Editor
Sue Matthews

Editorial Board
Himla Soodyall (EO: ASSAf) (Chair)
Jane Carruthers (SAJS)
Martin Bucher (UKZN)
Don Cowan (UP)
Amanda Esterhuysen (Wits)
Marina Joubert (SU)
Robin (Ted) Kroon (UFS)
Walter Matli (UFS)
Caradee Wright (MRC)

Editorial enquiries
The Editor | e-mail: Quest-Editor@assaf.org.za

Advertising enquiries
Barbara Spence | Avenue Advertising
PO Box 71308, Bryanston 2021
Tel: (011) 463 7940 | Cell: 082 881 3454
e-mail: barbara@avenue.co.za

Subscription enquiries and back ssues
Tsepo Majake | Tel: (012) 349 6645
e-mail: tsepo@assaf.org.za

Copyright
©2020 Academy of Science of South Africa

Published by the
Academy of Science of South Africa (ASSAf)
PO Box 72135, Lynnwood Ridge 0040

Subscription rates
(4 issues and postage)
(for other countries, see subscription form)
Individuals/Institutions - R145.00
Students/schoolgoers - R72.00

Design and layout
Garnett Design Studio

Printing
Seriti Printing Digital

Website and social media
https://questonline.org.za
Twitter:@questSA1
Facebook: Quest: Science for South Africa

Cover photo
Daleel Lilla

Every care is taken in compiling the contents of this publication, but we assume no responsibility for effects arising therefrom. The views expressed in this magazine are not necessarily those of the publisher. Content may be copied or shared with acknowledgement to *Quest* as well as the author where stated. Copyright of republished material and images remains with the original source.

Early warning systems

Science and technology have been fundamental to the development of early warning systems (EWS), which are designed to reduce the risk to life, livelihoods and health during disasters and other extreme events. The USAID-funded Famine Early Warning System Network (FEWS NET), established in 1985 as a response to the devastating 1984–1985 famine in Ethiopia and Sudan, is considered the first EWS to be implemented at a regional level, but efforts to develop such systems for other disasters increased rapidly following the 2004 Indian Ocean tsunami, which killed more than 230 000 people in 14 countries.

Japan had initiated the world's first instrument-based tsunami EWS in 1941, and the technology was replicated in Hawaii in 1949, but these early systems relied purely on earthquake detection. Since the magnitude of earthquakes is not directly related to tsunami intensity, the USA developed a more accurate system, called DART® (Deep-ocean Assessment and Reporting of Tsunamis), in the late 1990s. This relies on a bottom pressure recorder (BPR) on the seafloor and a moored surface buoy, with data transmitted via an acoustic link from the BPR to the buoy, and then relayed to ground stations via satellite. Following the 2004 earthquake, DART systems were installed by Australia, India and Thailand, which operate the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS) for the benefit of 25 member states. Similar regional tsunami EWS were established in the Atlantic and Pacific Oceans.

Other kinds of EWS exist for geologic hazards, such as earthquakes, volcanoes, avalanches and sandstorms, as well as extreme weather events and climatic conditions, including tornadoes, hurricanes, floods and droughts. There are also EWS for infectious diseases, and these will undoubtedly be the focus of renewed attention in light of the COVID-19 pandemic. Indeed, researchers in South Africa are already taking steps in this regard, in collaboration with international partners. A five-year project conducted with funding from Science and Technology Research Partnership for Sustainable Development (SATREPS) – a Japanese programme for international joint research – developed a weather-based malaria prediction model for Limpopo that will now be expanded and operationalised into an infectious disease EWS, making use of seasonal climate forecasts. Future outbreaks or resurgence of COVID-19 are expected to coincide with seasonal cycles, as is the case with other viral respiratory infections.

Of course, it's no good having high-tech systems and advance warning of an event if people cannot respond in a way that offers some protection, or because health and other government services are unprepared for the impacts. In September 2019, the Global Preparedness Monitoring Board, set up by the World Health Organisation and the World Bank in 2018, warned in their first annual report, *A World at Risk*: "The world is not prepared for a fast-moving, virulent respiratory pathogen pandemic".

Little did they know how soon that statement would be tested.

Sue Matthews
Quest Editor

Lesisiqephu se *Quest* sizogxila ku hlelo lokuxwayisa ngaphambi kokuba kube nenkinga, loluhlelo lakhelwe ukwehlisa ingozi engenzeka ezimpilweni, uma kwenzeka izinhlekelele, nokushintsha kwesimo sezulu ngokwendlulele.

Translated by Zamantimande Kunene

Academy of Science of South Africa (ASSAf)

ASSAf Research Repository **http://research.assaf.org.za/**

A. Academy of Science of South Africa (ASSAf) Publications D. Quest: Science for South Africa

2020

Quest Volume 16 Number 2 2020

Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa (ASSAf), (2020). Quest: Science for South Africa, 16(2). [Online] Available at: http://hdl.handle.net/20.500.11911/150

http://hdl.handle.net/20.500.11911/150

Downloaded from ASSAf Research Repository, Academy of Science of South Africa (ASSAf)