THE KNYSNA FIRES 2017:
LEARNING FROM THIS DISASTER

A collaborative research report between Santam, the University of Stellenbosch and CSIR. Supported by the Western Cape Disaster Management Centre

The Knysna fires of 2017 have resulted in much deliberation about the ability to manage such extreme incidents and have led to numerous findings and subsequent reports on the event that has had such a disastrous impact on all involved. On the positive side, it has also resulted in indepth discussions, meetings and workshops on strengthening the weaknesses and building relationships in order to strengthen response during future incidents. One thing is certain and that is that this will occur again and we need to be ready.

The following article is an excerpt from the collaborative research report between Santam, the University of Stellenbosch and the Council for Scientific and Industrial Research (CSIR) and is supported by the Western Cape Disaster Management Centre. The article is printed with permission from Santam.

We used mostly the key points, recommendations and conclusion from the report but slightly rearranged so as to make for easy reading. The report is available for download from www.radar.org.za.

When extreme weather, drought and ignitions combine, as they did in the Knysna fires, all fire protection measures can fail and will do so in many cases. Nonetheless, prevention is critical to reducing the risk of severe and damaging fires. We can and must strengthen capacity to respond when fires occur but we must prioritise prevention and preparedness. Without effective fire protection measures, human lives, livelihoods and assets will be exposed to far greater and, often, eminently avoidable fire hazards, particularly given expected global environmental change. In addition,

the risks faced by those attempting to fight the fire or protect their properties are significantly increased because they are exposed to far greater fire hazards. The impacts on the resilience and recovery of the natural environments affected by these fires will also be significantly greater. The one beneficiary, so to speak, is the invading alien plants, which will multiply and create an even greater fire hazard if they are not dealt with promptly and effectively.

The costs of the Knysna fires to the town and its inhabitants illustrate the importance of implementing effective measures to reduce risk in the Garden Route and South Africa. The benefits of fuel reduction, from measures such as prescribed burning in rural areas outside the wildland-urban interface (WUI), to ensuring that firewood is not stacked against the walls of a house and gutters are clear of litter, far outweigh the costs. Everyone has a role to play in this and citizens need to realise their responsibilities and not place all the responsibility on fire management agencies. The insurance industry can play a critical role in supporting risk reduction and rehabilitation and recovery.

Purpose of report
The Knysna fires were a perfect storm. A range of meteorological, bio-physical and institutional factors came together to create the disaster. But the underlying risk drivers are replicated throughout the Western Cape and in other provinces, creating the potential for similar wildfires elsewhere, as evidenced by extensive wildfires in Hessequa, Mossel Bay, George and Knysna Municipalities in November 2018 and the Overberg in January 2019. The purpose of this report is to identify the lessons and

how they can be applied to reduce risk and strengthen preparedness for future fires when they occur. The focus is on the Knysna Fires but the findings are applicable to the Southern Cape and to many other places in South Africa that experience wildfires in their natural vegetation (CSIR 2019).

The research
As a first step in identifying lessons and enhancing learning, Santam commissioned three linked research projects aimed at improving the understanding of the pre-fire situation, the fire incident itself and the post-fire recovery efforts. The goal of this was to:
1. Assist authorities and communities to be better prepared for future wildfires to reduce impacts
2. Identify how the insurance industry can support fire reduction initiatives at an appropriate level
3. Through the understanding gained, prevent the harmful consequences of wildfires through improved implementation of integrated fire management, including mitigation interventions and supportive institutional arrangements.

This research was conducted by the Council for Scientific and Industrial Research's (CSIR's) Natural Resources and the Environment Operating Unit (NRE) and Meraka Institute, the Research Alliance for Disaster and Risk Reduction (RADAR) at Stellenbosch University and Stellenbosch University's Fire Engineering Research Unit (FireSUN).

The three research projects were designed to document and develop an understanding of:
• The fire behaviour and its causes or drivers (CSIR)

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- The human and institutional risk drivers that increased the impact of the fires (SU/CSIR)
- The unfolding incident, including the timeline of the incident and the actions taken by institutional role-players and members of the public (CSIR/SU)
- The impacts of the event, including social impacts and financial costs due to infrastructural damage and property losses (SU/CSIR)
- Post-fire recovery measures (SU/CSIR) and
- The potential for similarly damaging wildfires to occur elsewhere in South Africa (CSIR).

Fire in natural vegetation in South Africa

Most of the natural vegetation types of South Africa evolved with fire, burn regularly and require fires to keep them vigorous and healthy. Fire-adapted vegetation ranges from the Highveld grassland to the coastal grasslands in Zululand, from the savannas of the Lowveld to the Kalahari and the grassy Nama Karoo to the Fynbos. Fires in many South African vegetation types are therefore both necessary and inevitable. The question is "When?" not "If?" there will be fires. This means that fire management practices must seek to reconcile the ecological requirement for fire with the protection of human lives, a delicate balance that is at the heart of veldfire policy and legislation.

The key point here is that fires in many South African vegetation types, including fynbos, are both necessary and expected.

Mega-fires

The risk of fires and 'mega-fires' is increasing. Climate change is extending the fire season in southern Africa and owing to rising temperatures and the increasing number of high and extreme

fire-danger days. Although there is not yet a clear upward trend in fire frequencies locally or globally, there is evidence that fires are becoming more difficult or impossible to control.

Are fires increasing in South Africa?
A growing population and expansion of the urban footprint into flammable natural vegetation is increasing both the likelihood of fires and the number of people in harm's way.

There is an increased risk of wildfires in the future. Without change, we are likely to see more 'mega-fires' in the Western Cape and elsewhere in South Africa and associated deaths and destruction. While the changes associated with climate change are unavoidable, we can and should take steps to reduce the frequency and magnitude of damaging wildfires. This will require balancing the ecological need for fire with the protection of human lives. It will also require that the authorities, exposed communities and landowners take steps to reduce the severity of fires and their impact.

The Knysna fires – a perfect storm

The Knysna fires occurred at the intersection of an array of hydro-meteorological, bio-physical, institutional and developmental factors, which are in turn linked to ecological, legislative and institutional dynamics. This research also highlighted critical capacity constraints affecting both fire-risk reduction and fire-response operations. Although this combination of factors came together to drive a fire of rare severity and magnitude, a similar combination of factors could occur anywhere within the Garden Route or elsewhere in South Africa. Therefore, identifying, understanding and addressing these factors is critical to reducing the risk of such fires in the future.

Hydro-meteorological conditions

The Knysna fires occurred during circumstances that are associated with similar wildfires worldwide: dry conditions created by an extended and severe drought, hot and dry weather with low atmospheric humidity and very strong winds that shifted abruptly in direction and strength. The 18-month running mean drought index shows that the drought was the most severe on record but, although the fire danger index had high values, there were occasions during the past 70 years when the fire indexes reached the same or higher levels.

Exposure of communities, assets and infrastructure to the Knysna fires

Topography and dominant vegetation types, particularly invasive alien plants (IAPs) and commercial forests, have high fuel loads that helped to make the fires more intense and severe. Settlement patterns increased the destructiveness of the fires. Dwellings that were damaged or destroyed were concentrated in areas that were densely invaded with IAPs and commercial forests and many were located on slopes, which increase the speed of fire spread. These findings clearly highlight the need for more effective fuel reduction in the WUI and the application of measures aimed at protecting structures, including houses, from fires (and reducing the probability of ignitions and the consequent losses).

Surrounding vegetation

Having tree or shrub vegetation near dwellings increases the chances of them being damaged or destroyed. Homes that have cleared space or short vegetation around them are much less likely to be damaged or destroyed.

Susceptibility of homes to fire

The features of the Home Ignition Zone (HIZ) are critical in determining whether a home survives fire. Simple ways of improving the chances of a home surviving include:
- Moving fuel sources away from homes and ensuring that gutters and roofs are kept clear of flammable leaves and debris.
- Choosing materials that are more resistant to fire. Roofing is particularly important and homeowners should ideally avoid highly flammable materials, such as thatch or take precautions to make them more fire-resistant.

Reducing risk effectively requires collective action by all those living in exposed communities.

Inconsistent land management practices

Improved management of land is critical to reduce the threat of damaging wildfires.

Inadequate understanding of risk by landowners, sometimes inadequate capacity to undertake activities and government's limited capacity to enforce owners' legal responsibilities, as well as the cost of interventions, currently prevent strategic land management. Getting landowners involved in risk reduction is essential. This requires incentivising action and building enforcement capacities. The insurance industry could support risk reduction by encouraging policy-holders to manage their land more effectively and requiring them to join their local fire protection association (FPA).

The Southern Cape FPA and other FPAs can play an important role promoting risk reduction and coordinating the activities of landowners but they are critically under-resourced. The insurance industry and private sector more generally, could help to build FPA capacity.

Strategic prescribed burning is an important environmental management tool. However, the prospect of financial liability should a prescribed burn get out of control is a significant deterrent, thereby increasing the risk of damaging fires. Prescribed burning needs to be complemented by fuel reduction in the WUI. This includes the use of firebreaks, created by burning, brush-cutting or encouraging vegetation with low flammability.

Prevention and response capacities
There are a range of role-players involved in fire prevention and response, with non-governmental stakeholders helping to spread the load on government resources. This notwithstanding, municipal fire and rescue services lack the capacity to perform optimally, particularly at the district level. This is particularly problematic as it is district municipalities that are mandated to respond to wildfires. This again suggests a role for the private sector, including the insurance industry. They could play a role in building capacity through corporate social responsibility programmes, particularly with respect to vehicles and equipment.

Other settlements exposed to similar fire risk
Many settlements in South Africa are exposed to significant fire risks, a situation which needs to be addressed. The CSIR's Green Book project is aimed at helping municipalities to manage their natural environmental risks under a changing climate (www.greenbook.co.za). This included a fire risk assessment within a one kilometre buffer around 1 596 settlements across South Africa, based on the vegetation characteristics and the occurrence of veldfires. Fire occurrences

for 49 percent of these settlements were classified as 'likely' and 33 percent as 'possible', which means that parts of their boundary are regularly exposed to wildfires with sufficient fuel to potentially damage infrastructure at least once in every 10 to 15 years. In addition, about half of these settlements have at least 25 percent of their buffer areas in the high or extreme fuel load classes. In the case of Knysna, more than 85 percent of the area burnt fell into the high or extreme fuel load classes, a factor which undoubtedly contributed to the difficulty of controlling these fires and, via embers and spotting, to the very rapid spread of the fire.

Reducing the risk of future fires
Several dynamics contributed to the devastation caused by the Knysna fires, which included very hot and dry conditions, the concentration of assets and housing in high-risk areas, the vulnerability of dwellings, high fuel loads in many areas and limited capacities to either promote risk reduction or respond to fires. Given that a shift in climatic conditions and urban expansion is inevitable and existing resource constraints, the emphasis must be on reducing the risk of fires. In addition to the points highlighted above, the research suggests two critical areas for action:

Reducing risk through integrated fire management
Integrated Fire Management (IFM) is essential. Reducing the risk of serious fires can only be achieved at a landscape level, and requires action across a range of sectors, scales and interest groups. Municipalities have a critical role to play in reducing development in high-risk areas and Knysna Municipality is already taking steps to do this by re-working its Spatial Development Framework (SDF). Landowners and

homeowners also need to play their part, as do developers.

Building response capacity
It is important to boost the fire services' capacity to respond to fires, especially given the expected shift to promoting prevention in the amended Fire Brigade Services Act (FBSA). Prevention is critical at both the district and local municipal level but particularly at the district level, as it is the district service that is ultimately mandated to respond to wildfires. Organisations like Working on Fire (WoF) and the SCFPA and volunteers represent valuable resources but FPAs and their constituent fire management units (FMUs), in particular, need to be adequately resourced, trained and equipped to play their role. They are also no substitutes for the fire and rescue services. Capacity building must seek to strengthen both municipal and external capabilities.

Through their social responsibility programmes, the insurance industry and private sector more generally, could help to build governmental and FPA capacity, particularly with respect to vehicles and equipment. Santam's Partnership for Risk and Resilience (P4RR) initiative, which aims to capacitate local government with fire and flood risk management skills and equipment, is a useful example of how insurers could assist in improving local capacity.

A complex and demanding incident
The response environment during the fires was extremely demanding. There were a huge number of moving parts and several unanticipated challenges. The critical lesson is that the worst can happen. It is essential to plan and prepare for complex, large-scale events, simultaneous infrastructure failures and ▶

road closures, as well as high-visibility events generating intense public interest and extensive relief operations. As discussed later, social media is also becoming an increasingly powerful dynamic in disasters and it is essential that authorities engage the medium.

In addition to building the capacity of fire fighting resources, the insurance industry could consider practical measures to build the resilience of municipalities to infrastructural failures, such as sponsoring generators for fire stations and life-line services such as pump stations.

Ensuring that members of the public have escape routes and the emergency services access is critical to prevent deaths and injuries and property losses. In Knysna specifically, the lack of alternative roads to the N2 and single entry and exit roads to some suburbs, poses a danger to residents. The municipality should seriously consider building additional roads to improve available escape and response options.

Strengthening early warning
The current National Fire Danger Rating System is not appropriate for the Garden Route District and the fynbos biome in general. An accurate early warning indicator could help authorities to be better prepared for incidents such as the Knysna fires. The Canadian Forest Fire Danger Rating System (CFFDRS), and specifically its Fire Weather Index (FWI) and Daily Severity Rating (DSR), would provide a useful complement to the current Fire Danger Rating System.

Learning from the disaster: strengthening humanitarian response in the Western Cape
Recognising the challenges experienced in June 2017, the Western Cape's Department of Social Development (WCDSD) is developing a social relief management protocol to guide the Department's involvement in humanitarian responses. This establishes the WCDSD's role and responsibilities, provides guidance on donation management and identifies critical stakeholders who can help to support people affected by disasters. The Garden Route District Municipality (GRDM) is developing its own protocol, in collaboration with the WCDSD and other stakeholders, which also establishes roles and responsibilities and guidelines for the strategic deployment of resources.

Establishing such guidelines should facilitate more responsive and efficient action during future disaster events and could provide a useful model for developing similar frameworks elsewhere in the South Africa.

Strengthening response capacity
The essential lesson is that neither government, other agencies nor the public were adequately prepared for an incident on the scale of the Knysna fires, particularly at the local level. Given anticipated increases in the frequency of large wildfires in the future, preparing for large-scale, complex and multi-stakeholder events is essential.

This research identifies a need for:
- training and equipping people to better deal with complex events, particularly at the district and local scale
- evacuation planning and communication strategies
- planning to facilitate inter-governmental and inter-agency cooperation and resource mobilisation and make institutions more resilient

- greater strategic leadership in both fire operations and civilian responses and
- strengthened data collection and analysis to inform decision-making.

A good starting point would be to strengthen response planning. It is critical to develop evacuation plans and to engage members of the public to create community-specific strategies, along with event thresholds that should trigger evacuations. Developing these plans could be included in efforts to promote more fire-ready communities. Mutual aid agreements between municipalities and plans and instruments to guide inter-agency and inter-departmental resource-sharing would facilitate more rapid and efficient action. Another is to ensure that all fire fighting resources are properly equipped and trained to fight wildfires.

Turning to the humanitarian response, this research highlights:
- the municipality's limited resources, facilities and expertise to manage large-scale relief operations
- the need for standardisation with respect to beneficiary criteria and standards of relief and donation management systems
- the importance of data collection and standardisation and
- mechanisms to ensure information-sharing and alignment of relief activities across organisations.

The multiplicity of role-players involved in the humanitarian response, the flood of donations and inadequate systems for managing these were key challenges, suggesting that the WCDSD and disaster management agencies need to identify and engage with NGOs involved in providing humanitarian assistance in the GRDM to define roles and responsibilities and minimum standards of relief during disasters. The guidelines being developed by both the WCDSD and the GRDM provide an opportunity and framework for engaging with a broader suite of NGOs. Given the lack of capacity in local government to cope with large-scale relief operations in many parts of South Africa, the findings suggest that local governments should consider alternative relief models that tap the expertise and capacity of NGOs. It is important that all NGOs are thoroughly vetted and that municipalities engage with and monitor NGOs on an ongoing basis to ensure fairness and the integrity of relief provision.

Crisis communication during the Knysna Fires
Communication between the authorities and the public was sometimes challenging. Difficulties associated with

the event, particularly self-dispatching and donations, were in large part due to this communication gap and might have been avoided. Early, clear and ongoing communication is essential not only to provide information, but also to more effectively direct and harness the public's desire to help. Training municipal communications teams in crisis communication for comparable events would help strengthen their capacity to engage effectively with the public. Strengthening the ICS communication function would also facilitate more effective communication.

Social media

Social media is becoming an increasingly important dynamic in disaster response, one that the authorities must engage with in order to remain current. This is particularly important given the potential for both intentional and unintentional misinformation. Social media provides a useful tool for sharing information during disasters. In Knysna, Facebook users predominantly sought information and responded primarily to posts with a visual element. This suggests opportunities to target package information to reach a wider audience.

The research highlights the importance of effective communication during disasters. It is critical that the authorities communicate with members of the public effectively, as consistently and as early as possible. This is not only essential to keep them informed and safer but also to ensure that the public is aware of their needs and requirements and how they can best help.

Social media platforms represent a powerful communication tool but the authorities have yet to harness them optimally. This is necessary not only because these platforms represent a powerful tool to engage the public but also because the authorities need to counter negative aspects, such as misinformation. Such engagement need not be confined to crisis communication during incidents; social media also provides a medium to interface with the public during and after events, when it provides opportunities to educate, organise and keep people informed.

Post-fire recovery efforts

Recovery efforts were centred on the Garden Route Rebuild Initiative (GRRI). The GRRI sought to optimise efforts to 'Build Back Better'. Given the scale of the damage to housing, infrastructure and the environment, the extensive humanitarian support needs and the large number of role-players gearing up to respond, the GRRI was envisaged

as the anchor for a comprehensive, integrated reconstruction and recovery effort for the Garden Route.

The initiative aimed to create a multi-disciplinary, inter-governmental and multi-sectoral platform to align and maximise recovery and rehabilitation efforts. It brought together national, provincial and local government, state-owned enterprises, community members, civil society organisations and the private sector in seven sector-based working groups to design and implement recovery projects.

Rapid deployment of post-fire, anti-erosion measures

Various actions were taken to limit erosion and sediment loss on steep areas, upslope of infrastructure such as roads, houses and pump stations, particularly where there have been severe fires. In total, 358 fibre mats and 5 826 fibre rolls were installed on these high-risk slopes. These are the kinds of responses that should become the norm.

Two positive outcomes of stabilising the steep slopes and allowing the vegetation to re-establish itself rapidly, were: (a) that it minimised localised mudslides, thereby preventing homes and infrastructure being flooded in the weeks and months after the fire and (b) it also limited the amount of silt from the burnt area that would be deposited in the environmentally sensitive Knysna Lagoon.

Counting the cost

The fires cost Government, the insurance and forestry industries a little over R3 billion in direct costs but these figures under-estimate the true cost of the incident. The impact on those who lost homes, businesses and jobs

was immense but this is impossible to quantify as the information is not publicly available. Data on the losses sustained by parastatals was also unavailable. In addition, there are indirect costs that are difficult to measure. The private sector sustained the heaviest losses.

Even though official figures probably underrepresent the cost of the fires, the losses sustained by Government and the insurance and forestry industries highlight the destructiveness of large fires and the value of investing in risk reduction. The return on money spent on efforts to prevent destructive wildfires and mitigate their impact is exponential compared to the costs of not acting. The losses sustained by insurance companies, in particular, underscore the benefits that the insurance industry could gain by being more proactive, particularly given anticipated increases in the frequency and severity of fires due to global warming.

Challenges to restoring infrastructure following disasters

The research suggests that prevailing emergency and recovery funding processes may inadvertently undermine the principle of 'building back better'. Provincial and municipal departments submitting claims for emergency and recovery funding following a disaster must specify whether the damaged infrastructure has already been repaired, in which case it is usually excluded from allocations. The problem is that this penalises departments who undertake temporary repairs. For example, Knysna Municipality's Electrical and Energy Services Department spent R6,4 million on emergency repairs to restore essential electrical reticulation and infrastructure immediately following the fires. Some of these repairs were known to be temporary ▶

because they used second-hand parts nearing the end of their lifespan. However, because the electrical systems were functioning when the damage was assessed, they were not awarded the funding needed to make permanent repairs and engineers expect to see the aging parts failing in the near future.

The long road to recovery

The fires had a profound impact on Knysna's residents and economy and recovery is happening slowly. Many of the homes and businesses damaged or destroyed were not insured or were underinsured and people are struggling to rebuild. The findings highlight a 'missing-middle' of people who have been left in a precarious position by the fires. A key challenge lies in knowing how to support these households, who currently fall through gaps in existing social safety nets. The insurance industry could play a role by exploring insurance options that are more affordable and tailored to the needs of pensioners and others in this group.

Recommendations

Wildfires are both necessary and expected in South African ecosystems and with global environmental change, are likely to become more frequent. The conditions conducive to uncontrollable 'mega-fires' also are likely to occur more frequently. Population growth and the expansion of the WUI are also increasing both the communities' exposure to wildfires and the likelihood of human activities starting fires. Despite this, it is possible to reduce both the risk of destructive fires and their impact on the exposed communities. However, we first must recognise that our current fragmented

approaches to fire management, which involve a range of organisations and actors, are not effective, especially in a changing fire environment. We also need to strengthen our ability to respond to fires through capacity building, planning and preparation.

Integrated fire management (IFM) incorporated different fire management activities in a strategic framework to reduce the overall impact of unwanted fire damage and promote the beneficial use of fire. A clear and shared understanding of IFM is essential to successfully engaging all stakeholders in fire risk management (FynbosFire 2016). IFM should inform all activities aimed at reducing the risk of damaging fires and improving readiness, response and recovery planning. The recommendations that follow need to be implemented within the context of IFM.

Recommendations for Government Reducing the risk and impact of wildfires:

- The authorities must commission research to assess the risk of damaging wildfires to vulnerable communities along the WUI in settlements across South Africa.
- Municipalities should ensure that they manage fuel loads on municipal land along the WUI. They should protect vulnerable infrastructure through zonation or restrictions and fire-proofing of structures.
- Municipalities should consider introducing by-lays to promote fire risk reduction, and explore measures to enforce existing legislation. They should also incorporate fire-risk reduction into the planning of new developments.

- Municipalities should work with FPAs to effectively educate the public so they have a far better understanding of fire risks and what they can do to reduce them. They should find ways of maintaining awareness during wildfire-free periods. Education activities should include people living in informal settlements along the WUI. FPAs must be remunerated for their efforts.
- Municipal fire and rescue services should take pre-emptive action to deal with naturally occurring fires if they are within inhabited landscapes, regardless of whether they present an imminent threat. Provincial government should assist with additional training and resources where needed.
- District municipalities, in collaboration with FPAs, should develop and adhere to standard operating procedures for remote-area and lightning-strike ignition monitoring and suppression.

Reducing fuel loads

The National Disaster Management Centre (NDMC), DEADP and other relevant role-players should explore ways of addressing disincentives that favour risk aversion and hinder adaptive management both within and between organisations.

Municipalities must support FPAs to develop collaborative local networks among organisations working on fire-related issues to build trust, an understanding of how to reduce fire risk and how to turn this understanding into action.

Enhance the fire danger index component of the national fire danger rating system

The NDMC together with South African Weather Service should consider including the Canadian FWI in the National Fire Danger Rating System in addition to the LFDI currently in use.

Strengthen planning at the municipal and district level

- Provincial Disaster Management Centres should train and equip resources to better deal with complex, multi-stakeholder responses.
- Municipal disaster management and/or the fire and rescue services must give top priority to the development of evacuation plans. These should incorporate responses under different conditions and provide for the simultaneous loss of electricity and ICT infrastructure.
- Municipal disaster management centres should work with the fire

and rescue services and municipal managers to identify and include critical role-players to be included in disaster planning. Scenario exercises and training will help identify critical role-players, establish roles and responsibilities and build relationships. Planning activities should include both civilian role-players and emergency responders.

- Municipal disaster management centres and/or the fire and rescue services should establish agreements to facilitate inter-governmental cooperation and resource mobilisation. The National Incident Management System (NIMS), which promotes the multi-stakeholder coordination system, provides a framework for strengthening collective action at this level.
- Municipal disaster management centres and/or the fire and rescue services should also establish Memorandums of Understanding with agencies such as SANParks and CapeNature to define their roles and responsibilities.
- Disaster management and the fire services should engage with municipalities to explore how to better integrate municipal funding and oversight mechanisms. Municipalities should explore the potential for expediting extraordinary procurement and funding during emergencies.

Strengthen capacity to respond to wildfires

- The National Disaster Management Centre must prioritise capacity-building in the fire and rescue services, particularly with respect to training and equipping municipal firefighters to respond to wildfires, particularly on the WUI.
- The WCDMC, and other provincial disaster management centres, should develop the logistical and institutional capacity to support the implementation of the ICS, especially for extended incidents. ICS training should also be considered for municipalities' senior management and communications teams.
- Municipal fire and rescue services must work with FPAs to ensure that communities become more self-sufficient and self-organised to be better prepared for wildfires. This should include providing guidance on defending properties, developing evacuation plans and identifying safe refuges when there is no way out.
- Municipal disaster management centres must ensure that communities have access to early warnings and are able to act on

warnings. This should be linked to evacuation planning.
- Municipal planning departments and the relevant municipalities must ensure that towns, suburbs and developments have enough access routes for efficient access and egress, especially for emergency services. This must include roads to access natural vegetation in areas behind secure estates because walls and fences will not prevent fire from spotting into the estate or finding continuous fuels. Knysna Municipality must consider building an additional road to provide alternative routes into and out of Knysna if the N2 is closed.
- Municipalities must fire-proof critical infrastructure and ensure that sufficient water is available for fire fighting, even in the event of fire damage.
- Municipalities, in collaboration with FPAs, should review policies relating to the use of backburning during an incident. Approval by the incident commander should be granted based on the current and foreseen fire behaviour.
- Municipal fire services must strengthen coordinated information gathering and fire behaviour analysis capacities to improve situational awareness and intelligence in the incident management team. A person dedicated to documenting, in detail, the progress, behaviour of the fire and the responses must be present in the situation unit at the incident command post.

Strengthen humanitarian relief management

- Municipal disaster management centres at both the district and local level must work with the WCDSD to identify and engage with prominent NGOs to define roles and responsibilities and minimum standards of relief during disasters. The guidelines being developed by both the WCDSD and the GRDM provide an opportunity and framework for engaging with a broader suite of NGOs.
- Identified NGOs need to be included in coordination structures to ensure information-sharing and alignment of activities. They should also be included in response planning and exercises.
- Municipalities also need to explore arrangements for accepting financial donations. One option could be to establish agreements with humanitarian NGOs such as the SARCS that would allow them to accept, administer and disburse donations on the behalf of government.

Improving communication with the public

Municipalities must ensure that communication personnel receive training on crisis communication, and that communication units are adequately staffed and resourced. Communications teams must identify high-profile social media influencers and enlist their support in spreading messages and directing users to information sources. Communications teams should engage as early as possible to proactively shape the conversation.

Plan post-fire environmental recovery and rehabilitation properly

DEADP, in collaboration with FPAs, must get all relevant stakeholders (officials, business and knowledgeable private individuals) around the table as soon as possible after an event to plan and prioritise control efforts and thereby optimise the use of resources.

Enable responsive action to address time-sensitive rehabilitation concerns

The WCDMC must engage with the NDMC and Treasury to explore quick-release funding mechanisms to enable time-sensitive recovery activities immediately after a disaster.

Data collection for risk assessment and monitoring to inform risk reduction

All municipal impacts should be recorded, independently of funding processes. There should be uniformity across all municipalities and sectors for calculating and presenting damage costs. These should be actual costs and not estimates. The WCDMC should establish a standard impact reporting procedure for municipalities and government departments. This includes the standardisation of electronic formats and clear designation of a focal point to consolidate information, as onerous reporting demands on technical personnel keep them from their core responsibilities. Impact reporting templates should include a description of damage and a spatial reference ie GPS coordinates. Post-disaster assessment findings should be integrated into risk assessments as a measure of actual as opposed to possible impacts.

Recommendations for all stakeholders: adopt a learning approach

It is often very difficult to get detailed information after fires on facts like who did what and when, what then happened and why. The real problem is that the opportunity for sharing the learning and for adapting is lost or, at the very least, delayed. Resolving this challenge is critical to inform a learning and adaptive approach to support more effective veldfire risk management. 🔥