

NATURAL AND HUMAN-INDUCED HAZARDS AND DISASTERS IN AFRICA AND THE ROLE OF WOMEN IN CURRICULUM DEVELOPMENT

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Women in Science Without Borders (WISWB) Jubilee

www.wiswb.org

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Disaster Risk Science

- **INTRODUCTION** – Energy Story @ MYWanawake
- **NATURAL DISASTERS**
- **HUMAN-INDUCED**
- **DRS CURRICULUM AT UNIVEN**
 - Partnership with Mopani DM
 - Bursary NDMC
- **LIMPOPO BASIN PROJECT - IHL**
- **DISCUSSION**

FORMAT

ICSU-ROA Science Plan

- **NATURAL DISASTERS**
 - Volcanic
 - Drought – food security
 - Earthquakes
 - Landslides and Mudflows
 - Subsidence
- **SCIENCE PLAN ADDRESSES BOTH NATURAL AND HUMAN-INDUCED HAZARDS AND DISASTERS IN SUB-SAHARAN AFRICA**
- Africa Array images are courtesy of Prof Rau Durrheim - Wits

GEOPHYSICAL



- EARTHQUAKES
- VOLCANOES
- EXPLOSIVE CRATER LAKES
- **MASS MOVEMENTS**



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CRATER LAKES



Figure 4.2: Photograph of the Lake Nyos disaster showing: a) change in colour of water in Lake Nyos after CO₂ explosion (inset shows lake colour before explosion); b) livestock killed by CO₂ explosion in Lake Nyos.

EARTHQUAKES



An engraving of the Lisbon earthquake of 1755, which Voltaire depicted as morally blind.
<http://www.nytimes.com/imagepages/2005/09/07/books/08roth1.html>

Causes of earthquakes



Apep or Apophis was an evil god in Egyptian mythology, the deification of darkness and chaos (izft in Egyptian), and thus opponent of light and Ma'at (order/truth), whose existence was believed from the 8th Dynasty (mentioned at Moalla) onwards. In a bid to explain certain natural phenomena it was said that occasionally Apep got the upper hand. The damage to order caused thunderstorms and earthquakes. <http://en.wikipedia.org/wiki/Apep>

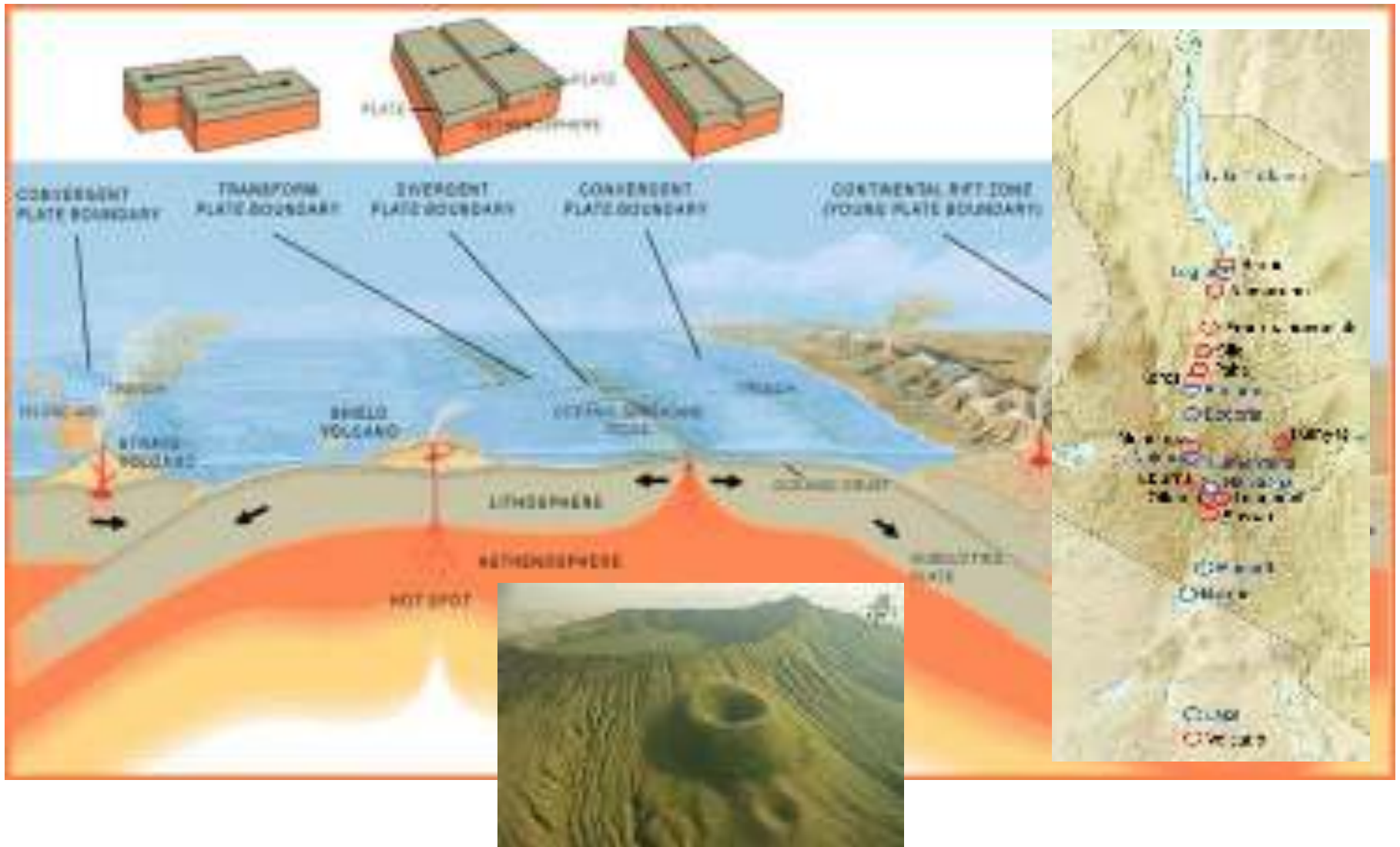


Plate tectonic boundaries: divergent, convergent, and transform plate boundaries

DROUGHT



WILDFIRES

steps Up when complex forest fire-black-smoke

(Natural and Human-induced Hazards and Disasters

CLIMATOLOGICAL





HYDROLOGICAL



- FLOODS
- FLASH FLOODS

Violent Processes - Floods



COASTAL HAZARDS

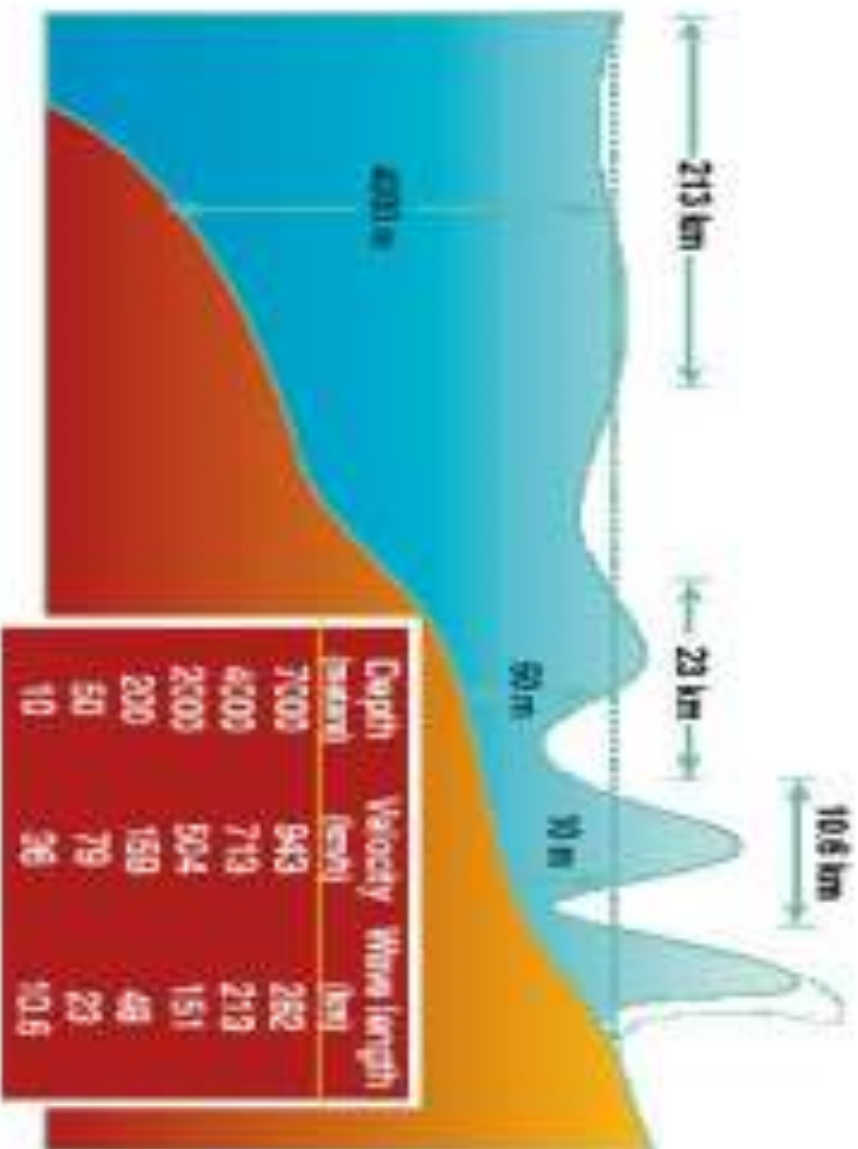


Figure 13.6: Enhancement of a tsunami wave¹²



13. COASTAL HAZARDS



A man praying on the remains of his local mosque shortly after the tsunami struck the Somali village of Hafun.
<http://www.unhcr.org/43a2caad4.html>



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The Hurricane





BIOLOGICAL

- Epidemics
- Pests (Desert Locust Control; ***BUT is food!!***)



MASS MOVEMENTS



Figure 5.1: Landslide at Nameret Village, Uganda, where over 300 people, homes and a community health centre were buried by the debris flow¹.



Figure 5.2: Partial view of the 2006 landslide in the Tarnaber area, Ethiopia. Over 3 000 people were displaced as a result of the large-scale landslide (areal size: 5 km ² × 9 km).



Figure 5.3: Mass movement affecting express highway in Onecha City, Nigeria, which is associated with gully erosion development.



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ICSU-ROA Science Plan

- **HUMAN INDUCED DISASTERS** – issues with planning and land use practices.
 - Urban Flooding – **flood line issues**
 - Lack of forecasting capacity
 - **Lack of respect for science and IKS; e.g.**
 - **use of traditional foods, e.g. *dede/senene* in East Africa**
 - **Mopani worms, termites,**
 - Refugees
 - Mining and Mine Disasters
 - Slope Stability etc.

HUMAN-INDUCED



- **POLLUTION**
- **GAS FLARING**
- **ARTISANAL & SMALL-SCALE MINING**
- **TOXIC WASTE DISPOSAL**
- **CONFLICT-RELATED HAZARDS**



**River floodplain is dominated by sever Erosional Gullies in
GA-Sekgopo Limpopo Province**

Disaster Mortality

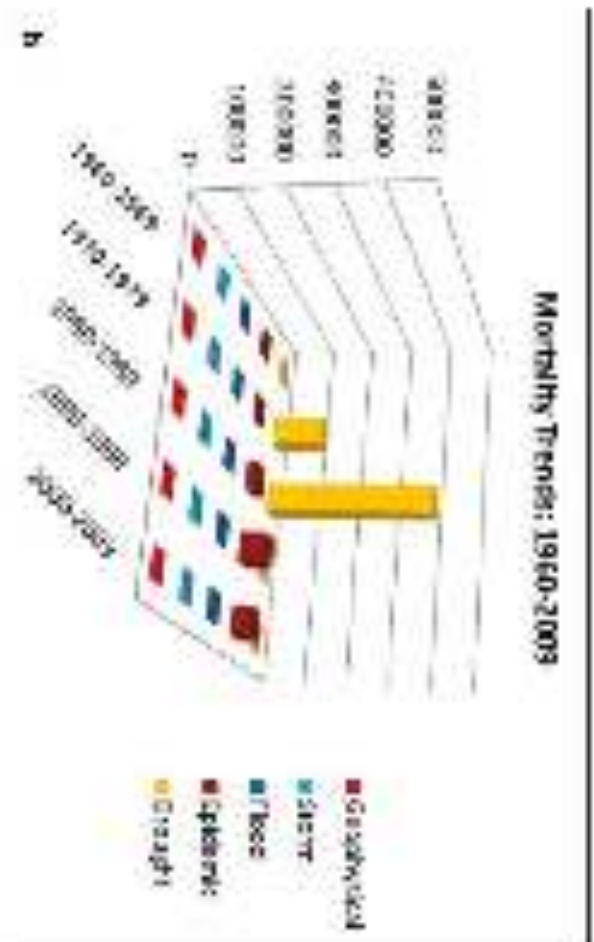
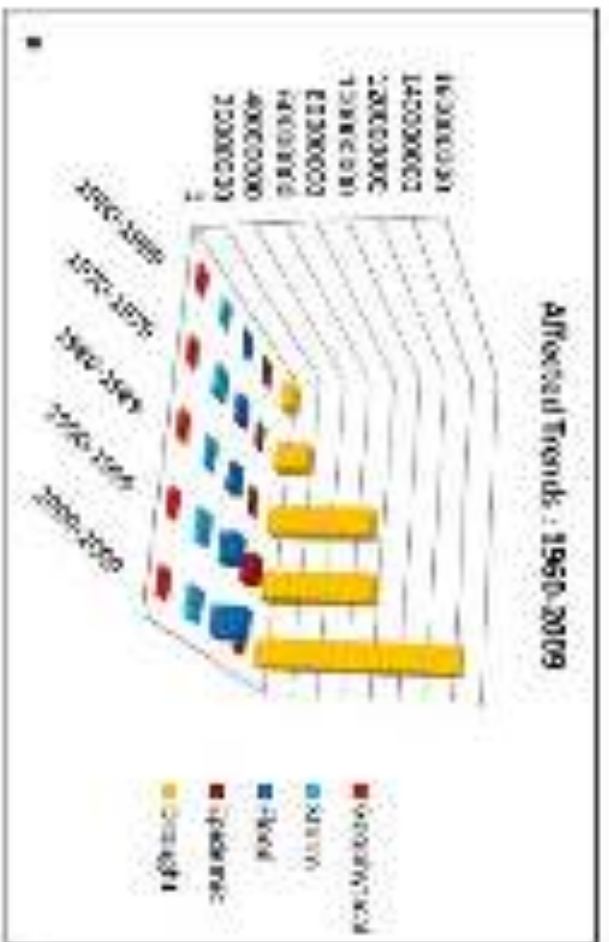


Figure 1.3: Trends in disaster victim numbers and mortality (1960-2009):
a) Victims; b) Mortality.

PUBLICATION OF SCIENCE ICSU-ROA, 2017



**Natural and Human-Induced
Hazards and Disasters in Africa**

(Open Access) (Publications 2017)

DRS AT UNIVEN

Prof Agnes Musyoki

- In 2010, the National Disaster Management centre conducted a National Education, Training and Research Needs and Resource Analysis (NETaRNRA).
- Need to design disaster risk management education programmes that form part of the formal education system and in line with the requirements of SAQA and the National Qualification Framework (NQF).

DRS Curriculum Prof Agnes Musyoki

- Due to inadequate expertise, research and knowledge on disaster risk management, the need to support higher education institutions was identified.
- The University of Venda was identified by NDMC for collaboration; an MOU was signed between UNIVEN and Department of Cooperative Governance (DCOG) in 2013.
- Disaster Risk Science and Management Conference.

DRS Curriculum

Prof Agnes Musyoki

- The curriculum is designed in line with national priorities; and meets SAQA and requirements for the Department of Higher Education (DHE) and South African Council for Natural Scientific Professions (*SACNASP*).

It is informed by the research and community engagements already taking place in the School of Environmental Sciences & UNIVEN.

DRS Curriculum Prof Agnes Musyoki

- **The new degree will be known as Bachelor of Environmental Sciences (Disaster Risk Science).**
- **The curriculum addresses the need for Preparedness (risk and vulnerability assessment, and early warning systems)**
- **Capacity building, Response (IKS, volunteerism, mitigation and adaptation) and Recovery (damage assessment, resilience evaluation, rehabilitation, reconstruction).**
- **The curriculum also addresses research, skills development and community engagement for disaster risk reduction.**

DRS Curriculum

At exit level a Disaster Risk Science graduate should be able to:

- Understand the nature of disasters and risks associated with them.
- Identify and assess levels of disaster risk and vulnerability
- Work with different stakeholders involved in disaster risk reduction and management
- Collect, analyse, evaluate and effectively communicate Disaster risk information

UNIVEN MOPANI DISTRICT MUNICIPALITY

DISASTER PROJECT *Prof Agnes Musyoki*

The Mopani District Municipality in collaboration with the University of Venda have identified key topical research areas that include:

- Waste Management
- Air Quality
- Drought Impacts and Climate Change
- Infrastructure Development & Planning
- Fire Services and Fire hazard prediction using R.Sensing & GIS
- Water Issues
- Food and Environmental Health, Malaria and other Communicable diseases.

UNIVEN MOPANI DISTRICT MUNICIPALITY DISASTER PROJECT



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BURSARY AWARDS BY NATIONAL DISASTER MANAGEMENT COMMITTEE



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**Prof Agnes Musyoki
handing over the
contract to the 1st DRS
Bursary recipients' after
the 2017 ceremony at
UNIVEN**

LIMPOPO BASIN PROJECT Prof Heila

- The Institutions of Higher Learning (IHL) network of six institutions working within the Limpopo Basin/Olifants Catchment
- The IHL in the watershed include:

Rhodes University	University of Venda	University of Mpumalanga
Southern African Wildlife College	University of Limpopo	
Pedagogical University, in Mozambique	Universidade Eduardo Mondlane, Mozambique	



Prof Heila and a Univen masters students during a dinner.



The SA Group preparing for a photo session.



**The SA Limpopo
IHL Group meeting
with the
Mozambique
counterparts in
Maputo, Nov
2017.**

LIMPOPO BASIN PROJECT Prof Heila

- IHL in the Limpopo Drainage Basin came together in a interdisciplinary project to infuse aspects of climate change into their curricula.
- IHLs should endeavor to capture major aspects of climate change in their curricula, and if **new curriculum are being developed**, emphasis should be placed on climate change.
- The project is funded by USAID through the Association for Water and Rural Development (AWARD).

LIMPOPO BASIN PROJECT Prof Heila

- The IHL in the basin to undertake joint collaborative research projects.
- IHLs will develop **Field Stations** both upstream and in the Indian Ocean coastline; opportunities for studying coastal geomorphology.
- The project will enable joint/co-supervision of graduate students.

CONCLUSION

- To me both Prof Agnes Musyoki and Prof Heila are examples women tackling disasters at the core - through education and training (and have faith and respect in science).
- This is a more effective way of dealing with these disasters; being prepared to manage and mitigate their adverse effects.

Thank you-Asante sana Ndo livhuwa

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