Environment (DFFE)

DFFE Minister Dr. Dion George's COP29 statement

Communities Must Take Ownership of Fire Safety

Communities and residents are at the heart of wildfire prevention and preparedness. Actively participating in fire safety can save lives, and protect property, and livelihoods. Integrated Fire Management Solutions (IFMS) - our comprehensive approach that includes prevention, preparedness, response, recovery, planning, and management - empowers communities to mitigate the impact.

Zanele Nxumalo, our Head of Fire Awareness, stresses the importance of proactive community involvement, "Our fire awareness campaigns prepare communities for fire seasons by raising awareness about the associated risks, encouraging them to take responsibility for their wildfire risks, and fostering collaboration with key partners like Fire Protection Associations (FPAs), municipalities, and farmer associations."

These campaigns are multifaceted, with initiatives ranging from FireSafe workshops, fire safety education in schools, door-to-door outreach, radio talks, and social media campaigns to practical fire prevention measures such as clearing invasive alien plants and creating

firebreaks. We are combining education with actionable steps, ensuring a well-rounded approach to community safety.

Partnership with Santam

To extend the reach of these fire awareness initiatives, Santam, a leading short-term insurer, has partnered with the WOF-Kishugu JV. Together, we aim to educate communities on the severe risks posed by wildfires and the importance of early preparation and proactive actions. As climate change continues to exacerbate the threat of wildfires, these partnerships and collaborations are vital for boosting community resilience.

Always Ready to Respond to Wildfire Threats

The Working on Fire-Kishugu Joint Venture offers extensive resources, including trained firefighters, vehicles, and aerial support, to manage fires throughout South Africa during fire seasons. We urge all stakeholders - including Fire Protection Associations (FPAs), local governments, environmental organisations, landowners, and educational institutions - to unite in efforts aimed at prevention, awareness, education, and training.



Collaboration is Key

Actively engaging in fire safety education, supporting fuel load reduction, and investing in preparedness initiatives, can work to create a safer, more resilient South Africa and the world. Only through collaboration can we effectively save lives, and protect our communities, natural landscapes, and wildlife from the wildfire threat. By working together, we can ensure that fire management strategies evolve to meet the challenges of a changing environment, making a lasting impact for generations to come.

