

# DISASTER MANAGEMENT

Official Journal: Disaster Management Institute of Southern Africa



Volume 3 No 2



# DMISA CONFERENCE 2019

REVIEW



# DISASTER RISK REDUCTION

The internationally recognised annual Disaster Management Conference for Africa. Presented by the Disaster Management Institute of Southern Africa.



# IMPACT AND INFLUENCE

Enhancing strategy and execution in disaster, risk and resilience management

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**The Station Urban Event Space,**  
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The Station Conference Centre is centrally located in Durban, the warm heart of the scenic KZN coastal area a 40 minute drive from King Shaka International Airport.

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# DMISA PRESIDENT'S MESSAGE

We are delighted with the successful DMISA 2019 Conference 'Adapting to Extremes and Limiting Disaster Loss - Pathways to integrated resilience and sustainability for basic services, critical infrastructure and thriving communities', held on 18 and 19 September 2019 at the ATKV Resort, Hartenbos, Mosselbay, Western Cape.

We wish to thank all delegates, speakers and exhibitors who contributed to another successful conference. Our sincere appreciation to Santam, the South African Weather Service (SAWS) and the National Disaster Management Centre (NDMC) for the financial contribution towards the DMISA Conference 2019 and trust that we can count on your support of the DMISA Conference 2020.

The DMISA Conference 2020, 'Impact and influence: Enhancing strategy and execution in disaster, risk and resilience management', will be held on 30 September and 1 October 2020 at The Station Urban Event Space, 65 Masabalala Yengwa Avenue, Durban in KwaZulu-Natal.

It is anticipated that a Memorandum of Collaboration (MoC) between the NDMC and DMISA will be finalised during the first quarter of this year.

2019 will be remembered as the year the climate crisis devastated parts of



Mduduzi Lancelot Nxumalo

east and southern Africa, with floods, landslides, drought and cyclones leaving at least 33 million people at emergency levels of food insecurity or worse, according to new analysis by Save the Children.

A recent United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) report shows increasing evidence that climate change is contributing to higher temperatures in the region and that these temperatures are exacerbating the impacts of drought and flooding. These climate shocks decimate livelihoods, leaving households desperate for food and putting children at risk of acute malnutrition - a life threatening condition requiring urgent treatment. Children also bear close to 90 percent of the burden of disease attributable to climate change, such as malaria and dengue fever.



A stranded family sits on top of their home after Cyclone Idai



One of the extreme weather events southern Africa was Cyclone Idai

Repeated erratic and extreme weather events in east and southern Africa has meant that in 2019:

- At least 1 200 people lost their lives as the result of cyclones, floods and landslides in Mozambique, Somalia, Kenya, Sudan and Malawi.
- Ten countries across East and Southern Africa ie Madagascar, Malawi, Mozambique, Zambia, Zimbabwe, South Sudan, Sudan, Ethiopia, Somalia and Kenya, are experiencing ongoing weather-induced crises, with an average of 10 percent of people living in these countries currently experiencing serious hunger.
- Massive movements of people have created additional risks of children being exploited, separated from their families or dropping out of school. By June 2019, over one million people across seven of the 10 countries had been newly displaced by climate-related shocks. Over half of these displacements were the result of Cyclone Idai, which hit Mozambique, Zimbabwe and Malawi in March 2019 and was

followed six weeks later by Cyclone Kenneth, which was the first time in Mozambique's recorded history of two strong tropical cyclones in the same season. The storms were also the strongest cyclones ever to hit the African continent.

**Coronavirus:** The Centres for Disease Control and Prevention (CDC) is closely monitoring an outbreak of respiratory illness caused by a novel (new) coronavirus first identified in Wuhan situated in the Hubei Province, China. Chinese authorities identified the new coronavirus, which has resulted in thousands of confirmed cases in China, including cases outside Wuhan City. Additional cases have been identified in a growing number of other international locations, including the United States. There are ongoing investigations.

Health Minister Zweli Mkhize and health officials from the World Health Organisation (WHO) and the National Institute for Communicable Diseases (NICD) addressed the media in Johannesburg on 31 January 2020

and the minister said that South Africa remained on high alert.

Minister Mkhize said that there was no evidence to support repatriation or emergency evacuations of South African citizens in China. "We have remained vigilant on the development regarding the movement and behaviour of the viral infection across the world and we continue to engage with the international academic fraternity to better understand how this virus behaves," he said. Minister Mkhize reiterated that South Africa was adequately prepared for active surveillance, early detection, isolation, case management, contact tracing and prevention of the infection.

Best wishes for peace and prosperity in 2020. Wishing you a fresh start with renewed energy and confidence throughout the New Year.

Thank you for being part of the DMISA Team, "Let's walk the talk."

**Mr ML Nxumalo**  
DMISA President 

# DMISA EXCO AND BOARD MEMBER:

## JOURNAL AND MARKETING SHADI TSEBE



Shadi Tsebe

First of all, I would like to wish everyone a happy and prosperous new year. The New Year has certainly brought with it new challenges, like the coronavirus outbreak that has affected China and with fears of it affecting the rest of the world. There are now strict rules in place regarding the movement of people between territories in China. Chinese authorities are now screening all travellers that intend leaving China before they are able to purchase a ticket. Any traveller that is found to have a red flag in the screening process is denied further leave to travel until coronavirus is excluded. They have also fine-tuned regulations on trade and logistics to ensure that food security and essential amenities remain protected whilst at the same time not enabling the spread of the virus. Any foreign traveller in China who has been subjected to the lockdown rules will be provided with housing, food

and essential amenities at the cost of the Chinese Government. China continues to receive aid from across the sectors; whilst we applaud and welcome the pledges of support, this is also an expected and necessary outcome of the World Health Organisation's (WHO) declaration of a Public Health Emergency of International Concern. Reliable, credible information on the coronavirus can be obtained from the WHO website and social media pages, the National Institute of Communicable Diseases (NICD) website and social media pages and the Department of Health website and social media pages. As of Wednesday, 5 February 2020, the death toll from the outbreak in mainland China rose to 563.

Scientists in China and indeed all over the world, continue to work hard to find effective treatment and to develop a vaccine for 2019nCoV.

Currently there are no confirmed cases of coronavirus in Africa yet but with steady traffic to and from China, experts worry that the epidemic could overrun already-strained health systems. The South African Department of Health continues to closely monitor the rapidly evolving developments surrounding the coronavirus outbreak. Anyone who experiences flu-like symptoms with a travel history or contact with someone who has travelled, particularly to China, should seek immediate medical attention at their nearest clinic, general practitioner (GP) or hospital.

South Africa has experienced heavy rains affecting parts of Gauteng in December 2019, the worst affected are areas on the outskirts of Pretoria, where flooding left cars and buses submerged and residents trapped in buildings. Flooding has also caused widespread power cuts. Some areas of Pretoria recorded more than 200mm of rain in 48 hours to 10 December 2019. Emergency services and South Africa National Defence Force helicopters were called on to rescue around 200 people from flooded homes or trapped vehicles in Mamelodi, east of Pretoria and part of the City of Tshwane Metropolitan Municipality. A further 150 people had to be rescued from a church in Mamelodi that was surrounded by flood water. The Municipality accommodated the displaced people at public buildings, churches and a sports stadium have been opened to house those displaced.

South of Pretoria, flooding in Centurion also left motorists stranded. Guests and staff were evacuated after the Centurion Lake Hotel was flooded and again in the Eastern Cape in February 2020 homes were damaged and traffic brought to a standstill as flood waters of over one metre deep swamped the town. As most people are well aware, the immediate impacts of flooding include loss of human life, damage to property, damage to the environment and deterioration of health conditions owing to waterborne diseases. As communication links and infrastructure such as power plants, roads and bridges are damaged and disrupted, some economic activities may come to a standstill, people are forced to leave their homes and normal life is disrupted. Proper measures need to be put in place in order to minimise the impacts of floods.

In conclusion I would like to thank the sponsors of the DMISA Conference and everyone who attended the conference. It has been an opportunity for a diverse range of stakeholders in disaster management from across Africa to gather and share skills, knowledge and experience.

Wishing you all the best for 2020. God bless you all.

**Ms Shadi Tsebe**  
DMISA EXCO and Board member:  
Journal and marketing 



December 2019 saw flooding in various parts of Gauteng including Centurion



# 'ONE DISTRICT, ONE PLAN, ONE BUDGET, ONE APPROACH'

Message by the Deputy Director-General:  
(Head) National Disaster Management Centre, Dr Mmaphaka Tau

The Living Planet Report, WWF's flagship publication released every two years, is a comprehensive study of trends in global biodiversity and the health of the planet. The 2018 report, reiterates many similar statements made in the contemporary discourse by stating that we are living in an age of rapid and unprecedented planetary change where our ever-increasing consumption and resulting demand for energy, land and water, is driving a new geological epoch known as the Anthropocene.

According to the report, the rise of industrialisation and our technological advances made, has brought about unprecedented improvements in our health, wealth, food quality, food security and general state of living but the price we as society is starting to pay for this advancement, in the face of ignoring the sustainable use of the resources available, is starting to add up. Overexploitation of land coupled with destructive agricultural activities, land degradation, the decimation of bees and other plant pollinators, overfishing and plastic pollution in the oceans are but a few of the key threats listed by the report, that we as society needs to resolve.

The 2019 Global Assessment Report in similar vein lists global warming, growing populations, income inequality, environmental degradation and

agricultural limitations as contextual risks that through stressors such as droughts, heat waves, international trade complexity etc result (suddenly or gradually) in systemic failures in a society that increases their vulnerability especially to disasters. South Africa faces these and other risks and is working with various stakeholders both domestically and on the international front to find ways of reducing the risks. Given this, there is a need for adaptive and integrative plans to reduce disaster risks with bottom up processes supported by top to bottom measures. In this regard, we need to employ an "all of society" approach in managing disaster risk, which is key to sustainable service delivery and development.

The "Khawuleza" District Development Model (DDM) is one of the key strategic interventions that has been adopted by the sixth administration. The District Development Model has been approved by government structures, including Cabinet to integrate service delivery that will be more practical, achievable, implementable, measurable and clearly aligned to the key priorities of the government. It is a break from a past where government departments did not plan properly and imposed projects on communities without taking their needs into account. The district-based model is about putting local government at the



Dr Mmaphaka Tau

centre of our country's growth and development and an opportunity to heed the call of the Global Assessment Report and the aspects articulated in the Living Planet Report to integrate DRR across all sectors and disciplines in a unified manner.

The DDM is a new integrated planning model for cooperative governance, which seeks to be an integrated, district-based, service delivery approach aimed at fast-tracking service delivery and ensuring that municipalities are adequately supported and resourced to carry out their mandate.

This approach brings exciting opportunities to advance the development in our country and the National Disaster Management Centre, supported by provincial and municipal disaster management centres, is well placed to play its rightful role in building resilience and bringing the development of our communities to fruition.

The role of the NDMC in the DDM is to work with stakeholders across the spheres of government and other role players to promote the implementation of disaster management programmes, in each of the 44 district and eight metropolitan spaces that seek to:

- Reduce disaster risk
- Prevent the development of new disaster risk
- Enhance preparedness and mitigation;



Mami Mizutori  
Head of the UN Office for Disaster Risk Reduction

## DECADE OF ACTION

"Nothing undermines **sustainable development** like a disaster. We have seen it recently in Haiti, Nepal, Mozambique and many other places. The decade of action demands that we **reduce disaster risk.**"

Follow us at [@UNDRR](https://twitter.com/UNDRR)

#GlobalGoals

- Ensure quick response and recovery and
- Implement reconstruction aimed at 'building-back-better'.

This calls for the disaster management fraternity in South Africa to execute its legislative mandate through a district lens. It means that we will collectively need to do things differently to support the implementation of the DDM. We need to reorganise our operational capacity to have a focus on the 44 plus eight geographical spaces to ensure that:

- operational activities are focused around impact in 44 districts and eight metros
- Disaster management plans are integrated into the 'One Plan' of each of the 44 districts and eight metros
- Monitoring, reporting and analysis on disaster management implementation are aligned with 44 districts and eight metros
- Capacity is identified and deployed to provide disaster management expertise in selected district hubs (high disaster risks)

Government has successfully piloted the District Development model at the OR Tambo District Municipality in Lusikisiki which has elements of rural spatial development, in eThekweni Municipality in Durban, which has elements of urban spatial development and at the Waterberg District in Lephalale, which has elements of mining spatial development. Each of the disaster risk profiles of these areas are also unique and needs to be considered in planning and sustainable development.

All departments across the three spheres of government are required to actively participate in the district municipalities' Integrated Development Plan (IDP) processes and ensure that their plans are informed by the district IDPs of which the disaster management plan should also be a core component.

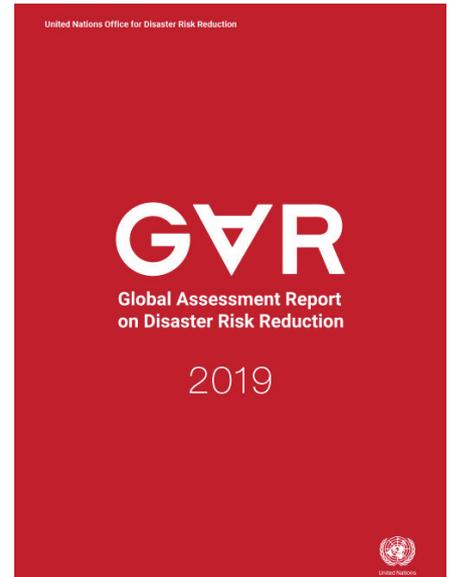


The District Development Model allows government departments at national and provincial levels to combine resources and work together towards the implementation of a single plan, developed locally and coordinated at a district level. 'One District, One Plan, One Budget, One Approach.'

The Disaster management fraternity is entering an interesting era to be at the centre of sustainable development within the DDM. Let's seize this opportunity to reduce the risk of disasters and build resilience of our communities!

**NDMC and DMISA MOC**

The Disaster Management Act, 2002 (Act No. 57 of 2002) and the National Disaster Management Framework, 2005 (NDMF) enjoins the National Disaster Management Centre (NDMC) to promote an integrated and coordinated system of disaster management. Paragraph 1.4.3 of the NDMF provides for organs of state across the spheres of government to conclude agreements,



where necessary, to strengthen capacity to deal with disaster risk reduction, response and recovery.

In fulfilling its objective, the NDMC has been interacting and collaborating with DMISA on a number of issues that concern disaster risk reduction and management. Following extensive discussions between DMISA and the NDMC, it was resolved to enter into a Memorandum of Cooperation (MoC) on broad areas of possible collaboration between the parties. These include:

- Integrated institutional capacity and arrangements for disaster management
- Disaster risk assessment
- Disaster risk reduction
- Preparedness, response and recovery
- Information management and communication (early warning, emergency communication protocols, infrastructure and systems)
- Monitoring and evaluation
- Education, training, public awareness and research
- Funding
- Technical support and capacity building

The MoC is currently being processed for finalisation and signature between the parties.

I thank you.

**Dr Mmaphaka Tau (PhD)**  
 Deputy Director-General (Head):  
 National Disaster Management  
 Centre (NDMC)  
 Department of Cooperative  
 Governance (DCoG)



# DMISA CONFERENCE 2020

30 SEPTEMBER AND 1 OCTOBER 2020 IN DURBAN



The Disaster Management Institute of Southern Africa (DMISA) will be holding its 2020 conference in Durban in KwaZulu-Natal on 30 September and 1 October 2020. The conference theme for this year will be 'Impact and influence: Enhancing strategy and execution in disaster, risk and resilience management'. This year's conference will be held at The Station Urban Event Space, situated at 65 Masabalala Yengwa Avenue in Durban, KwaZulu-Natal.

The DMISA Conference routinely attracts more than 300 delegates and is proudly presented by the Disaster Management Institute of Southern Africa (DMISA), supported by the South African National Disaster Management Centre (NDMC), South African Weather Service (SAWS) and Santam.

The conference provides an annual opportunity for a diverse range of stakeholders in disaster management from across Africa to gather and share skills, knowledge and experience.

The Disaster Management Institute of Southern Africa (DMISA) is a non-profit professional association, registered by the South African Qualifications Authority (SAQA) and hosts the

biggest annual Disaster Management conference in Africa, rotating the conferences between the provinces of South Africa. The Institute is recognised as the mouthpiece of the Disaster Management profession in Southern Africa.

The following information will be provided on the DMISA website ie [www.disaster.co.za](http://www.disaster.co.za) from end of March 2020:

- Conference invitation
- Registration form
- Accommodation information
- Details of exhibition space
- Call for papers

Watch this space.....!!!!

For more information on booking, contact:

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Visit [www.disaster.co.za](http://www.disaster.co.za) for updates. 🇿🇦



*This year's DMISA Conference will be held at The Station Urban Event Space in Durban, KwaZulu-Natal*

# MEET LEBOGANG LINAH MOSOTHO-SEGAGE

## DMISA EXCO MEMBER: REGIONAL MATTERS, EQUITY AND RECRUITMENT PORTFOLIO



Lebogang Linah Mosotho-Segage

**L**ebogang Linah Mosotho-Segage is the disaster management officer at Capricorn District Municipality (GDM), which is one of the five districts of Limpopo Province in South Africa. The district is named after the Tropic of Capricorn, which runs through it. Capricorn is a Category B municipality established in 2000 from the then Northern District Council with Polokwane as its capital. It is a district municipality predominately rural in nature.

Mosotho-Segage is an EXCO member of the Disaster Management Institute of Southern Africa (DMISA) and manages the portfolio for 'Regional matters, equity and recruitment'. She is also the chairperson for DMISA's Limpopo Region.

Disaster Management Journal spoke to Mosotho-Segage to ascertain what made her decide on this particular career path and the challenges she faced. "Disaster management chose me," said Mosotho-Segage. "I did a National Diploma in Engineering and somehow God decided to put me in disaster management in 2003 when I was appointed as a control room operator for the disaster management unit at Capricorn District Municipality. In 2006 we were sent to do a course in disaster management through DMS. I then fell in love with disaster management and I said to myself that this is what I want to do; I want to pursue a career that will give me an opportunity to make a difference in someone's' life." She has been working for Capricorn District Municipality for 17 years and achieved her disaster management qualifications and occupational experience through CDM.

### Career

She started her career in 2002 at the Department of Public Works as an electrical inspector through a learnership programme after which she joined the Department of Education during the

same year doing data capture. Her career then changed to being a secretary at Mogolola- Mokoka and Associates Consulting Engineers in 2003. Towards the end of 2003 she joined Capricorn District Municipality as a control room operator, where in 2008 she was appointed as a disaster management coordinator. In 2009, Mosotho-Segage was appointed to her current position of disaster management officer at the Capricorn District Municipality.

We asked Mosotho-Segage what has had the biggest influence or impact on her career thus far, to which she replied, "Being appointed as the chairperson of the DMISA Limpopo Region and member of the DMISA National Executive. Also being selected and appointed to serve as the subject matter expert for Local Government Sector Education and Training Authority (LGSETA) for the development of the Disaster Management Officer and Manager qualifications.

Answering to the question whether public service has been in her family, she answered, "Yes, actually my mother is an educator with at least 25 years of experience".

### Mentors

Mosotho-Segage's mom and her late grandmother were her mentors. "They taught me that nothing is impossible; perseverance is the key and always dream high, never under estimate the power of prayer. Always know each one of us is given a change to make a difference in someone's life do not miss the opportunity to do that. The words shared by both have played a significant role in how I look and pursue things in my career and profession. The other important thing that they have shared was that I should always try to do things in a manner that I would want others to do for me. In a profession where things change every day, it is important to be abreast with what is happening around you and worldwide and try to find innovative ways to promote disaster risk reduction."

### Motivation

When asked which factors kept her in the industry through the years and motivated her, she responded, "I have always believed that I have a responsibility to make a difference in other people's life. The work of disaster management has



Mosotho-Segage at the recent DMISA Conference 2019



*She was appointed as a disaster management officer at Capricorn District Municipality from 2009 to date*

given me that chance. The only thing I wish for is to use the opportunities given; to make a difference while I'm still alive. The factors keeping me in the industry include the fact that I have a responsibility to always advocate for DRR in all spheres. Also that I have a responsibility to educate at least one child in DRR, to make them know the risks and the impact of those risks in their environment and further to make them understand their responsibility in changing their environment for the better."

**DMISA**

Mosotho-Segage's role in DMISA started in 2016 when she assisted in the portfolio for 'Journal production and marketing' nationally. She was also appointed in 2016 as chairperson of DMISA Limpopo Region for the period 2016 to 2018 and again in 2018 for the period 2018 to 2020. In 2018, she was appointed as a National Executive Committee Member for DMISA for the period 2018 to 2020. "Being a member of DMISA has opened up new possibilities and given me an opportunity to network and learn from my fellow counterparts within the industry. It has given me an opportunity to push myself for the better and a platform to bring change in the profession and the industry. I will forever be grateful for the opportunity. Being part of DMISA's management is a huge responsibility I must say, firstly stepping into the shoes of the most respected people in the industry and having to ensure that the responsibility vested upon me, are fulfilled. As the portfolio holder for 'Regional matters, equity and recruitment', it is imperative that I make each disaster management practitioner understand the value of their profession and that matters of equity should be considered at all

cost. Lastly, it is only US who can make the change we want to see, so it is OUR responsibility to professionalise DRM."

**Challenges**

She said that the challenges faced by disaster management professionals in South Africa include:

- Snail commitment within the industry to professionalise the profession, even though the platform is available to do so.
- That thinking that disaster management is a reactive profession for example blanket and tent (LOL), meaning the main mandate of DRM preplanning is then over looked.
- The importance of including disaster risk reduction programmes in service delivery projects is still a challenge, so tools such as strict application of the law should be prioritised to able

those in the field to do their work without interference.

- The lack of staff education about the profession, which in return makes people in the industry to think that anyone, can be a disaster management practitioner, that they do not have to have qualifications; this thinking is crippling the profession and further it makes those leading to give DRM and DRR last priority.

**Future**

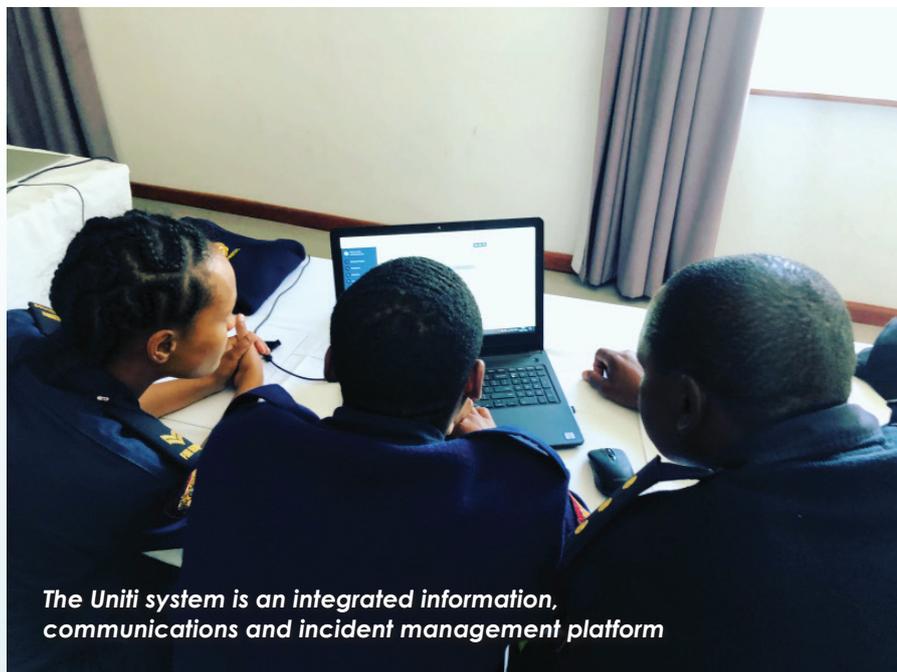
Discussing the future of disaster management and the institute, Mosotho-Segage believes that the effect of climate change will definitely exacerbate impact of disasters, so it is imperative to understand that:

- DRR should form an integral part of the school curriculum, public and staff education



*Working as disaster management coordinator from 2008 to 2009*

# UNITI SYSTEM ROLLED OUT THROUGHOUT CAPE WINELANDS DISTRICT MUNICIPALITY



*The Uniti system is an integrated information, communications and incident management platform*

and non-emergency services for the reporting of burst water pipes, electrical faults to utilise the same system. FireWeb is a module in Uniti, specifically incorporating the incident types used by fire services.

**Why use such a system?**

The rollout of the Uniti system by the Cape Winelands District Municipality resulted from a need that the district had to obtain information from local municipalities concerning incidents in their areas. Disaster management is a secondary function that has been allocated to fire services as only one of the five local municipalities has a dedicated disaster management official. With capacity in the local municipality in short supply, the use of the Uniti system allows the CWDMC to view necessary sections of their incident reports in order to compile a combined situational report for the district. Previously, the Cape Winelands Disaster Management Centre had to telephonically contact the local municipalities for information following severe weather events or in the case of significant incidents such as the farm worker unrest or flood events resulting from cut-off low pressure systems; information had to be emailed three times a day. By now utilising the Uniti system will prevent duplication of information and frees up

The Cape Winelands Disaster Management Centre (CWDMC) is in the process of rolling out the Uniti system to the local municipalities within its district. The Cape Winelands has procured the licenses for the local municipalities to utilise the application.

2019. Breede Valley has been utilising the system for a number of years but will be migrating over to the Cape Winelands platform on 1 December 2019. Witzenberg and Drakenstein Municipalities' went through training on the system during November 2019.

The Breede Valley, Witzenberg and Drakenstein municipalities went live on the Uniti system as of 1 December

The Uniti system is designed to allow all emergency services such as fire and rescue, traffic, law enforcement

- DRM professionals and those in the related field should look at sustainable ways that can be applied during development to avoid or mitigate future disasters.

- Politicians to advocate for the inclusion of DRR in development programmes and making sustainable development an essential part of building back better.

Her advice to fellow DMISA members is to "Love your profession to a point that you are jealous of not making a difference in your DRM field. Let us be the ones that say that disaster risk management is everybody's business and let us make people understand the importance of promoting, advocating and pursuing a sustainable future for the sake of our children. As Mahatma Gandhi said, 'Be the change you want to see in the world'."

On a personal level she shared, "I am married to Gladwin Segage and have two kids; Lehumo, our daughter who is nine years old and our son, Letlotlo, who is now six years old. I hold a Masters' Degree in Disaster Risk Management from the University of the Free State and I love life, nature and music. I am very artistic and an independent thinker who believes that when you love, it should be unconditional."



*Working as a control room operator in 2003 in the then uniforms*

staff to focus on the coordination and response of incidents.

The Uniti system was first utilised in the Cape Winelands during the coordination of memorial activities across the district following the death of the Former President Nelson Mandela. Adaptations to the system to allow for the reporting from places of tributes that had been established within the five local municipalities namely Breede Valley, Drakenstein, Langeberg, Stellenbosch and Witzenberg.

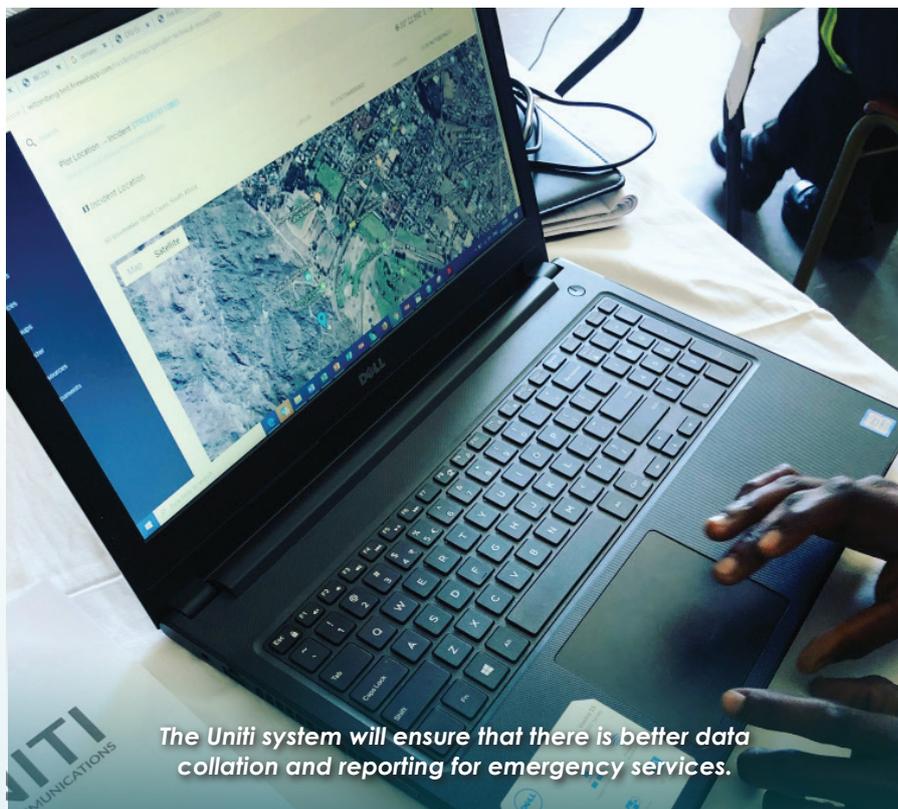
**Technical**

The Uniti system is an integrated information, communications and incident management platform.

Uniti is an online system, meaning parties do not need expensive equipment or major capital investment to participate and can access it from any device with an internet connection. It was developed and maintained in South Africa allowing for all participating locals, districts, provinces and other services to cooperate together on incidents for example, a local municipality incident details could be shared with the district or if a local needed district assistance, you would be able to contribute on a single incident report as opposed to each capturing your own incident report, reporting two incidents, when actually just the one.

This cooperation allows for better communication during disasters, better and a wider audience in terms of dissemination of critical incident information and an overview of available personnel and resources throughout the district. From an overview perspective, you are able to see incidents matching key criteria in the situation reports ie automatically linking all social distress calls, during times of heavy rains. Communication with critical facilities such as schools, hospitals or old age homes and the ability to message these contacts with a few clicks directly out of the system.

Utilising the mobile application will send automated updates to key stakeholders via push notifications and allows responders to capture evidence such as photos, videos, voice notes, occurrence book entries as well as plot the incident area for instance a burnt area, with fire line divisions, automatically synchronised with all other participating persons on the incident, as well as disaster management via the situation report overview. The mobile application allows for offline mode capture for those without data or a connection, which can be uploaded at a later time.



*The Uniti system will ensure that there is better data collation and reporting for emergency services.*

The Uniti system will ensure that there is better data collation and reporting for emergency services. Utilising the system, municipalities will be able to easily determine daily, weekly, monthly and yearly statistics as well as calculate the accumulated year on year statistics. It enables disaster management to have oversight of happenings during times of disaster in a centralised manner.

The CWDMC will be able to load all role players and advisory forum members on to the system and distribute early

warnings and advisories via both email and text message.

Following the conclusion of the Ward Based Risk Assessments the CWDMC has undertaken, all ward risk assessments will be loaded on to the system to allow for a dynamic risk register.

The Cape Winelands District Municipality will provide the system to the local municipalities for a period of two years as part of their assistance to local municipalities for disaster management capacity. 🇿🇦



*Witzenberg Local Municipality undergoing training on the Uniti system*



# LESSONS LEARNT IN ICS TO BE IMPLEMENTED

By Michelle Kleinhans, managing director, Dynamic Incident Management

**M**emory is good but short. A lesson learnt, needs to be a change in personal or operational behaviour as a result of the experience that should be considered in future operations or response. Yes, collecting and disseminating lessons learned helps but:

- What about applying them?
- Important enough to be communicated and re-applied?

The only way to avoid problems happening again, is to carefully consider what went wrong at the time and why; then decide what can be done differently next time to avoid the problems/issues. It is important to understand that lessons learnt should be implemented not only upon responding or during incidents but before responding or deploying resources. It is called preparedness.



Let's look at some lessons learnt in implementing the incident command system (ICS) before during and after incidents.

Activate the ICS structure from the start of an incident!! No matter how small the incident, there must always be an incident commander (IC), this is the start of forming the ICS structure. Remember an incident commander cannot do all the work on his/her own. One cannot just do one training course and think you know how the system operates and implement the structure the way you think it should be. It is important to understand the situation and know when to activate ICS positions as the incident escalates. Take notice of when the incident is escalating into an extended attack and plan the structure needs to grow with the incident.

### The incident commander (IC)

The incident commander (IC) must have full authority (delegation of authority) to make decisions and has full accountability at the incident. A lack of understanding of this concept during incidents is evident in our country. The IC must draw on trained, qualified and experienced people to build the ICS structure. People tend to use people they know ie friends, instead of using people that are more qualified to fill the positions. It is important to not change IC's per shift. It is confusing and contributes to regular change of tasking to 'suit' the new IC's view of the situation, instead of continuing with the current plan. Unified command is

seldom used and can make a major difference during an incident.

### The incident command post (ICP)

The incident command post is not the same as an emergency operations centre (EOC). The incident command post is where the incident commander and his/her incident management team (IMT) manage the incident from. Also, it is not a place for gatherings or where people walk in and out from. The incident command post should allow for each section activated, to have their own room for operations. The incident commander should have his/her own space and meetings need to be held in a separate room and not within the sections, so that people can continue to work. Briefings should preferably be held on the outside of the incident command post or at a camp, as to avoid cramping into one small room.

### ICS structure

The ICS structure complements the incident needs and requirements. It is important to fill the required ICS positions using skilled personnel. A section chief, who does not understand his/her role and responsibilities, should not be appointed. An incident is no place to do in-house training; activate a trainee position without the responsibility of the actual position for training purposes. Activate unit leaders; one person cannot do all the work.

### ICS positions

ICS positions should never be combined. Only the incident commander can fill all positions at once if he/she does not activate the specific position. The section ▶



# BEYOND FIRST RESPONSE

Dynamic Incident Management is a LG SETA accredited Training Service Provider and specialise in Integrated Incident/Event Management.

The importance of having trained, competent and prepared response capability from First Response to complex incident/event management personnel is vital in all agencies for effective and efficient incident and resource management.

## OUR TRAINING AND SERVICES INCLUDES:

### INCIDENT COMMAND SYSTEM (ICS)

- Basic to Advanced ICS (I-100 to I-400)
- Position Specific (All levels)
- Incident Management Teams (IMT)
- Emergency Operations Centre (EOC)
- Control Room Operators/Aviation Dispatch (Expanded Dispatch)
- On Line Incident Command System (per registration – from Mid April 2018)

### FIRE SUPPRESSION AND MANAGEMENT

- Wildland Fire Fighting Training (Basic and Advanced)
- Fire Safety (Awareness, Fire Safety in Buildings and Lodges)
- Prescribe Fire Operations
- Fire Weather
- Wildland Fire Investigation
- Leadership for the Wildland Fire Officer
- Tactical Radio Procedures and Base Radio Operators License

### SKILLS DEVELOPMENT

- Basic Communications and Office Etiquette
- NLP Life/Work Coaching
- Leadership Programme

### INTEGRATED ALL HAZARDS SUPPORT SERVICES

- Training and Fire and Rescue Equipment packages (Wildland Fire and Structural Fire)
- Establishment/upgrade of Fire Emergency Service (Including Wildland Fire Services)
- Established and trained Incident Management Teams

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- ▶ chief can fill the unit positions if not activated by them. Critical positions such as logistics cannot be used to check in resources, which is part of the planning section's responsibility. There is a reason for each position with a specific role and responsibility; to combine or cross the role and responsibility is asking for unclear instructions and communications.



### Incident management teams (IMT)

It is all about span of control! An incident management team (IMT) means trained, qualified and experienced people that support the operations during an incident, not vice versa. One does not just put people in positions to form a team. ICS is about position, not rank. IMT members do not necessarily need to be from one organisation, if they understand the incident command system and the roles and responsibilities, the person can work within any IMT. The use of local experts can strengthen the incident management team's work and outcomes. Regular incident management team training will ensure that each member is still current within the position. There is a need in South Africa for a national IMT database.

### Use of the planning process

Without following the planning process the only thing that continues is chaos management. Implement the process should not be as we like it to be but rather it needs to follow the ICS formal planning process. Meetings and briefings during the process is not a time for 'catching up' with friends. Operational period briefings are formal briefings where tactical supervisory personnel receive operational instructions and should be formal and timely.

### Standard terminology and forms

The use of standard incident action plan forms and other relevant incident forms is critical on all incidents. Refrain from using your company forms or what you feel is relevant. Resource typing is critical on any incident and need implementation.

### Incident action plans (IAP)

Incident action plans (IAPs) are done before the start of the operational period, not after. There should be an incident action plan per operational period and each supervisory personnel must receive an IAP during the operational period briefing. The IAP becomes a legal document at the end of the incident and should be filed and kept. Proper completion of each form of the IAP is critical and the incident commander should ensure that IAPs all are completed and signed off. The IC on final signing off the IAP confirms that all is correct and ready for implementation. The accountability lies with the incident commander.

### Checking in and tracking of resources

One cannot put enough emphasis on checking-in and tracking of resources. The incident command system uses a T-card system, which is visible and easy to read. Electronic resources tracking should be used for record purposes not as the only tracking system. All resources, tactically and functionally, must check in; this will help with volunteers just arriving to check on qualifications before tasking.

### Communication

Integrated communications are critical for successful communications. WhatsApp cannot be the main communications method tactically but it is a good back-up system. Each division or group must have their own channel and not everybody should have a radio. Air communications should be done through a licensed person and not used by everybody. Public information during the incident is critical. The more information provided, the less calls will be received; not only via radio, television or newspapers but regular updates on community billboards will give calming information to the public. Social media must be controlled; difficult but possible for all incident personnel and resources.

### Incident identification

Resources arriving at an incident must go through check in and should receive an incident call sign and not use their own call sign for the incident. Vehicles, crews and single resources should receive a colour tag to confirm official check-in and tasking were received. IMT members should wear the same PPE ie shirt with position identification; different uniforms should be avoided.

### Incident resources, camps and staging areas

Check-in is a must when arriving at incidents, camps or staging areas. Activate proper camps for resources to allow for relieve resources to be housed and rested to continue working. This will also allow for more control of resources. A camp should not be used a staging area. Allow for enough relieve resources during larger incidents; don't wait until needed.

### Transfer of command

Formal transfer of command should take place and everybody should be informed of the transfer of command. Stick to the current plan; do not just change it to suit your needs as new incoming supervisory personnel.

### Demobilisation

Demobilisation is not an on-the-spur-of-the-moment task.

Allow enough time for demobilisation orders. Proper check-out and tracking need to happen. Implement demobilisation plans and debrief resources before demobilisation.

### Formal debrief

The formal debrief is not an opportunity for a finger-pointing session. The formal debrief is critical for lessons learnt and must be attended by all IMT members and supervisory personnel, not just decision makers and political leaders; it is not about the who but the what. The incident commander should not chair the debrief; it should be chaired by a person who was not involved in the incident. Emotions have no place in a debrief.

### Training

The use of qualified, experienced incident command system facilitators is vital. A one or two course coaching opportunity does not make a person an ICS facilitator. ICS is not just about reading from a slide or a book; it is to provide an understanding of implementation to each student in front of you. As an ICS facilitator, if you do not understand the process and each step's role, responsibility, forms, inputs and outcomes, you are not ready to train ICS. Use registered training service providers and ask for qualifications in ICS training skills.

Lessons learnt outcomes must be shared and implemented! It is of no use if it is only on paper and not shared with all. Ask yourself, why are we not sharing lessons learnt from incidents?

- Is it because it is about people or organisations and not what happened?
- Is it because egos are too big?
- Is it because we do not care?
- Is it because we think we do not make mistakes?
- Is it because we think it will not happen again?
- Is it because we do not want to share new ideas because then it is not yours?
- Is it because someone in a lesser rank/position can't have better ideas?

Share, share, share then we will all learn from mistakes. Do not keep your lessons learnt a secret. It might just save a life. 🇿🇦

# DMISA DISASTER RISK REDUCTION CONFERENCE 2019

The Disaster Management Institute of Southern Africa (DMISA) held its annual conference on 18 and 19 September 2019 at the ATKV Resort in Hartenbos, Mossel Bay in the Western Cape and was supported by the South African National Disaster Management Centre (NDMC), Santam and the South African Weather Service (SAWS). This year's conference was aptly themed, 'Adapting to extremes and limiting disaster loss: Pathways to integrated resilience and sustainability for basic services, critical infrastructure and thriving communities.' The two-day conference is the biggest disaster management conference in Africa and provides an annual opportunity for a diverse range of stakeholders in disaster management from across Africa to gather and share skills, knowledge, expertise and experience.

Dr Mal Reddy led the customary candle lighting ceremony and a minute of silent reflection for those who had lost their lives and livelihoods during the past year to disasters followed by the introduction by DMISA President, Mduduzi Nxumalo.

Mossel Bay Municipality's Cnr Anton Dellemijn spoke on behalf of the Executive Mayor of Mossel Bay, Alderman Levendal, welcoming all to Hartenbos. Cnr Dellemijn said that South Africa suffered on of its worst wildfires in its history, referring to the Knysna Fires and added that the Greater Southern Cape, including Hartenbos, had subsequently also experienced major wildfires. He said that Mossel Bay Municipality focussed on building integrated sustainability, resilient communities and investing in infrastructure and that the community of Mossel Bay was very proud of the Mossel Bay Fire and Rescue Service. "Chief Joey Johnston, we thank you", said Cnr Dellemijn.

Dr Mmaphaka Tau, Head of the National Disaster Management Centre (NDMC) in South Africa, delivered the keynote

address and official opening on behalf of Dr Nkosozana Dlamini Zuma, National Minister of Cooperative Governance and Traditional Affairs, highlighting the importance of synergising our collective energies in order to strengthen our ability to deal with sudden onset disasters. The address also emphasised key infrastructure design, building capacity and the National Development Agenda.

DMISA Board Member, Dr Johan Minnie, shared the current status quo on Professionalisation, Recognition of Prior Learning (RPL), recent DMISA achievements and an overview of the conference approach and theme with a focus on the Sendai Seven targets, 2019 focussing on Target D ie to substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

NDMC head, Dr Mmaphaka Tau, provided an overview of disaster management strategies and challenges in South Africa. Dr Tau discussed the disaster risk and development challenges, stating that

climate change and vulnerability as well as population and infrastructure pressures are compounding the disaster risk challenge and undermining service delivery efforts. "South Africa faces increasing disaster risk dynamics and this is compounded by service delivery backlogs and poor quality of some of the services," said Dr Tau. The NDMC has also signed an MOU with Santam; the business sector can contribute to building community resilience through fostering collaborative arrangements in the implementation of DRM and fire services in South Africa. He provided feedback on the progress of the DMISA 2018 Conference resolutions, which we will report back on in the next issue. In his closing remarks, Dr Tau said, "The Sendai Framework enjoins us to achieve 'the substantial reduction of disaster risk and losses in lives, livelihoods and health and in economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries'. Integrated and coordinated disaster risk management (DRM) based on partnerships and cooperative governance between all spheres of government is fundamental for us to achieve the Sendai Outcome. Adequate allocation of



Some of the DMISA Board members at the 2019 Conference



Mossel Bay Municipality's Clr Anton Dellemijn with some of DMISA's Board members and the NDMC's Dr Mmphaka Tau

le Maitre, principle researcher at the CSIR shared the 'Development of a practical decision support tool for improved flood risk management at the settlement level'. Willemien van Niekerk furthermore explained 'The impact of climate change and urbanisation on South Africa's settlements in 2050: Why we need to start adapting now'. Nabeel Rylands, director, district and local municipal performance monitoring and ICT for the Western Cape Government presented on 'Linking the Green Book, risk assessments and geographic information system (GIS) to the Integrated Development Plan (IDP) – a case study from the Sarah Baartman District Municipality'.



Dr Mal Reddy led the customary candle lighting ceremony

Greg Forsyth also shared the research findings and lessons learned from the Knysna Fires of 2017 while Lebogang Makgati, senior forecaster at SAWS discussed the lessons learnt from Cyclone Idai.

A panel discussion on 'Adapting to extremes and limiting disaster loss, insurance perspectives' followed with Dr Johan Minnie of the Disaster Risk Management Centre of the City of Cape Town as facilitator. Panel members included Thabiso Rulashe, Strategy at Santam, who discussed the risk protection gap and Cedric Masondo, CEO of South African Special Risk Insurance Association (SASRIA) who shared information on escalating social unrest and implications for state insurance.



The DMISA Conference provides an opportunity for a diverse range of stakeholders in disaster management from across Africa to gather and share skills, knowledge, expertise and experience

Mr K Harald Drager, President of The International Emergency Management Society (TIEMS), discussed trends in international emergency management and shared an overview of TIEMS. He provided feedback of emergency management around the world and highlighted the challenges and lessons learned during and after major disasters, outbreaks and events.

Francis Hoets of DMS NPC discussed 'Dynamic 'real-time' disaster risk profiling for a resilient future' after which a number of plenary sessions followed.

- resources to both DRM and fire services is a key requirement for the reduction of disaster risks and losses. A multi-portfolio committee seminar is being pursued under the aegis of the portfolio committee for CoGTA to heighten parliamentary oversight of and support to DRM."

Mnikeli Ndabambi, acting CEO of the South African Weather Service (SAWS), discussed the weather/climate enterprise under the Fourth Industrial Revolution: Opportunities for adapting to extremes.

The majority of presentations focussed around the recently launched Green Book by the Council of Scientific and Industrial Research (CSIR) with an overview and introduction to the Green Book provided by Willemien van Niekerk, senior researcher at the CSIR. Greg Forsyth, senior project manager at the CSIR shared an insightful presentation on 'Wildfire risk in South Africa - now and in the future'. Dr Johan Malherbe, senior researcher at the CSIR discussed the impact of climate change on drought and Dr Dave

We will publish some of the papers presented in separate articles in upcoming editions of the Disaster Management Journal, as well as the 2019 conference resolutions.

The 2020 DMISA conference will be held at The Station Urban Event Space, situated at 65 Masabalala Yengwa Avenue in Durban in KwaZulu-Natal on 30 September and 1 October 2020 with the theme, 'Impact and influence: Enhancing strategy and execution in disaster, risk and resilience management'.







# WILDFIRE DISASTERS: LESSONS LEARNT

*By Colin Deiner, chief director, disaster management and fire brigade services, Western Cape Government*



Over the past three years a number of massive wildland fires have occurred in various parts of the world that have been shocking in their magnitude and devastation. The fire that started on 8 November 2018 in Northern California's Butte County and was more popularly known as the 'Camp Fire', started when a faulty electric transmission line ignited and was driven by an east wind, which pushed the fire downhill through developed areas. After exhibiting extreme fire spread and intensity, it spread through the nearby rural communities forming an urban firestorm in the foothill town of Paradise. 85 people died in this fire while seventeen were injured including three fire fighters. It covered an area of 62 053ha and destroyed 18 804 structures, with most of the damage occurring within the first four hours. The towns of Paradise and Concow were almost completely destroyed, each losing about 95 percent of structures in town. By January 2019, the total damage was estimated at \$16,5 billion of which one-quarter of the damage was not insured. The Camp Fire is the deadliest wildfire in the United States since the Cloquet fire in 1918 and is high on the list of the world's deadliest wildfires; it is the sixth-deadliest US wildfire overall.

On 17 June 2017 a wildfire raged through the Pedrógão Grande region of central Portugal, devastating an area four times the size of Lisbon, destroying hundreds of homes and killing 66 people. 53 000 hectares of land burned, including 20 000 hectares of forest. 2 018 farmers were affected at a cost of €21m. Portuguese officials dispatched more than 1 700 fire fighters nationwide to combat the blazes while Spain, France, Morocco and Italy deployed fire fighters and aircraft to help extinguish the fires. Further fires broke out in central Portugal in 2019 causing more widespread damage.

You are reading this while the world is still reeling from the massive wildfires taking place in various parts of Australia and which have still not been brought under control. At least 28 people have died nationwide and in the state of New South Wales (NSW) alone, more than 3 000 homes have been destroyed or damaged. State and federal authorities are struggling to contain the massive blazes, even with fire fighting assistance from other countries, including the United States.

South Africa is not spared this scourge and wildfires have become part of the landscape of the Western Cape Province and the forestry regions of

Mpumalanga, Limpopo and KwaZulu-Natal. It was particularly in the Western Cape where some of the costliest and most devastating wildfires have occurred over the last three years.

During the 2017/2018 wildfire season, which runs from early December to mid-April annually, more than 17 000 fires had been attended to by the various fire services in the Western Cape Province. Approximately 9 000 of these were wildfires (veld/vegetation fires). Ironically, the two largest fires experienced in the Western Cape over the past 50 years have been outside the recognised wildfire season. In June 2017 a fire broke out in the Elandskraal region of Knysna following a major windstorm that had affected the entire province from as far west as Cape Town. 973 formal homes were destroyed leaving 4 000 people displaced and eight people, including two fire fighters, lost their lives. Approximately 19 000 to 22 000ha burned out and it was calculated that the approximate cost of the disaster was in the region of R4-billion. The same area was again affected in October and November 2018 when a fire approximately four times the size of the Knysna Fire caused the death of eight civilians and covered an area of between of 86 000 and 90 000ha.

### The wildland/urban interface

Wildfires have been a part of the lives of the people who live in these areas for as long as anyone can remember. In the past, however, wildfires were generally confined to the more rural areas with minimal intrusion into areas inhabited by humans. In recent years this has changed significantly.

In the industry the term 'wildland' denotes the area in which development is essentially non-existent, except for roads, railroads, powerlines, etc and any structures are widely scattered. The wildland/urban interface (WUI) is that zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. It is in this area where a wildland fire can potentially ignite homes.

The increase in the wildland/urban interface (WUI) is due to changes in human behaviour on both sides of the Gini coefficient. The massive urbanisation of rural workers looking for employment has caused them to settle and build informal houses on the urban edge and even into the wildland space with very little formal firebreaks between them and the environment threatening their homes. On the other side of the coin you have the tendency of the more well-heeled members of the community wishing to live 'closer to nature' by settling in luxurious properties very close to forested areas. Although the risk is not as severe, due to the quality of construction and maintenance, these homes generally do not have sufficient space between the wildland space and their buildings to allow for sufficient retardation of the wildfire or defensible space for fire services to utilise when trying to prevent flame impingement on the threatened structures. Generally, this is due to home owners not wanting to change the rural atmosphere projected by being 'in the forest' or poor maintenance of holiday homes, which are only inhabited at certain intervals.

The increase in the WUI has also necessitated fire services to change the way wildfires are responded to. The risk of a wildfire spreading rapidly into an inhabited area necessitates the need for early fire suppression, which results in changes in vegetation fuel structures and fuel accumulation, leading to more high-intensity fires.

Fortunately, wildland fire suppression operations successfully control 97 to 99 percent of wildfires during the initial response and fire attack. Modern

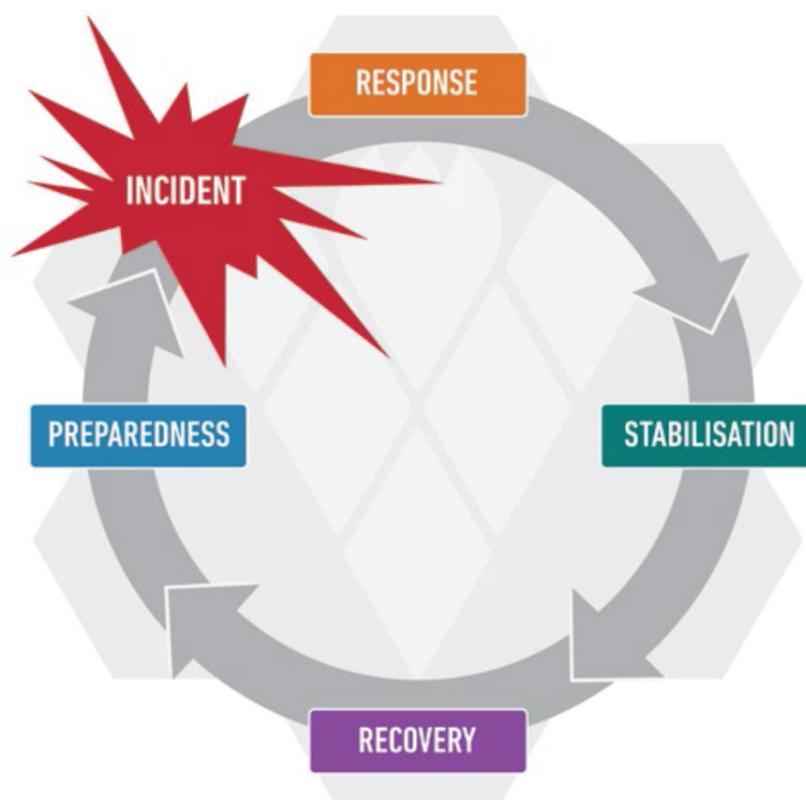
technology and the implementation of effective incident command systems allow fire officers to plan their operations properly and to prioritise the protection of lives and property. When a single structure does, however, get involved in a fire, it can also be dealt with by a structural fire fighting team who, as a primary objective, will try to prevent it spreading to other structures. Only during extreme wildfire conditions do numerous houses ignite and burn simultaneously overwhelming the fire fighting efforts. It is only a very small percentage of wildfires that are not controlled by the initial attack and this then leads to extreme fire behaviour conditions, which ignite numerous structures and cause disastrous conditions.

Wildland/urban interface fire disasters are frequently preceded by extreme weather conditions such as high wind speed and low humidity. Fire monitoring agencies worldwide constantly monitor such conditions during their high risk periods and will ensure an increase in resources to rapidly respond to any threats that may present. When the above conditions are such that they are able to overwhelm the initial attack and then start to threaten multiple structures the potential for a disastrous WUI fire becomes a reality.

### Main causes

I have mentioned the problem of the wildland/urban interface above. Although it is an integral 'requirement' for a disastrous wildfire, there are two other factors that we have detected in the Western Cape that have a profound impact, alien invasive vegetation and global climate change. "There is a massive army marching across South Africa. It's silent and looks harmless but it's growing by the day. It's depleting the country's water supply, intensifying wildfires, reducing agricultural productivity and threatening globally significant biodiversity. More than half of the area that burnt in the Knysna Fire comprised of either pine plantation or areas of natural vegetation that was severely invaded by alien invasive plants. A lot of which are the same pines that are planted in the plantation as well as several Australian species. Most of these alien invasive plants produce much more biomass and therefore fuel," stated Dr Tineke Kraaij during a conference held at the Nelson Mandela University in George.

The above statement made by Dr Kraaij defines the enormity of the problem facing not only the wildfire community in the Western Cape but also impacting severely on the devastating drought that the province is enduring. Alien invasives steadily



*The Wildfire Shared Responsibility System has been structured around the disaster management cycle*

- ▶ diminish water resources, as they typically use significantly more water than native vegetation. Across the country, invasives reduce mean annual runoff by 1,4 billion m<sup>3</sup> ie three percent. A 2016 study on the impact of invasives on the Western Cape water supply system indicated that they reduce water yields by 38 million m<sup>3</sup> per annum, which equates to losing the entire Wemmershoek Dam annually.

The proliferation of alien invasives in the Western Cape can increase the fuel loads by up to 60 percent in invaded fynbos, which could then support higher intensity fires. Other fuel attributes of invasives, like moisture content, chemical composition and fuel structure also affect fire behaviour. There is research that shows that fire intensities during the 2017 Knysna Fires were higher in pine plantations and invasions than in uninvaded fynbos. Over half the total area burned consisted of invasives and this likely increased the overall fire severity.

South Africa is remarkably biodiverse and the Cape Floristic Region, a world heritage site containing the unique fynbos biome, is famed for having one of the highest concentrations of plant species per unit area globally. Two-thirds of the region's 9 000 plant species are found nowhere else on earth and no less than 2 000 of these species are threatened with extinction by invasives.

The impact of global climate change on wildfires is still an area of contention. Evidence in the western United States has seen a two-degrees-Celsius rise in annual average temperature and lengthening of the fire season by almost three months since the 1970s; both elements contribute to what the scientists refer to as the "new era of western wildfires". This pattern of bigger, hotter fires, along with the influx of homes into fire-prone areas, over two million since 1990, has made wildfire vastly costlier and dangerous.

It is also important to note that the two most devastating fires in the Western Cape Province over the last three years have happened outside of the normal fire season. It is accepted that the devastating drought and lack of rainfall in the Southern Cape region has been a major contributor, with the conditions prior to the Knysna fires in 2017 being akin to a 'perfect storm'; however, the impact of cutbacks on environmental management must not be excluded. While global climate change has become one of the most critical challenges of

our time, I believe that we should also earnestly consider our contribution to 'global climate management'.

### Risk reduction strategies

Managing a complex wildland/urban environment will require an integrated fire-risk reduction strategy encompassing environmental modifications, engineering, education, enforcement including legislation and evaluation.

This is not only a fire services' problem.

Following the devastating fires experienced in the province in 2017, the Western Cape Disaster Management Centre embarked upon a strategy to prevent or at least mitigate large scale wildfire disasters from continuously recurring. In order to achieve this, it was appreciated that the province needed to transform all the people and systems affected or involved with wildfires. The system, known as the Wildfire Shared Responsibility System, shows the responsible participants at each stage of the disaster management cycle and gives practical examples of measures undertaken by those working towards the desired future state. This Wildfire Shared Responsibility System is a starting point for discussion and all involved are encouraged to:

1. Envisage where they would like to be in the future
2. Identify measures to achieve this future state
3. Develop collaborative relationships and partnerships to enable transformation and
4. Set deadlines to achieve the desired state and strategise how challenges will be overcome.

### Prevention and preparedness

Prevention, as we know, is by far the safest and most cost effective way of managing the wildfire challenge. To this end the largest focus in the proposed shared responsibility system is on prevention and preparedness.

The first group of stakeholders identified here are the fire protection associations, local municipalities, disaster management fraternity and the insurance industry.

These organisations should pro-actively carry out sustained wildfire risk-awareness communication campaigns that change the behaviour of rural and WUI homeowners and landowners exposed to wildfire risk. These targeted campaigns will help homeowners and landowners comprehend their risk. They should then be incentivised and rewarded for being prepared for wildfires. Crucially,

there should also be mechanisms in place to penalise non-compliance. We have often been hearing reports of arson being responsible for the bulk of our wildfires. It is, in most cases, very difficult, if not impossible, to bring perpetrators to justice, for many reasons. It is, however, important to focus on those who we do have a watertight case against and make examples of them.

Integrated Development Planning (IDP) is a legal requirement for all municipalities in the country. It is furthermore a requirement that each IDP should include a disaster management chapter. This 'chapter' should take into account the disaster risk presented by the plan implementation and include the measures to be taken to address that risk. In wildfire prone municipalities, wildfire awareness, understanding and planning for risk are critical components of development planning. As such, wildfire risk is well-thought-out when considering the following:

- Positioning of homes/communities in relation to vegetation, slope and aspect
- Proximity of homes to each other
- Road networks for emergency services' access and egress
- Location and availability of hydrants and water sources
- Placement of hazards eg electricity lines.

Municipalities cannot take sole responsibility for wildfire preparedness although they should endeavour by all possible means to accommodate developers, builders, architects and landscapers to ensure that all new developments exposed to wildfires are appropriately designed and constructed to limit their risk. Wildfire building codes and standards should be established and wildfire intelligence should be reflected in all aspects of design and building.

People who choose to build homes in WUI areas should be aware of their exposure to wildfires and complete at least the basic proactive mitigation measures around their buildings, assets and infrastructure. The installation of more advanced defensive measures around the home such as water sprinklers, water tanks and fire fighting equipment, should be considered.

Fire services, by their origin, are response agencies. Over years, however, we have seen an awareness of the role of fire services in preventing fires and creating awareness. South African municipal fire services have largely subscribed to international training standards, which have had a heavy focus on structural

fire fighting. It is only really in the forestry industry where fire fighting in the wildland environment has enjoyed the necessary attention. Authorities must ensure that fire fighting crews and incident managers are specifically trained for wildfire and WUI operations. Due to the scale of wildfire operations, it is imperative that incident command systems (ICS) is an integral part of the strategy. All responders must receive adequate ICS training and implement ICS during operations. ICS will only be successful if ALL responders understand the ICS, this includes the most junior staff members. The Western Cape, learning from international best practice, implemented the provincial incident command system in 2012 and, since then, it has been central to the success of numerous wildfire operations.

The prevention of wildfires and pre-season mitigation efforts must be a shared responsibility between fire services and landowners. Fire service crews assist with fuel-reduction burns on the properties of landowners meeting certain criteria for assistance. This should take into account that the landowner has done the correct planning, have their own resources in place and have plans to monitor the area after the burn.

A crucial partner in the shared responsibility model is the fire protection association (FPA). FPAs must be supported to build up sufficient capacity to meet the needs of their landowners as well as build membership numbers. It is important that there is good cohesion with district and municipal fire services and wildfire specialist services.

The role of the weather service must also not be ignored. Weather services are a key partner in the system. As we enter the age of more catastrophic wildfires, an integration between the Fire Danger Index (FDI) with a new catastrophic index level becomes a necessity. This can be achieved by identifying recognised leaders in wildfire warning systems in South Africa and forming partnerships between these providers and emergency resources.

### Response

The shared responsibility must be carried through from the prevention and mitigation phase to the response phase. Rapid detection and accurate reporting is the key to early response and control of a fire. This is attributable mainly to fire services promoting and advising the public how to report wildfires. All ignitions must be treated as serious and a predetermined set of response actions, based on the current FDI rating, warnings and advice must be initiated. A



*The prevention of wildfires and pre-season mitigation efforts must be a shared responsibility between fire services and landowners*

staggered response over a longer period will seriously hamper the probability of controlling and extinguishing a fire before it reaches the catastrophic stage. This can't be done on an ad-hoc basis and therefore fire services must have a system to ensure a formal response to all wildfire incidents. This can be made possible through support received from supporting fire fighting agencies/organisations such as landowners, volunteers, FPA resources, private contractors, etc.

Experiences over recent years have stressed the value of bringing experienced commanders together early when a potential catastrophic fire is expected. By considering information such as the weather, terrain, available resources and prevailing trends such as drought conditions etc, the future state of the fire can be determined. This will assist in deploying resources as effectively as possible to ensure the utilisation of sufficient resources in time-critical areas. This acts as a force multiplier when resources are not adequate and ensures maximum utilisation of all available resources.

The costs of aerial fire fighting support have increased as newer and larger capacity aircraft have become available. The increased reliance on contracted services has amplified this bill and it is virtually impossible for one government agency to bear the costs for all the aircraft required to manage a catastrophic fire. A shared responsibility for aerial fire fighting is here also crucial.

By all response agencies using a central service provider costs can be shared and better rates can be negotiated. It also allows for greater operational synergy across responding agencies.

### Stabilisation/recovery

An area that requires much attention is the recovery work that should be done in an affected area after a fire. There is the period immediately after the fire when mopping up is done and the fire line is adequately monitored for flare ups and potential problem areas are identified and dealt with. Mopping up must be treated as an essential and specialised activity and must be done by trained personnel according to standard operating procedures.

Then there is the period that kicks in later when the opportunity may present itself for alien clearing, ground rehabilitation etc. This must become an integral part of any wildfire management plan. What you do at this stage, will save lives and the environment (and lots of money) in the future.

### Conclusion

A huge amount of expertise exists in South Africa on the topic of wildfire management. There are scientists, academics and experienced fire fighters with a wealth of knowledge which, in my experience, they are happy to share. There must be an understanding under decision makers that wildfire is its own specialty, that there is always something to learn about wildfires from others and that collaboration results in consistently better outcomes. 🇿🇦

# A CONSEQUENCE MANAGEMENT APPROACH TO DISASTER MANAGEMENT: ALL-HAZARD PREPAREDNESS AND RESPONSE

By Dr Johan Minnie and Schalk Carstens

## PART 7



*An all-hazard preparedness planning meeting for the 2019/2020 festive season in Cape Town*

**T**his article is the seventh article within this series of articles on consequence management. In the previous article, we discussed responsibility in response management. While the first article in this series, published in the Disaster Management Journal Vol 2 No 2, already argued for a generic all-hazard approach to consequence management, this article and the next article will focus the all-hazard preparedness and response approach, a view on preparedness and response that argues for meaningful and reasonable standardisation of preparedness and response to the non-standardised impacts and consequences of hazards.

### **The need to rise above the specific**

In countries where disaster, emergency management or civil protection workers are employed and mandated to deal with the full spectrum of natural and human-induced hazards, they come into contact with a variety of incident and emergency management personnel from a variety of governmental, non-governmental and private institutions, from petrochemical facilities to corporate headquarters to nuclear

installations to educational facilities. The degree of contact is of course dictated by the presence of and the mandate given to disaster management workers in any specific country; the expectation is that such a cadre of officials will exist in any country with a functioning government and the United Nations (UN) system for example expects to work with a central national body responsible for disaster and/or emergency management in countries. The task of these workers is not to become an expert in each of the fields they encounter but rather to have an approach that is flexible and can accommodate collaboration with any of these stakeholders.

Such an all-hazard responsibility demands impartiality or an ability to rise above the hazard-specific response instincts drilled into line functions and imprinted through experience in responding to specific hazards within a line function. The ability to achieve this impartiality is clouded by the professional origins of disaster and emergency management officials, who may have backgrounds in very specific fields of expertise and

experience that does not prepare them for the coordination of multidisciplinary response. Disaster management training may also not assist in building generalists if the focus of that training is not generalist enough. A major obstacle for an all-hazard approach is also cooperation between services.

It is therefore not surprising that in certain locations specific attention has been invested in ensuring that multidisciplinary operational coordination in emergency response is codified in procedures and plans and developed through training and experience and that specific training, from a basic to an advanced and general staff level, has developed towards an all-hazard approach to preparedness, response and consequence management.

### **Objective**

Integrated and standardised disaster response by multiple agencies remains a challenge worldwide. An all-hazard approach to preparedness and response aims to establish mechanisms to ensure integrated response efforts when significant events and/or disasters occur or are threatening to occur.

All-hazard preparedness and response is described by the managerial, administrative and physical arrangements that have been made within a specified jurisdiction to safeguard the public and to minimise the public consequences of any type of incident, resulting from any type of hazard, which may occur in the area. All-hazard preparedness and response does not replace any risk-specific contingency plans and is also not a jurisdictional emergency response or disaster management plan. This type of approach provides a standardised multidisciplinary response framework to any major incident or disaster, irrespective of the hazard that is causing the emergency.

**Scope**

The scope of an all-hazard preparedness and response approach encompasses the preparedness, response and relief actions to be taken before during and after any incident, which has the potential or may result in injuries, loss of life or property and damage to the environment in an area. To ensure that appropriate protective measures are taken in a timely manner it is necessary to identify:

- Those events which may require activation of response
- The area(s) in which actions may be needed
- The actions to be planned and
- Those conditions under which specific actions should be considered.

An any-hazard approach is intended to facilitate multi-agency and multi-jurisdictional coordination in both pro-active and reactive activities.

The all hazards concept is also useful to the extent that a large range of risks can cause similar problems and such generic measures as warning, evacuation, medical services and community recovery will be required during and following emergencies.

**What hazards tell us**

Disasters mainly occur when there is an interrelation between hazards, resulting from natural or human action and the population, who are, for various reasons, vulnerable. The causes of vulnerability are complex and are related to factors such as settlement of populations in disaster prone areas, demographic growth (in the main urban areas), the degradation of the environment and poverty.

Hazards include a wide range of natural, technological and environmental hazards, which may impact on

people, property, the natural and built environment and the socio-economic activities of communities. Hazards are often identified through assessment and presented in policy documents for disaster management.

At an international level, some degree of separation has historically existed between those looking at natural hazards as opposed to technological and also socio-economic hazards and humanitarian action. Such a separation is, however, not possible at the local level where communities are directly affected by a wide variety of hazards and need to respond and be assisted where possible, irrespective of the hazard or its source. This is a further motivation for maintaining an all-hazard approach. For example, after following a natural and technological hazard classification for many years, the South African experience of the displacement of foreign individuals due to violence against them, made it clear that a natural/technological hazard classification is insufficient and that socio-economic and political factors should also be considered as potential hazards that drive a need for disaster response in the

form of humanitarian relief. The South Africans recognised a need to incorporate social conflict and complex emergencies in a hazard classification.

Hazard that can be identified in any jurisdiction includes a wide range of natural, technological and environmental hazards that may impact on the members of the public, property and the environment.

In order to respond effectively a coordinated and integrated response is of utmost importance. This must be achieved through the preparation and implementation of disaster management plans that involves all necessary role-players.

**From approach to plan**

The following risk-specific or hazard-specific contingency plans are examples of what could be in place. This is an extract with some changes to remove specific names of entities and jurisdictions from a list of plans in the Western Cape Disaster Preparedness, Response, Relief and Rehabilitation Plan.

*Table 1: Examples of hazard- or risk-specific plans*

Plan names
African Horse Sickness Contingency Plan
City Flood Plan
Communicable Diseases Contingency Plan
Drought Plan
Foot and Mouth Disease Contingency Plan
Hazardous Materials / Dangerous Goods Incident Response Plan
Hazardous Waste Management Plan
Influenza Pandemic Preparedness Plan
Maritime and Aviation Search & Rescue Contingency Plan
Mass Casualty Contingency Plan
Municipal Electricity Outages Plan
Nuclear Emergency Plan
Oil Spill Plan
Electricity Outages Plan
Flood Plan
Rail Incident Contingency Plan
Rock Lobster Emergency Plan
Social / Humanitarian Relief Plan
Swine Fever Contingency Plan
Swine Blue Ear Disease Contingency Plan



*A collection of stakeholders during a Koeberg emergency exercise*

▶ A quick inspection of the list will indicate that there are plans that are similar to each other eg Communicable Disease Contingency Plan and Influenza Pandemic Preparedness Plan. It follows that these plans addressing similar hazards could be combined into a higher level plan that addresses one category of hazards. The several animal disease outbreak plans could for example be combined into one overarching animal disease plan so that those things that are similar in each plan can be combined into a more generic plan without repetition. As additional hazards are identified and specific plans are compiled, a danger exists that different plans will not use the same terminology and that parties involved will not be able to communicate effectively and will not be able to efficiently work together as required. In order to increase efficiency, it is necessary to standardise disaster response and relief as far as possible without negatively affecting the ability of specialised services to deal with specialised needs and requirements.

The approach encourages disaster and emergency managers to address all of the hazards that threaten their jurisdiction in a single plan instead of developing a large number of stand-alone plans.

A plan that is flexible enough for use in all emergencies, including unforeseen events, provides a community with an emergency management 'bottom line'. From there, a community can proceed confidently, from a position of relative security, with long-term mitigation efforts directed at specific hazards.

Creating a different plan for each hazard is an option but not one that agencies such as the Federal Emergency Management Agency (FEMA) recommend. The all-hazard approach:

- Avoids duplication of the planning effort for every hazard and for every activity and action step
- Serves in all hazard situations, even unanticipated ones, by organising the plan around performance of 'generic' activities and action steps and
- Permits emphasis on hazards that pose the greatest risk to a jurisdiction, through the use of hazard-specific appendices.

While the causes of emergencies vary greatly, the potential effects of emergencies do not. This means that jurisdictions can plan to deal with effects common to several hazards, rather than develop separate plans for each hazard. For example, earthquakes, floods and hurricanes all can force people from their homes. The jurisdiction can develop a plan and an organisation around the activity or function of finding shelter and food for the displaced, with minor adjustments for the probable rapidity, duration, location and intensity of different hazards if desired. It can do the same for other common activities. In fact, a critical aspect of planning for the response to emergency situations is to identify all of these common tasks or functions, that must be performed, assign responsibility for accomplishing each function and ensure that tasked organisations have prepared standard operating procedures (SOPs) that detail how they will carry out critical tasks associated with the larger function.

However, the plans for performing each activity should not be created in isolation. Since the jurisdiction's goal is a coordinated response, activity-based plans should follow from a basic plan that outlines the jurisdiction's overall emergency organisation and its policies.

The following list of core activities warrant attention and may require that specific action steps be taken during emergency response operations:

- Direction and control
- Communications
- Warning
- Emergency public information
- Evacuation
- Mass care
- Health and medical services and
- Resource management

The fact that several functions are not included in the list does not mean that they are regarded as less important than the ones that are included. Each jurisdiction's planning team should assess its own need for functional annexes.

Additional or different activities should be prepared at the discretion of the planning team. Typical candidate annexes include damage assessment, search and rescue, emergency services, aviation operations and radiological protection, among others. The primary concern is that all important activities be covered properly in the plan. The location or categorisation of these activities is of secondary importance, though government should strive for consistency among its jurisdictions to facilitate coordination.

### Conclusion

In summary, this article considered all-hazard preparedness and response in general and specifically the objective and scope of such an approach and also hazard analysis as an indication of the need to an all-hazard approach. It was shown that meaningful and reasonable standardisation of preparedness and response to the non-standardised impacts and consequences of hazards is important as we strive towards high levels of preparedness and rapid and effective response.

This concludes this seventh article in this series of articles about the wider consequence management practice. The next article will focus on further aspects of all-hazard preparedness and response, namely coordinated emergency organisation and incident and disaster classifications. 🇿🇦

# DEVELOPMENT OF A PRACTICAL DECISION SUPPORT TOOL FOR IMPROVED FLOOD RISK MANAGEMENT AT THE SETTLEMENT LEVEL

By Dr Ilse M Kotzee and Dr David C le Maitre, Natural Resources and Environment, CSIR, Stellenbosch, South Africa

The future climate of South Africa is generally expected to be characterised by increased temperatures and changes in rainfall. There is no single approach or dataset that is recommended as the best for estimates of flood magnitudes and frequencies in South Africa. Detailed approaches based on generating flood lines and estimating flood durations are impractical given the limitations on the available data and the time and resources they would require. Here we propose the use of selected climatic and environmental characteristics to generate a relative flood hazard index at a national scale. In this approach flood hazard is characterised based on the environmental characteristics of the catchment such as rainfall, elevation, land cover and soil type. We use Sensitive Catchment Integrated Modelling and Analysis Platform (SCIMAP) modelling software to analyse the hydrological responsiveness and connectivity of catchments of South Africa. When assessed at the national level, the flood hazard index is rated medium for much of the country, with Namaqualand, the Kalahari, parts of the Karoo, the Limpopo valley and the Zululand coast having a low to very low flood hazard index. Very high flood hazard index values are found in all tributaries of the Great Fish River, the Mbashe River valley, the central Tugela River valley, the Drakensberg escarpment and the Soutpansberg. The approach shows great potential as a decision support tool for improved flood management and is intended to be used in the preliminary stages of a study to prioritise areas in the landscape where future resources, time and expertise should be focused.

## Introduction

Recent increases in the magnitude, frequency and duration of flood events have increased awareness of the need for improved flood risk management worldwide (Posthumus et al., 2008; Wheeler and Evans, 2009). Like many other countries, South Africa has a history of floods ranging from minor, local events through to national disasters with widespread flooding generated by

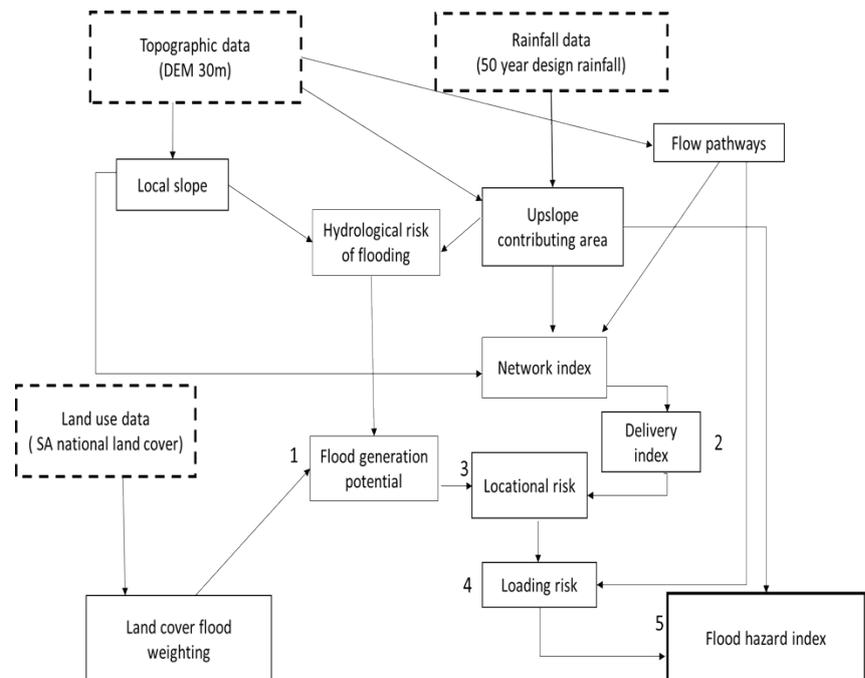


Figure 1. Diagram summarising the steps and inputs in the calculation of the flood hazard

extreme events such as cut-off lows and cyclones, the most recent one being cyclone Dineo in February 2017 (Davis-Reddy and Vincent, 2017; Holloway et al., 2010). These flood events have the potential to cause fatalities, displacement, property and infrastructure damage, agricultural loss and damage to the environment (Bahauddin and Uddin, 2012). In order to minimise the risks posed by extreme flooding, proactive or reactive measures can be put in place (Palmer et al., 2009; ten Brinke et al., 2008). Proactive measures are actions that, if implemented, will improve the capacity of river systems to absorb disturbances while minimising threats to the environment and human populations. Whereas reactive action involves responding to problems as they are generated by repairing damage or by mitigating ongoing impacts. The ideal is to be able to anticipate change and adapt flood management to those changing circumstances, whilst having disaster

relief, flood control infrastructure and evacuation plans in place (Schelfaut et al., 2011). Due to the unpredictable nature of floods, the degree of vulnerability to damage from flood hazards can vary. The first step in improving the understanding, managing and protecting against floods is to identify and locate the flood hazard areas in a watershed.

A number of studies have used the concept of critical source areas to model how fine sediments, organic matter and nutrients are transported by water from the source to the waterbody (i.e. delivered) (Agostinho et al., 2009; Reaney et al., 2011) by modelling hydrological connectivity, particularly those focusing on the likelihood of delivery and how it varies spatially (Beven et al., 2005; Lane et al., 2009). Because non-point source (diffuse) pollution models are designed to identify areas which are most likely to generate surface runoff, either by infiltration excess or saturation excess

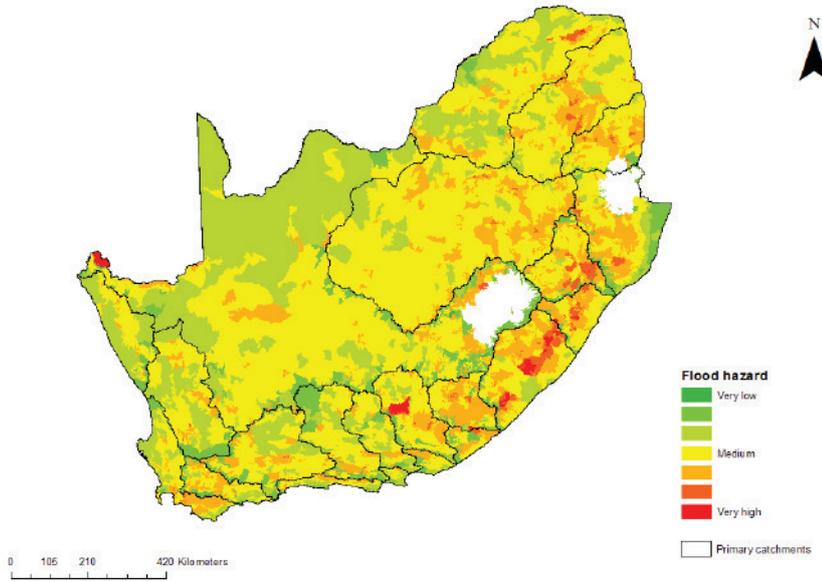


Figure 2. Mean Flood Hazard Index (FHI) per quinary (5th order) catchment based on the SCIMAP model run at the secondary catchment level. Class intervals based on the standard deviation of the mean FHI for the quinary catchments.

▶ (both of which allow for rapid responses to rainfall), they capture the spatial distribution in the strength of a key flood generation process (Hahn et al., 2014; Moore et al., 1991). They may, therefore, offer an avenue for representing the spatial patterns in the potential source and delivery areas for floodwater using widely available data on topography and land cover (Lane et al. 2003). The use of these models also allows for a shift from local scale flood hazard assessment to assessments, which focus on the scale at which floods are generated and propagated – the watershed scale. This is also the scale at which management agencies operate and decision making can affect flood management. Although studies often treat water and sediment separately, there is no basis for doing so as the controls ie the hydraulic and sediment transport processes, are both determined by the channel network (Croke et al., 2013). In fact, more integrated and interlinked approaches may be the key for a better understanding and management of hydrological hazards. This study explores the potential of these models to capture the role of landscape characteristics in regulating floods, by testing whether the Sensitive Catchment Integrated Modelling and Analysis Platform (SCIMAP) can be adapted to identify flood hazard areas and support flood management.

**Method**

**SCIMAP model**

The Sensitive Catchment Integrated Modelling and Analysis Platform (SCIMAP), a decision support tool developed by the Durham and Lancaster Universities along

with the British Environment Agency (<http://www.scimap.org.uk/>) was chosen because it uses readily available datasets and can be used at any scale. The main aims of the model are to identify source areas and pathways of poor water quality and sediment erosion using the concept of hydrological connectivity (Milledge et al., 2012; Reaney et al., 2011). As it captures the key hydrological processes involved in flood generation from surface runoff, the modelling framework used in SCIMAP could be adapted and used to identify flood hazard areas.

**Model inputs**

The model inputs consist of: (1) topographic data of appropriate spatial resolution and vertical precision; (2) land-cover data; (3) design rainfall data and (4) soil data. For topographic data a 30m digital elevation model (DEM) with a planimetric accuracy of 15.24 metres was used (Chief Directorate Surveys and Mapping, 2002). The national land-cover (NLC) 2000 data for South Africa, Lesotho and Swaziland derived from satellite images and field verification was used to obtain land-cover data (Van den Berg et al., 2008). To account for extreme rainfall events, design rainfall data for a 50 year return period were taken from the South African Atlas of Climatology and Agrohydrology (Schulze and Smithers, 2007). Design rainfall is a theoretical flood event based on rainfall intensities (using historical rainfall data) associated with a set duration and frequency of recurrence (Smithers and Schulze, 2002). Hydrologic soil type data was inferred from soil texture data obtained from the Soils and Terrain Digital Terrain Digital Database (SOTER) for South Africa (Dijkshoorn, 2003).

Model inputs were interpolated onto the topographic data resolution of 30m via a nearest neighbour algorithm using ARCGIS 10.3 and Spatial Analyst (Environmental Systems Research Institute 2015). In order to run the model for the whole of South Africa the model input layers were clipped to the catchment scale and then further clipped to the quaternary scale in order

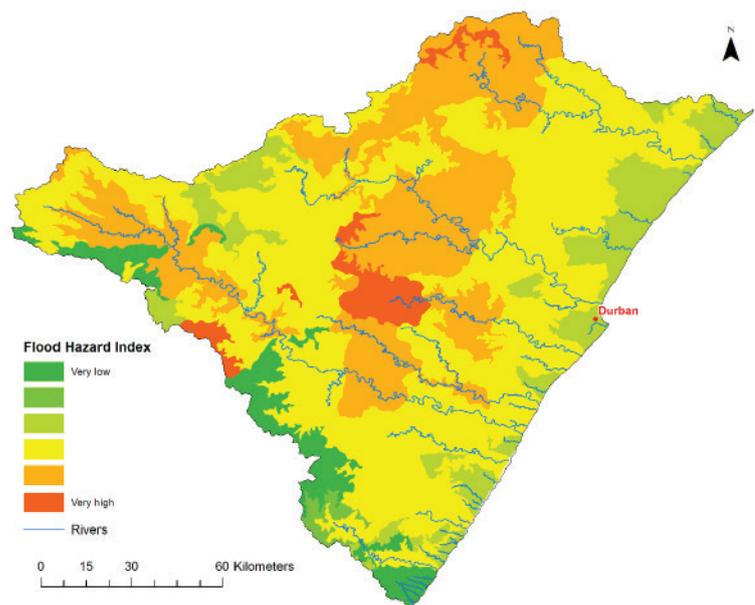


Figure 3: The Flood Hazard Index calculated by the SCIMAP model for the primary catchment area U showing the mean values per quinary catchment. Class intervals based on the standard deviation of the mean values per quinary catchment. For more information see the text.

to accommodate the model. After clipping the input layers to the desired catchment units, the raster files were converted to ascii files for input to the SCIMAP model which is run with the System for Automated Geoscientific Analyses (SAGA) an open source geographic information computer program (Conrad et al., 2015).

### Model application

The SCIMAP modelling framework consists of five main steps (Figure 1). For this study the framework was adapted from measuring fine sediment risk (Reaney, 2011), to measuring flood hazard areas. The Flood Hazard Index (FHI), which is based on the catchment characteristics and design rainfall, was averaged at the quinary catchment level and the classes were defined using the standard deviations because the distribution of the FHI values followed a normal distribution.

### Results and discussion

When assessed at the national level, the flood hazard index (FHI) is rated medium for much of the country, with Namaqualand, the Kalahari, parts of the Karoo, the Limpopo valley and the Zululand coast having a low to very low FHI (Figure 2). Very high FHI values are found in the Sneeuberge north and west of Cradock in the catchments of the Pauls, Wilgerboom and Kwaai rivers – all tributaries of the Great Fish River, The Mbashe River valley near Bashee Bridge, a region of the Eastern Cape extending from the central Thina and Mzimvubu River valleys (south-east of Mount Frere) through to Donnybrook in KwaZulu-Natal, and in the uMlazi River valley (Figure 2) The FHI for the Cape mountains is generally relatively low at the national level but there are areas with a higher FHI in these mountains. A small portion of the Richtersveld estimated to be very high FHI largely because it is mountainous and the land cover is predominantly bare ground but it is virtually uninhabited, giving it a low flood risk.

Two catchment areas are shown in detail to illustrate the outputs of the model. The first shows the quinary sub-catchments in the primary catchment U which includes all the river systems between the Mtentweni River, north of Port Shepstone and the Zinkwazi River, just south of the Tugela (Figure 3). A very high FHI is found in the headwaters of the uMlazi River south of Pietermaritzburg and forms part of a band of High FHI, which runs from north to south in this catchment. The upper catchment of the Lovu River in the Drakensberg foothills also has an area of High FHI. The lowest

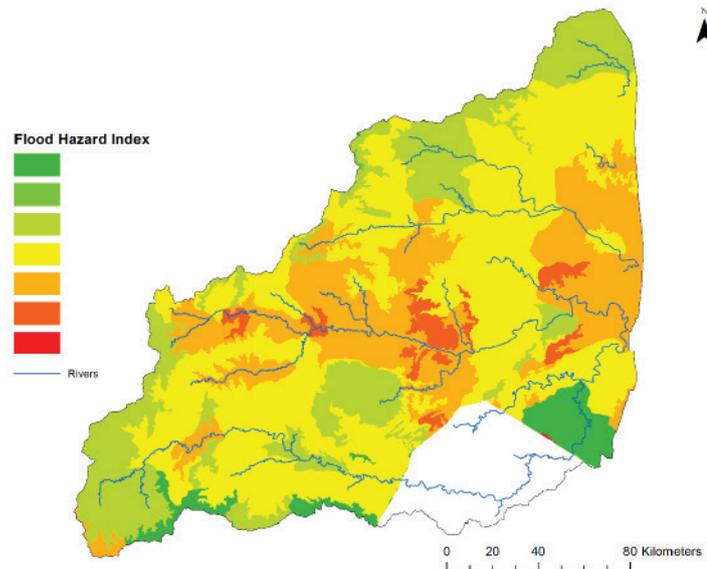


Figure 4: The mean flood hazard calculated by the SCIMAP model for the primary catchment area X (Inkomati River System) for each quinary. Class intervals based on the standard deviation of the mean values per quinary catchment. For more information see the text.

FHI values are found in catchments on the southern boundary and low values are found along the coast north and south of Durban.

In the case of Catchment X known as the Inkomati catchment, the very high FHI hazard is found at several points in the valley of the Crocodile River, particularly to the east of KaNyamazane (Figure 4). A large portion of the Crocodile River catchment also has a high FHI. There is also a relatively high FHI in the Lowveld in the eastern part of the catchment, much of which is within the Kruger National Park. The Highveld in the upper Komati catchment has a low to very low FHI, as do areas in the north of this catchment. The white area in the south of the catchment is a portion of Swaziland, which was not included in the analysis.

### Conclusion

This study investigates on the use of the SCIMAP model, for identifying spatial patterns in the potential runoff generating and receiving areas for floodwater. The outputs provide a means for users to identify areas where efforts should be concentrated in order to manage flood hazards as well as areas where flood mitigation strategies are most needed. This is only an initial assessment aimed at providing an overview of the relative flood hazards and risks for a wide range of settlements across the country. It needs to be supplemented with a more detailed local authority and settlement level assessment of the hazards and risk incorporating local knowledge and consultation with the affected

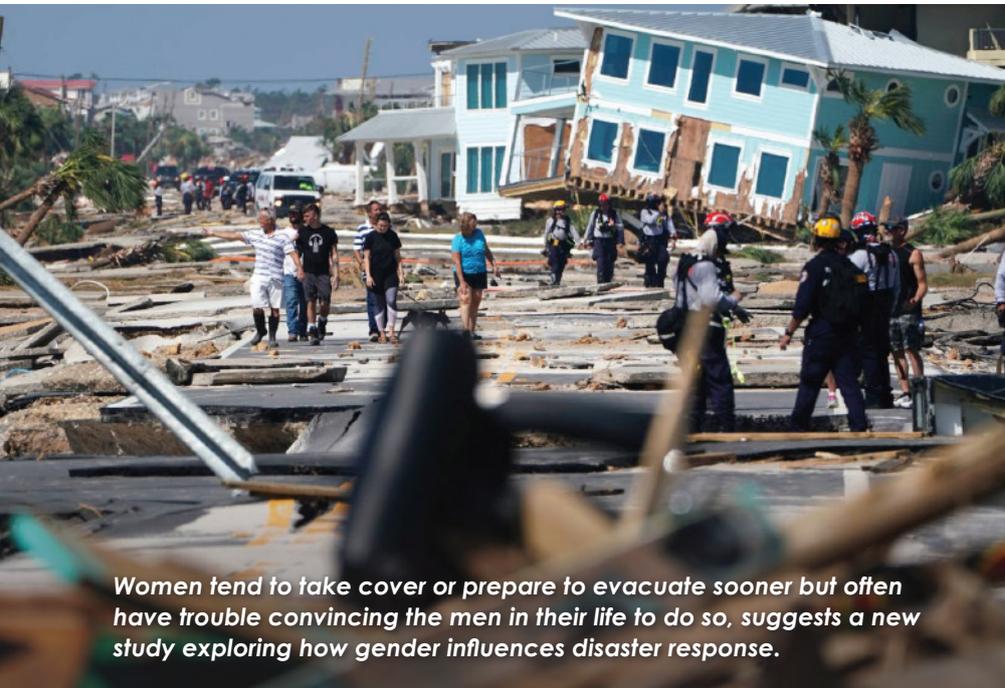
communities. Local authorities which have settlements that are exposed to flood risks should initiate and conduct such assessments in a participatory and consultative fashion. The most effective way of reducing the flood risk is to recognise the fact that floods occur, that their severity is likely to increase and that being adequately prepared is the best protective measure that can be taken. In some cases, settlements and other infrastructure may have to be moved out of flood-prone areas because prevention is better than attempting to repair the damage each time.

### Strengths and weaknesses

The data required to set up a hydrological model is one of the main constraints when choosing a model to apply to a specific area. One of the main strengths of the SCIMAP model is that it can be run with the use of readily available data sources such as national land cover maps, digital elevation models and soils data. In addition, the framework is not computationally demanding and can be run without extensive modelling expertise. The outputs of the model are spatially explicit maps, which make the presentation of results and their interpretation easier. Compared to other more complex hydrological models, the SCIMAP model does have limitations. Although it can identify flood-exposed areas, it cannot simulate hydraulic parameters of water velocity, depth and discharge.

The list of references is available by contacting the writers or Disaster Management Journal. 🌐

# WHEN NATURAL DISASTERS STRIKE, MEN AND WOMEN RESPOND DIFFERENTLY



*Women tend to take cover or prepare to evacuate sooner but often have trouble convincing the men in their life to do so, suggests a new study exploring how gender influences disaster response.*

Women are quicker to take cover or prepare to evacuate during an emergency but often have trouble convincing the men in their life to do so, suggests a new University of Colorado Boulder study of how gender influences natural disaster response. The research also found that traditional gender roles tend to resurface in the aftermath of disasters, with women relegated to the important but isolating role of homemaker while men focus on finances and lead community efforts.

Even agencies charged with providing assistance still, at times, ask to speak to the ‘man of the house,’ the researchers found. “We found that there are many barriers that disadvantage women in the event of a disaster, leaving them behind when it comes to decision-making and potentially slowing down their recovery,” said lead author Melissa Villarreal, a PhD student in the Department of Sociology and research assistant at the Natural Hazards Centre.

*Females tend to take risk more seriously but their voices often go unheard*

For the study, co-authored by Texas A&M University Assistant Professor Michelle Meyer and published in the journal *Disasters*, the researchers analysed in-depth interviews with 33 women and 10 men across two Texas towns. Some were from Granbury, which in 2013 was hit by an EF-4 tornado that killed six and cut a mile-wide swath of destruction, damaging 600 homes. Others were from West, where an explosion at a fertiliser company that same year killed 15 and destroyed 100 homes.

Residents were asked about their experiences in the midst of and the year after the disaster. While the circumstances surrounding the events were very different, common gender-influenced patterns emerged. “We often assume that men and women are going to respond the same way to these kinds of external stimuli but we are finding that’s not really the case,” said Meyer, director of the Hazard Reduction and Recovery Centre at Texas A&M.

In one interview, a Granbury woman recounted hunkering down in the closet with her children, pleading with her husband, who was looking out the window at the tornado, to come in and join them. In another case, a woman resisted her husband’s plan to get in

the car and drive away from the storm, preferring to shelter in place. She ultimately deferred and they ended up stuck in the car, the children in the back seat, being jostled by the wind as the tornado whipped through.

“Women seemed to have a different risk perception and desire for protective action than the men in their lives but men often determined when and what type of action families took,” Villarreal stated. “In some cases, this put women and their families in greater danger.”

The findings are the latest in a series of studies that have found that women tend to have a higher perception of risk but because they are framed as “worriers”, they are sometimes not taken seriously.

Women in the new study also complained that recovery organisations tended to call the men of the household to find out where to direct aid, even when women had filled out the forms requesting it. “Eliminating the male head-of-household model is crucial for speeding overall household recovery,” the authors conclude.

During recovery, women were often charged with ‘private sphere’ tasks like putting the house back together and caring for children while schools were closed, but they often felt excluded from leadership roles in community recovery projects. “If your perspective is not taken into consideration and you feel isolated, that can impede your mental health recovery,” said Villarreal.

She recently embarked on a separate study set in Houston, looking at the unique challenges Mexican immigrant populations are facing in the aftermath of Hurricane Harvey, which hit the region in 2017.

Ultimately, she would like to see government agencies consider gender differences when crafting disaster warnings and prioritise providing childcare post-disaster so that women can play a greater role in community efforts. “If we can put racial and gender forms of bias aside and listen to all the people tell their stories about what is affecting them, that could go a long way in helping communities recover,” said Villarreal. 🇺🇸

# REBUILDING COMMUNITIES AFTER DISASTERS: FOUR AND A HALF LESSONS LEARNED

By Abas Jah, World Bank Blog

The death toll from Cyclone Idai that ripped into Mozambique, Zimbabwe, and Malawi in March 2019 is now above 1 000, with damages estimated at \$2 billion. In 2018, more than 10 000 people lost their lives in disasters with \$225 billion of economic losses. Approximately 79 percent of fatalities occurred in the Asia Pacific region, including the catastrophic earthquake and tsunami in Indonesia's Sulawesi Island. In fact, 2017 and 2018 have been estimated as the most expensive back-to-back years for weather disasters, totalling \$653 billion of losses.

With climate change increasing the probability of extreme weather events and the explosive and largely unplanned growth of populations and assets in the developing world, the process of post-disaster rebuilding of communities offers a stark choice, 'The right policy choices could set economies, cities, towns and villages and neighbourhoods on a resilient, sustainable path and, unfortunately, the wrong policies would inevitably lead to fraud, waste, corruption, delays and failure'.

Several studies by the World Bank and the International Monetary Fund (IMF) have looked at the reconstruction process after major disasters over the past several decades. The four of the most important lessons we have learned are:

1. The macroeconomic growth impacts of major weather disasters are negative, large and persistent but fiscal impacts can be mitigated through good policy. The IMF finds that severe weather-related disaster episodes cause a substantial economic growth decline and deterioration in debt dynamics. The fiscal impacts can, however, be mitigated by:

- Integrating disaster risks into the medium-term fiscal framework, fixing the budgetary 'plumbing' that enables resources to hit the ground quickly eg by incorporating some escape clauses for disasters in budget laws and fiscal rules or streamlining the process for preparing and passing a revised budget

- Having emergency procurement procedures in place ex-ante and
- Generating fiscal space to finance disaster response programmes, by transferring residual risks to the private sector such as Mexico's public asset insurance programme FONDEN or buying reinsurance in international capital markets, such as the Pacific Catastrophe Risk and Financing Initiative.

2. The most vulnerable poor households, children, and the disabled need special attention and protection. It is an empirical fact that the poor disproportionately live in areas of the highest environmental vulnerability and highest risk from natural hazards and hence suffer the most. In the Philippines, over the last two decades, 15 times as many infants have died in the 24 months following typhoon events as died in the typhoons themselves; most of them were infant girls. In Niger, regardless of the birth location, children born during a drought are more than twice as likely to be malnourished between the ages of one and two.

Safety net programmes can play a valuable role in protecting the poor in the aftermath of disasters. Ethiopia's Productive Safety Net Programme (PSNP) mandates hazard risk mapping and early warning systems (EWSs). This has helped with an early response and reduced disaster losses. In Indonesia, the community-led REKOMPAK programme has used the existing nationwide PNPM network of facilitators and volunteers to enable local governments to target the poor and quickly rehabilitate infrastructure. The World Bank's Disability Inclusion and Accountability Framework offers a useful framework to ensure the needs of the disabled are taken into account in the recovery and reconstruction processes.

3. The right institutions for reconstruction make the difference between success and failure. In the immediate aftermath of a major disaster, once relief and recovery efforts are complete, there is huge pressure on governments to immediately start rebuilding and showing results. This is understandable but rushing into the reconstruction process without the proper institutions

in place is a huge mistake. A fully empowered reconstruction agency with delegated powers of government on procurement, financial management, etc and staffed with capable technical specialists is critical for success.

In the aftermath of the Aceh earthquake and tsunami, the government of Indonesia put in place such an institution with tremendously capable leadership and staff that delivered positive results. Similar examples exist across the world, such as in Pakistan, Australia and Chile. These agencies can help navigate some of the most complex policy issues, such as formulating the reconstruction policy (who gets what), sorting out land rights and titles and smart choices of technology. The use of smart cards, for example, can significantly reduce costs and leakages, drones and satellite technology as well as risk modelling now enable us to rapidly complete damage assessments.

4. Preparedness is the best investment any government can make.

If I had one wish, I would put a sign in every finance ministry official's office that says, "The biggest driver of disaster losses is the growth of people and assets in harm's way." Risk-based land-use planning that steers future growth of cities and settlements away from high-risk areas, early warning systems especially the last-mile connectivity into communities, shown to save at least \$3 of benefits for every dollar invested and investments in multi-purpose shelters such as what Bangladesh has successfully done, not just saves lives and avoids losses but generates tremendous economic benefits as well.

Which brings us to our 'half lesson': each disaster and its context is unique.

While the four lessons above are important, reconstruction strategies must be country-owned and community-driven, taking into account ground realities and institutional capabilities. Post-disaster reconstruction strategies should also balance trade-offs between speed and fiduciary controls, emergency versus regular procurement, urban versus rural settings, on versus off budget expenditures and most importantly, immediate rebuilding versus long-term planning. 🇨🇦

# UPCOMING EVENTS

JUNE 2020 - DECEMBER 2020

**23 - 25 June 2020**

## **12th International Conference on Risk Analysis and Hazard Mitigation**

The conference covers a series of important topics of current research interests and many practical applications. It is concerned with all aspects of risk management and hazard mitigation, associated with both natural and anthropogenic hazards

**Venue:** Lisbon, Portugal

For more information visit:

[www.wessex.ac.uk/conferences/2020/risk-analysis-2020](http://www.wessex.ac.uk/conferences/2020/risk-analysis-2020)

**23-26 June 2020**

## **Asia-Pacific Ministerial Conference on Disaster Risk Reduction 2020**

The 2020 Asia-Pacific Ministerial Conference on Disaster Risk Reduction (APMCDRR) is expected to focus on the need for local and inclusive action to build community resilience in the face of growing disaster risks. It will bring together more than 2,000 delegates from over 50 countries, primarily from Asia Pacific – the most disaster-prone region in the world, with seven of the ten countries with the highest number of disaster-related deaths in 2018

**Venue:** Brisbane, Queensland, Australia

For more information visit: <https://sdg.iisd.org/events>

**8 – 10 July 2020**

## **Regional Platform for Disaster Risk Reduction in the Americas and the Caribbean**

The Regional Platform for Disaster Risk Reduction in the Americas and the Caribbean under the theme "Building Resilient Economies in the Americas and the Caribbean" is aimed at raising awareness of the increasing economic and human cost of disasters in the Americas and the Caribbean, including the special challenges facing Small Island Developing States

**Venue:** Montego Bay, Jamaica

For more information visit: [www.undrr.org](http://www.undrr.org)

**19 – 20 August 2020**

## **4th International Conference on Natural Hazards and Disaster Management**

Natural hazards and disaster management is playing an important role to create awareness and providing a platform to share and discuss on different types of natural hazards, significance of early warning systems and risk management strategies

**Venue:** Tokyo, Japan

For more information visit:

[www.naturalhazards.conferenceseries.com/](http://www.naturalhazards.conferenceseries.com/)

**1 – 4 September 2020**

## **National Geoscience Conference 2020**

The technical programme of NGC 2020 consists of oral

and poster presentations on all aspects of geoscience, environment and technology related to the theme. The conference is a premier geoscientific event in Malaysia and the region, which is well attended by geoscientists from academia as well as the public and private sectors

**Venue:** Bangi, Selangor, Malaysia

For further information visit:

<https://nationalgeoscience.wixsite.com/ngc2020>

**22 – 24 September 2020**

## **Integrated Disaster Risk Management (IDRIM) 2019 Conference**

The 2020 annual event for researchers and practitioners in integrated disaster risk management (IDRiM) will focus on the issues of knowledge-based disaster risk management: Broadening the scope by smart territories for sustainable and resilient cities and organisations

**Venue:** Kyoto, Japan

For further information visit: [www.idrim.org](http://www.idrim.org)

**30 September – 1 October 2020**

## **Disaster Management Institute of Southern Africa (DMISA) Annual Conference**

The annual conference of the institute is the biggest annual disaster management conference in Africa and routinely attracts more than 300 delegates. The institute is recognised as the mouthpiece of the disaster management profession in Southern Africa. The conference provides an annual opportunity for a diverse range of stakeholders in disaster management from across Africa to gather and share skills, knowledge and experience.

**Venue:** The Station Urban Event Space Durban, KwaZulu-Natal

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**13 October 2020**

## **International Day for Disaster Reduction**

The UN General Assembly sees International Day for Disaster Reduction as a way to promote a global culture of risk-awareness and disaster reduction. That includes disaster prevention, mitigation and preparedness.

For more information visit: [www.unisdr.org](http://www.unisdr.org)

**2 - 4 December 2020**

## **2020 FLASH Annual Conference: The Next Generation of Resilience**

The conference will bring together the USA's foremost voices in the disaster safety and resilience movement to share best practices, inspire, collaborate and create meaningful action

**Venue:** Florida, USA

For more information visit: [www.flash.org](http://www.flash.org)

# THE DISASTER MANAGEMENT INSTITUTE OF SOUTHERN AFRICA (DMISA)

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