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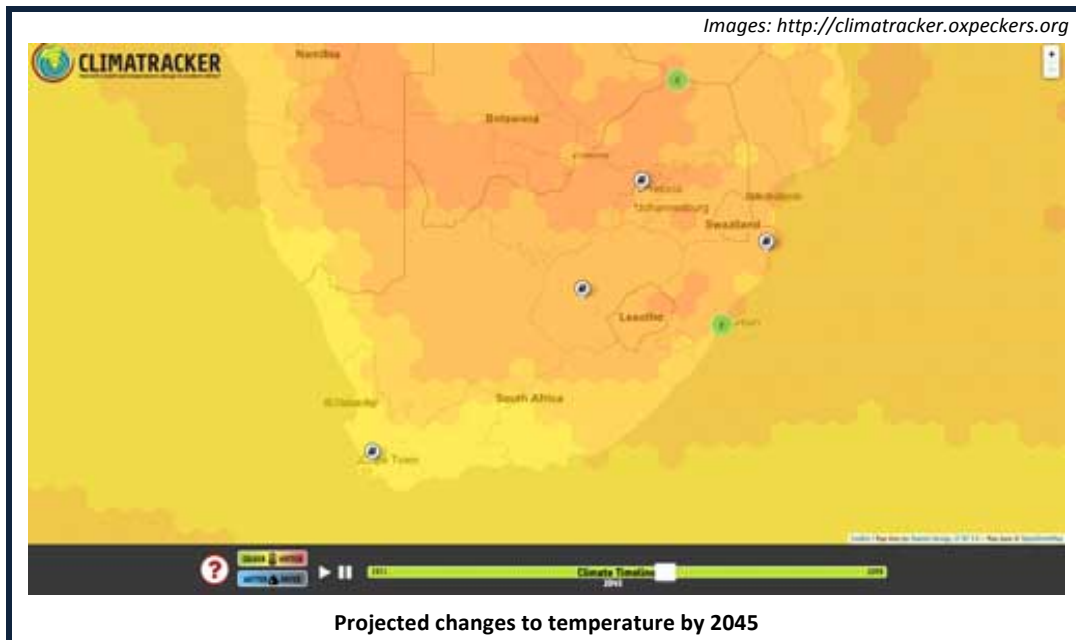
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**News and Events**

**ClimaTracker: making climate science accessible**

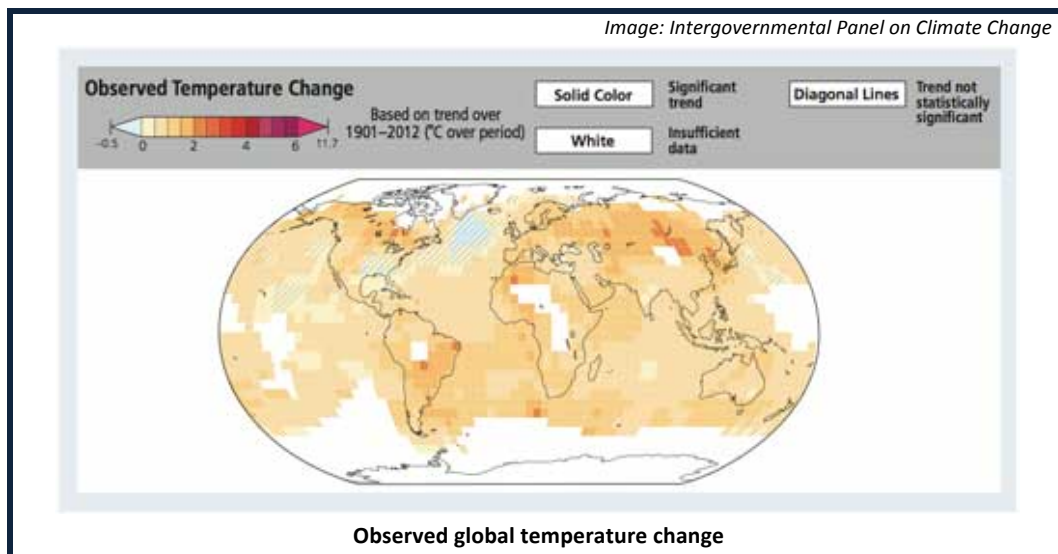
*By Fiona Macleod*

ClimaTracker is a new, innovative geojournalism project that makes complex scientific data accessible in an easy-to-use interactive visualisation. Combined with cutting-edge journalism, it tells Southern Africa's climate change stories at a mouse click.



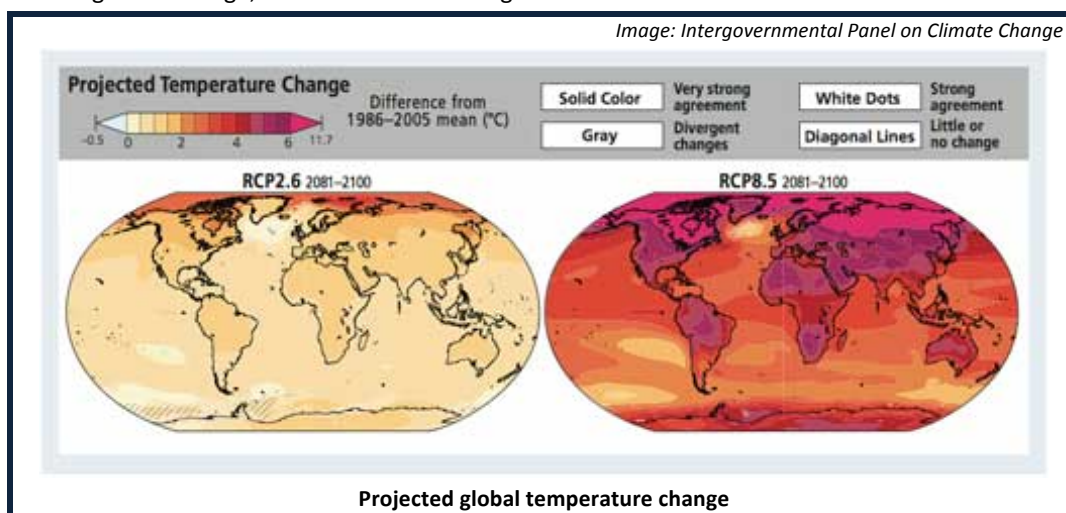
Will we have enough rainfall to sustain forests and agriculture? Will higher temperatures make some areas uninhabitable for animals and humans? Will today's coastal towns be under water in future? These are the type of questions scientists all over the world are trying to answer by predicting how local climates and the global climate will change over the next decades.

But climate modelling is a complex science. Carefully generated algorithms that try to consider all the variables are fed into powerful computers that calculate how climates might change. The variables that influence the climate include things like how cloud cover affects sunlight penetration, how air flows over mountain ranges and across oceans, how the sun heats up different parts of land and sea at different rates, and how much pollution is in the air over different parts of the world.



There are many different approaches to climate modelling – some models use historical data to extrapolate future conditions; others employ learning algorithms that essentially learn how different variables affect climate in order to model past and future conditions accurately. Some models are global, others try to zoom in on smaller regions.

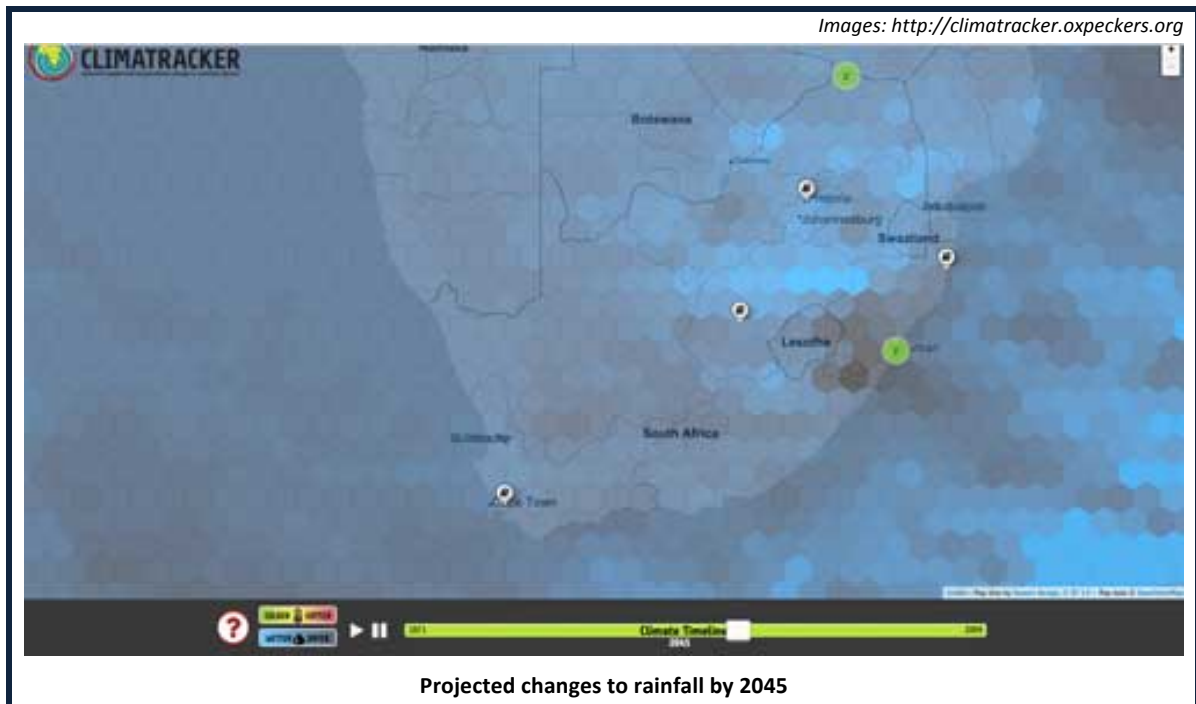
But all climate models have one thing in common: they tell us that the future is bleak. The world is expected to warm by nearly three degrees Celsius by 2099, and Southern Africa will warm by nearly twice that global average, whether we are talking worst case or best case scenario.



ClimaTracker was built using climate modelling data generated by researchers at South Africa’s Council for Scientific and Industrial Research (CSIR). The data behind ClimaTracker is based on the worst-case emissions scenario, which scientists call “RCP 8.5”. RCP stands for Representative Concentration Pathways, referring to the concentration of human-generated greenhouse gas emissions.

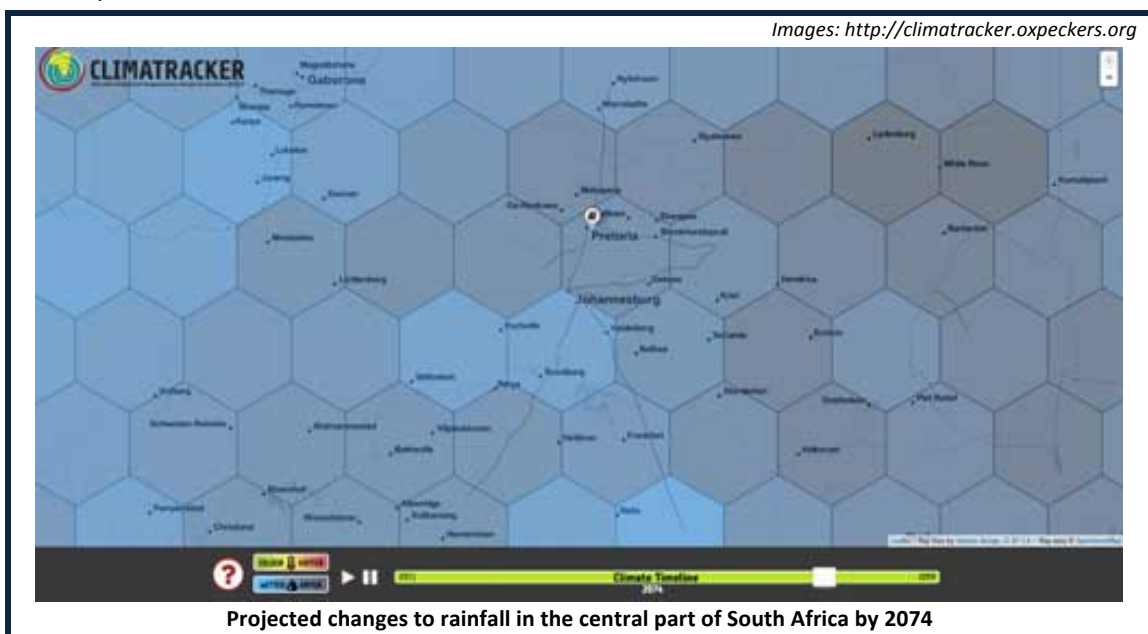
ClimaTracker used yearly averages and other selected data points within the larger data sets in order to make the map timeline as responsive as possible, and to show the general trends of climate change expected in Southern Africa. The model specifically shows how rainfall and temperature has changed since 1971, and predicts how these are expected to change until 2099.

The accuracy of ClimaTracker has been ensured through consultation with various experts, particularly the main brain behind the data, Professor Francois Engelbrecht at the CSIR, as well as Professor Barend Erasmus, director of The Global Change and Sustainability Research Institute at Wits University.



“This particular climate change data set performs well when compared to historical data for the 20th century,” says Erasmus. “It does so without relying heavily on the observed values to predict the future, by modelling our understanding of energy fluxes in the atmosphere, and interactions with the land and ocean surface.”

In other words, this model does not extrapolate from today’s data to predict tomorrow’s conditions; rather, it understands what affects temperature and rainfall, and is thus able to model accurately what happened in the past (researchers compared the modelled data to real data to confirm this). So we can trust, as many scientists do, that this model is able to predict future temperature and rainfall with some accuracy.



“Imagine Phalaborwa’s or Upington’s hot weather in Johannesburg,” says Erasmus, about what a five degree increase really means for South Africa. “The world will be vastly different for our children and their children. Climate mitigation is no longer an option for us; from here on, it’s adaption.”

Climate change will affect all South Africans, in every province. Changes in rainfall and temperature affects food and wine agriculture, water supply, the amount and location of natural disasters, grazing land for farmers and in national parks.

Ultimately it affects our health, safety, food security and many other aspects of daily life. Explore the stories on the map to find out how climate change will affect Southern Africa.

**ClimaTracker is a project of Oxpeckers Investigative Environmental Journalism.**

**It is supported by Internews’ Earth Journalism Network and developed by ScienceLink.**

**ClimaTracker is available at <https://climatracker.oxpeckers.org/>**

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## **Grim picture of sea level rise for Nelson Mandela Bay**

*By Guy Rogers*

If global temperature rises by 4 degrees Celsius, the impact of sea level rise on Nelson Mandela Bay could be catastrophic with the swollen waters of Algoa Bay swamping roads, highways, railway lines, port infrastructure and large parts of Deal Party and North End.



**What the Nelson Mandela Bay beachfront could look like in a 4 degrees Celsius scenario**

A graphic new report based on the latest climate change research shows how the sea could thrust into the Swartkops River pushing the polluted estuary into the residential areas of Kwazakhele and Soweto-on-Sea and, further upriver, inundating the industrial township of Perseverance. Expanded by heat, stalled mega-currents and melting glaciers, and prefigured by storm surges, it could crash over King’s Beach and across the prime land where the tank farm, ore terminal and new beachfront lifestyle development area are located. Further along Beach Road it could swell over Pollok Beach and the car park where the popular Something Good restaurant stands.

That’s just part of the prognosis for Nelson Mandela Bay captured in precise online visuals developed by the US-based organisation Climate Central. These visuals are based on research by the Proceedings of the National Academy of Sciences of the USA whose studies published late last year reveal that “unabated carbon emissions leading to 4 degrees Celsius warming could lock in 6.9m to 10.8m of long-

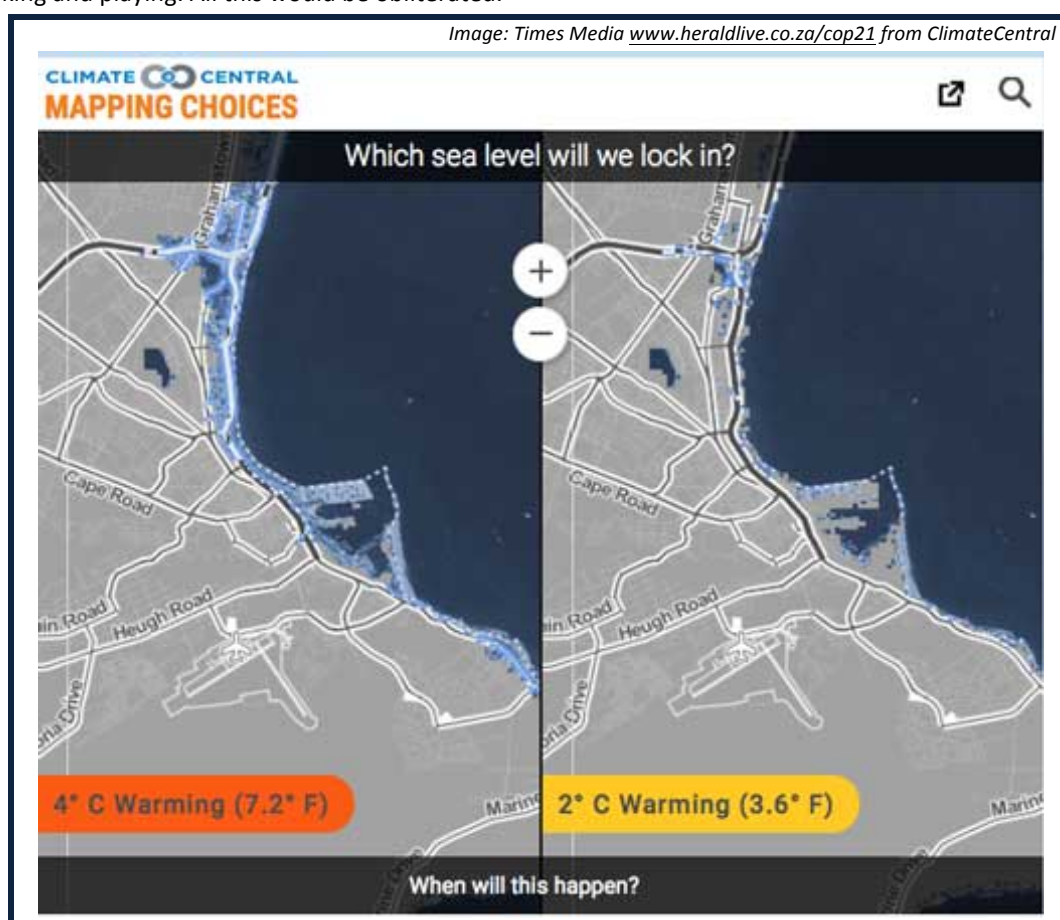


term global sea level rise: “Such a rise would threaten to submerge land currently home to 470-760 million people on six continents over the coming centuries.”

Working with global figures, Climate Central factored in a suite of local factors including gradient and terrain, warming off-shore winds, currents and degree of continuing land subsidence after the rebound following glacial subsidence 10,000 years ago. The result has allowed them to produce interactive coastal maps to show what the affects will be for different emission levels, temperature rise and consequent sea level rise, wherever you are around the world.

The Weekend Post took a slow drive to get a feel for how the surreal new blue shading on our Climate Central Surging Seas map of Nelson Mandela Bay (see graphic below) translates on the ground.

Low-lying Talant Road with Algorax on the left and the Fishwater Flats Waste Water Treatment Plant on the right could be hardest hit, it seems, with the ocean ballooning right over Grahamstown and Trunk roads, the railway line and the flatland between and into Kwazakhele, through streets like Mcaphukiso, Mahambehlala, Kuzwayo, Madlingozi, Sodladla, Ngwendu and Ghandi. These streets are all lined with homes and businesses, and this week they were thronged with adults and kids commuting, trading, talking and playing. All this would be obliterated.



The blue also washes over important conduits like Daku and Dibanisa and up at Coega over the Ngqura port. Back towards Port Elizabeth the relatively empty coastline is largely unaffected with the sea level rise apparently mitigated by the wide sandy beach – tying in with analysis by Nelson Mandela Metropolitan University sandy beach ecologist Dr Linda Harris. The map shows that, as human structures appear again, the ocean starts invading the land.

A large part of Settler’s Freeway and Burman Road, the main thoroughfare through Deal Party, are covered, and much of Port Elizabeth Harbour is under water. What is key about the research findings is that “carbon pollution casts a long shadow, as Dr Ben Strauss of Climate Central explained: “It is

expected to persist in the atmosphere long enough to prolong temperature increases for hundreds and thousands of years, long after we stop burning fossil fuels or clearing forests. It is not so easy to gauge when this level of sea rise will occur. It might be any time between 200 and 2,000 years from now, “although the faster end of the spectrum is more likely.” What is certain is that we are locked into it happening, he said.

Asked for his comment on the new maps, Nelson Mandela Bay Chamber of Business CEO Kevin Hustler said: “with the correct planning, we believe sufficient measures could be developed to alleviate extensive damage and loss to the economy.” There is no reason to panic but the Bay, business and ordinary citizens need to work together on this challenge, he said: “We need to establish clear scenarios and implement plans based on best practice developed around the world on how to jointly deal with this potential threat to the economy.

Metro spokesman Mthubanzi Mniki said the metro’s Coastal Management Plan (CMP), updated this year, ranks the risk of storm surges on the back of sea level rise as particularly important. To counter this, “the CMP recommends removal and relocation of some infrastructure.... and limiting development in certain zones to protect nourishment of beaches through sand migration.”

As part of the drive to bring down greenhouse gasses, the metro has developed an inventory of the worst polluters. On the other end of the scale over 100,000 households have been engaged through the metro’s Go Green programme to help them reduce their carbon footprints through a wide range of measures from recycling to planting spekboom and using electricity more efficiently, Mniki said.



eThekweni Municipality sea level rise specialist Dr Andrew Mather, who has advised the Nelson Mandela Bay Metro on set-back lines, was critical of the lack of specific time frames in the Climate Central visuals. Set-back lines for sea level rise of up to 1m have been established for the bay and the key is that development must happen behind these lines, he said: “Ordinary citizens should make sure that they are aware of the risk lines on their coastline and raise these issues when developments are proposed in these zones to ensure that the risks are considered and, in the case of public money, their contributions via rates is spent sustainably.”

Dr Harris said storm surge on the back of rising sea level likely poses the biggest threat to the metro. In March 2007 8.5m waves struck the KwaZulu-Natal coast on the back of a temporary 1m sea rise caused by a cut-off low pressure storm and equinox spring tide, resulting in R8.5 billion damage. Studies of that event showed natural coastlines absorb storm impact best but this is the biggest problem in Port Elizabeth where historic development and invasive exotic vegetation has blocked the sand migration corridor which used to supply sand to the beaches in the bay, Harris said: "That means we have we have sand inundating infrastructure at Sardinia Bay and erosion at Hoby Beach. This has compromised our natural resilience to seal level rise inside the bay. This resilience has to now be artificially constructed and this is already being done with a mixture of cement sea walls and imitation sandbag dunes."

Besides being fun for humans and key for resilience against sea level rise, beach sand helps clean seawater by filtering it and beaches are home to unique species, she said: "But if we decide we want to defend the beachfront amenities in a 4 degrees Celsius scenario, that would probably mean sacrificing our beaches and having the waves breaking against some kind of a wall: "Unless we can come up with a really creative engineering solution that would allow us to push against the sea and keep our beaches. The other alternative would be realignment and all the shore-lining structures would have to go."

Human rights and climate change activist, Nelson Mandela Metropolitan University development studies researcher Professor Janet Cherry, said the South African government had to sharply increase its commitment to carbon emission cuts: "Our government has to have the guts to take a strong position with measures like carbon taxes, bigger investment in renewables, shifting away from coal-fired power. Many industries can and must embrace clean energy. The jobs will follow. It's an opportunity."

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## **COP21 Debrief**

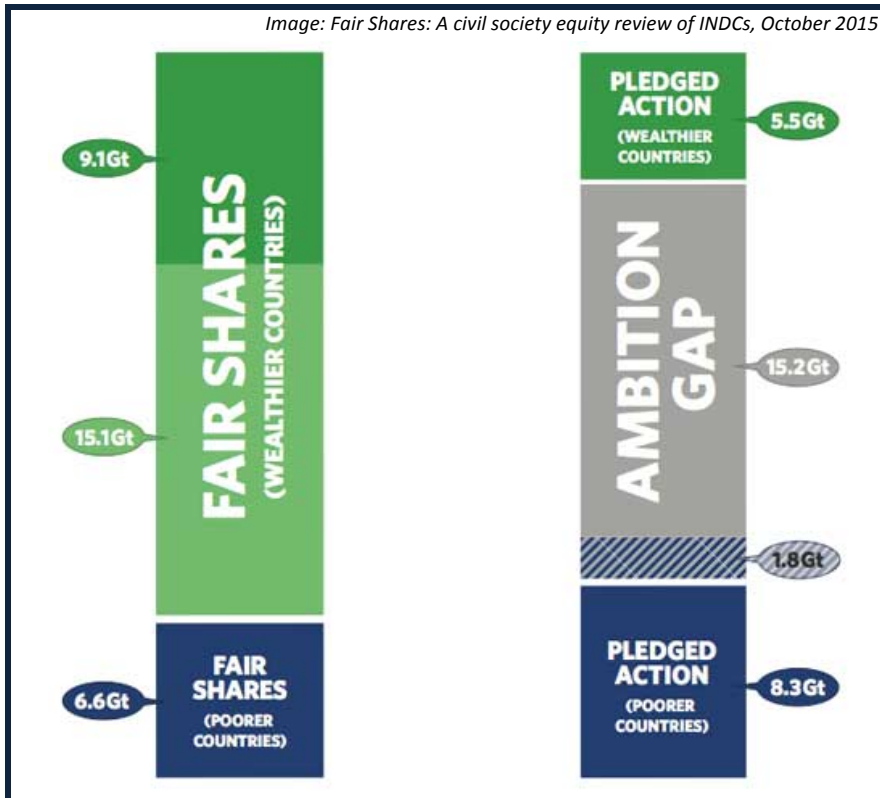
*By Rehana Dada*

In the first week of February the African Climate and Development Initiative (ACDI) at the University of Cape Town held a UNFCCC COP21 debrief in Cape Town. Speakers included Harald Winkler of the Energy Research Centre, Tasneem Essop of WWF, Goosain Isaacs of the Western Cape Province, Mark New of ACDI, and independent climate change researcher and analyst Penny Urquhart.

Winkler, who is a key member of South Africa's negotiations team, pronounced Paris a "relative" success, saying that it exceeded his personal expectations. Key contributing factors to its success, he said, included political will from the USA and China, good chairing of the G77China grouping, a good COP presidency, and the efforts of "many dedicated individuals working together".

Winkler talked to three specific goals achieved in the Paris Agreement. With mitigation, there is commitment for emissions to peak as soon as possible, with greater leeway for developing countries, and the decision to reduce emissions from 55 gigatonnes to 40 gigatonnes in 2030. The global goal for adaptation in terms of increasing adaptive capacity and resilience was a second key achievement. And the third was to increase finance flows from USD 100 billion per year beyond 2020, with a balance between adaptation and mitigation.

Essop heads WWF's Global Climate and Energy Initiative but spoke at the seminar in her personal capacity. She said that there should be no underestimation of the value of having achieved agreement but there are still significant gaps between what is required and the commitments on the table.



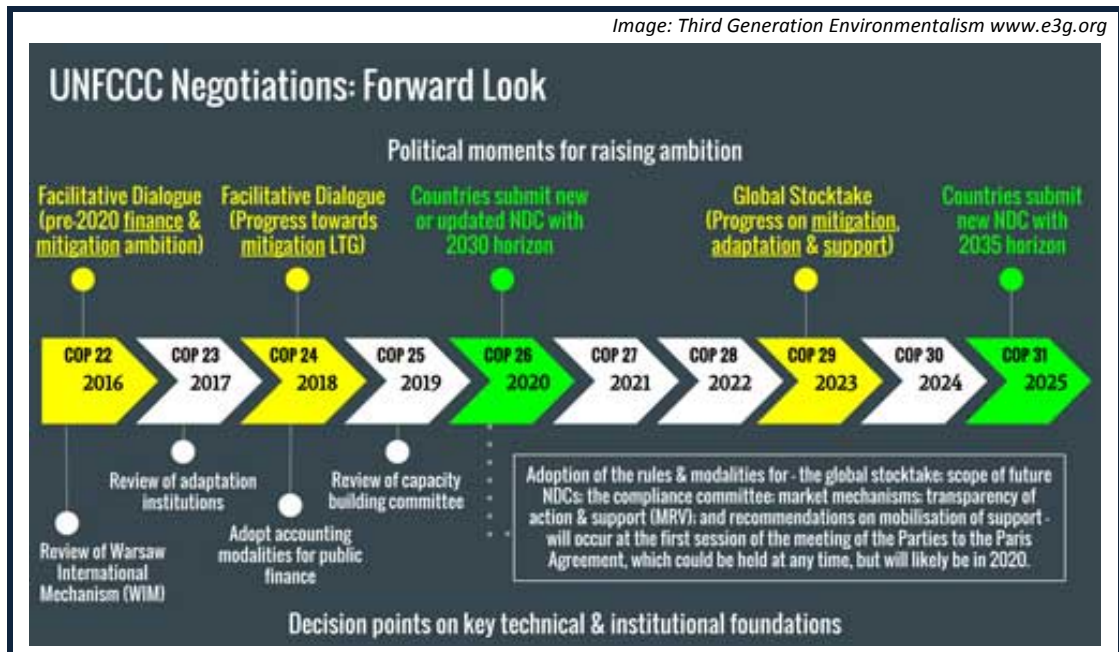
Although the Paris Agreement moved beyond the Annex I/non-Annex I categories that were previously used, differentiation is still reflected, particularly in mitigation and finance. The implication for South Africa, said Winkler, is that it can no longer avoid committed action on climate change on account of being in the non-Annex I grouping. The Paris Agreement made Adaptation and Loss & Damage more prominent than previously, and although the text on Loss & Damage is weak, that it is a standalone section acknowledges that there will be irreparable damage that adaptation cannot address.

Winkler said that in his opinion the strongest feature of the Paris Agreement was that of transparency, which talks to transparency on both action and support, common modalities of reporting, and improved reporting and review. As a result of the Paris Agreement, South Africa will be committed to produce more regular communications, and those communications will be subject to international review. Reporting requirements include reporting on mitigation, support in the form of finance, technology and capacity building, and adaptation plans and communications.

The practicalities of this translate into South Africa now being obliged to pursue domestic mitigation measures, in line with its nationally determined mitigation contributions, and required to show what measures will be implemented to achieve its mitigation objectives. The country is required to report on specific information every two years with a global review every five years, and to progress in its mitigation ambition.

For Essop, what is critical going forward is to reinforce the already strong and active citizen participation in all countries, and for countries to be held accountable at national level for the agreements they make at international fora. She said that the global stock takes were good opportunities to push for stronger commitments based on science and equity.





We will report further on Tasneem Essop's remarks in the March newsletter.

Read Harald Winkler's further reports at:

[Paris Agreement: after climbing a great hill, many more to climb](#)

[What might the Paris Agreement mean for South Africa?](#)

## Gauteng Provincial Climate Change Forum

By Felix Donkor

Cities are key agents in climate change, using 78 per cent of global energy and being responsible for over 60 per cent of all carbon dioxide and considerable amounts of other greenhouse gas emissions, principally via energy generation, vehicles, industry, and biomass use. Today more than half the global population lives in cities, and by 2050 this is expected to rise to over 70 per cent. Implications of such developments are severe, and this includes impacts to air and water quality, access to water accessibility, land use change, and waste management. Climate change also impacts infrastructural development and access to essential urban services and quality of life in cities. Moreover, the majority of crucial economic and social infrastructure, government facilities, and assets are situated in cities.

As a result, the mayors of cities across the world - from New York to London, Beijing to Tokyo, Brasilia to Buenos Aires, Lagos to Johannesburg - formed the World Mayors Council on Climate Change, with the intention of addressing these problems. Many cities have embraced their roles as agents of adaptation to provide the necessary conducive environment for harnessing the full potential of their residents.

The Gauteng Climate Adaptation Forum is an avenue for cities in the province to hone their skills and cross-pollinate ideas in climate change adaptation for sustainable development and the wellbeing of their residents, especially the urban poor (such as residents of informal settlements) who bear the brunt of climate ravages in developing countries. The forum also aims to promote coordination of climate change issues amongst institutions.

The Forum held its first meeting of 2016 in Johannesburg last week, with attendants including representatives of provincial government, Ekurhuleni Metropolitan Municipality, City of Tshwane Metropolitan Municipality, Mogale City Local Municipality, City of Johannesburg Metropolitan Municipality, and a number of non governmental organisations including Urban Earth and academic representatives.

Loyiso Mkwana of the Gauteng Department of Agriculture and Rural Development highlighted the draft Carbon Bill, pointing out that South Africa is ranked on par with developed nations in terms of carbon emissions. He added that several developmental milestones that we have achieved could end up being reversed if we do not address climate change impacts adequately. Consequently, South Africa's growth should be within the framework of green growth and sustainable development. Such a development paradigm, he explained, does not produce results overnight, but does eventually lead to longer lasting and healthier growth rather than short-term results that are fraught with many unintended negative consequences.



Representatives of Urban Health drew the link between climate change and health. They explained that climate change causes heat stress, with high temperatures resulting in fatigue and decreased worker productivity. This is a big concern for cities as engines of economic growth. Furthermore, climate change enhances the spread of communicable diseases. For example, high rainfall is associated with vector-borne diseases such as yellow fever, and floods may result in contamination of water supplies which, coupled with poor sanitation facilities, results in the spread of diseases such as diarrhoea and typhoid fever. Incidences of non-communicable diseases also increase with climate change, with extreme weather events and heat waves increasing cardiac diseases and hypertension, among other health complications.

Representatives from the various cities briefed the Forum on the measures being taken by their individual cities to address climate change. These included drafting new city policies and action plans; promulgation of regulations on urban planning and environment to manage climate change; more proactive responses to climate disasters whilst building capacity and resources; and increasing public awareness on climate variability and climate change-induced hazard mitigation.

With adequate planning, enhanced capacity, and the appropriate governance structures, cities can be avenues of innovation and efficiency. In partnership with their associated local authorities, cities have the potential to reduce the causes of climate change and effectively guard themselves from its impacts.

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## IPCC Expert Meeting on Communication

*By Rehana Dada*

Last week the Intergovernmental Panel on Climate Change (IPCC) held an Expert Meeting in Oslo to discuss strengthening of its communications ahead of the start of the next cycle of reports.

*Image: Intergovernmental Panel on Climate Change*



**Current co-chair of Working Group III, Youba Sokona holding the microphone, and behind him, Jean-Pascale van Ypersele who was an IPCC vice chair during the Fifth Assessment Report**

The IPCC reports are trusted by governments, civil society actors and business in their decisions relating to climate change. Although their reports and recommendations are often too broad for application at local level, they are nonetheless the most comprehensive assessment of climate change science available at a global scale.

Although the periodic assessment reports and the accompanying policy makers' summaries have proven invaluable over the years, particularly for informing decisions at global level, the IPCC has also been lobbied with criticisms of being too technical and the information being often unreachable. Criticisms of the political influence on the outcomes are also significant factors, however the IPCC reports still remain the most trusted consensus science reports on climate change. The assessment reports have improved in accessibility over the decades, with increasing use of info graphics and easy-to-read presentation of information, but the language is often considered still too technical, and in many instances, information provided in the policy makers' summaries require a pre-existing in depth knowledge of climate science.

This week's meeting included about 50 experts representing the full spectrum of society as well as experts who worked on the Fifth Assessment Report and those who are working on the Sixth Assessment Report. This includes South Africa's Debra Roberts, who is co-chair of Working Group II (Impacts, Adaptation, and Vulnerability) alongside Germany's Hans-Otto Pörtner.

*We will report further in the March newsletter.*

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## News and Events

### Water for the Future : Western Cape Government Seminar

In the first week of February, the Western Cape Provincial government held a symposium titled "Water for the Future". Stephen Law, attending on behalf of the Environmental Monitoring Group, reported that presentations ranged from discussions on supply and demand dynamics, innovations in water and sanitation, abstraction for agricultural use, energy costs of water supply, and environmental aspects.

Gerhard Otto of Eden District Municipality reported that during a major three-year drought period a few years ago, the municipality was able to reduce domestic use to around 100 litres per person per day, which they enforced through awareness campaigns, water restrictions and heavy fines for transgression, among other measures. Their public awareness campaign, with a relatively small budget, saved more water than was supplied by the desalination plants that were built at the cost of many millions.

Neil Armitage of the University of Cape Town shared his experience of a system in Singapore that diverts the city's storm water runoff into an artificial lake. The collected water contributes substantially to the city's freshwater needs, and largely due to this system, Singapore has managed to reduce its dependence on imported water from 80 per cent to 40 per cent of total demand. He also outlined a recent research project showing that storm water collection in Cape Town's Liesbeek river catchment could similarly meet the demand of a substantial number of households.

### Flowers for Valentine's or food for the future?

Kathleen Buckingham of the World Resources Institute suggests that if he didn't send you flowers this Valentine's Day, you might comfort yourself by considering it a sign that he's thinking of your children's future. Global population is expected to reach 9,6 billion in the next 35 years, and there is a roughly 70 per cent gap between crop calories produced today and that needed for the projected future population. Yet vast areas of land and water are used to produce cut flowers, even in countries that need to import food products to maintain food security. The impact of pesticide, herbicide, and fertilizer use on biodiversity and water quality is also significant.

The cut flower industry is worth around USD 33 billion today, with the Netherlands, USA and Japan accounting for nearly half the world's flower trade. In the past three decades, production shifted to countries with low labour costs, with the main producers now being Colombia, Kenya, Ecuador, and Ethiopia. In Kenya, over 2,000 hectares of agricultural land is used for cut flower cultivation, and in Ethiopia, production land rose to 1,200 hectares in 2008. Ethiopia's earnings was USD 131 million in 2009 and this is expected to rise to USD550 million this year.

### Informal meeting of the Green Climate Fund, Cape Town

In early February, the board of the Green Climate Fund convened an informal meeting in Cape Town. Co-chairs Zaheer Fakir and Ewen McDonald assured the public that the GCF board is committed to meet its target of investing USD 2,5 billion during 2016, in terms of scale and also through delivering "innovative and high-impact projects". They said that they had achieved some progress with their work plan and strategic plan, and are operating effectively as a board. The new board, with Fakir and McDonald as the new co-chairs, was elected in November last year.

A civil society campaign led by Friends of the Earth is underway to petition the board to reject accreditation of HSBC and Credit Agricole, which are reported to be among the top private bank financiers of coal. **Please contact Karen Orenstein for more information at [korenstein@foe.org](mailto:korenstein@foe.org).**

## **Development of a strategic framework and implementation plan for ecosystem based adaptation**

This week the Department of Environmental Affairs and South African National Biodiversity Institute hosted a stakeholder consultation workshop to develop a Strategic Framework and Implementation Plan for Ecosystem based Adaptation (EbA) in South Africa. Participants represented a wide range of sectors and expertise, resulting in a rich and insightful planning session. Candice Arendse reports on behalf of the Adaptation Network.

The workshop opened with presentations that provided an overview of EbA with an emphasis on the linkage between EbA and sustainable development. There were further presentations on national and international policies and meetings that support planning and implementation of EbA. The greater part of the workshop was spent on discussion involving all participants, with the intention of developing a proposed framework and refining a potential implementation plan. Five distinct focus areas were identified to guide discussions. Further information will be provided in our next newsletter.

## **Can oregano reduce methane in cow burps?**

Researchers at the Danish Departments of Food Science and Animal Science are researching whether feeding oregano to cows can reduce the amount of methane they emit. It is known that adding fat and nitrate or increasing starch content can both improve feed quality and reduce methane, but organic dairy farmers are not allowed to use such supplements. Oregano has a high essential oil content and antimicrobial effect, and can be a potential natural tool for reducing the amount of methane produced in the rumen. This is a four year project, and the hope is that there will be benefits both to reducing greenhouse gas emissions and improving quality of milk and milk products.

## **No hope of climate change settling over the next 10,000 years**

Projections of climate change concentrate on the next century and sometimes look further into the next two centuries, but there is little work on the potential impacts of climate change in the next 10,000 years. A paper published in Nature Climate Change looked at the impact of four emission scenarios, incorporated new data on the relationship between carbon dioxide, sea level rise and temperature going back 20,000 years, and then compared this to modelling extending 10,000 years into the future. Human activities have already resulted in a release of about 580 billion tons of carbon dioxide into the atmosphere, and the researchers modelled the effects of releasing another 1,290 to 5,120 billion tons between 20000 and 2300, with carbon dioxide release ending in 300 years. They showed that warming and related impacts persist for 10,000 years.



## Credits

This newsletter is produced by the Adaptation Network Secretariat, which is housed within the Environmental Monitoring Group. Rehana Dada is the editor.

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Articles do not necessarily represent the views of all Adaptation Network members.

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