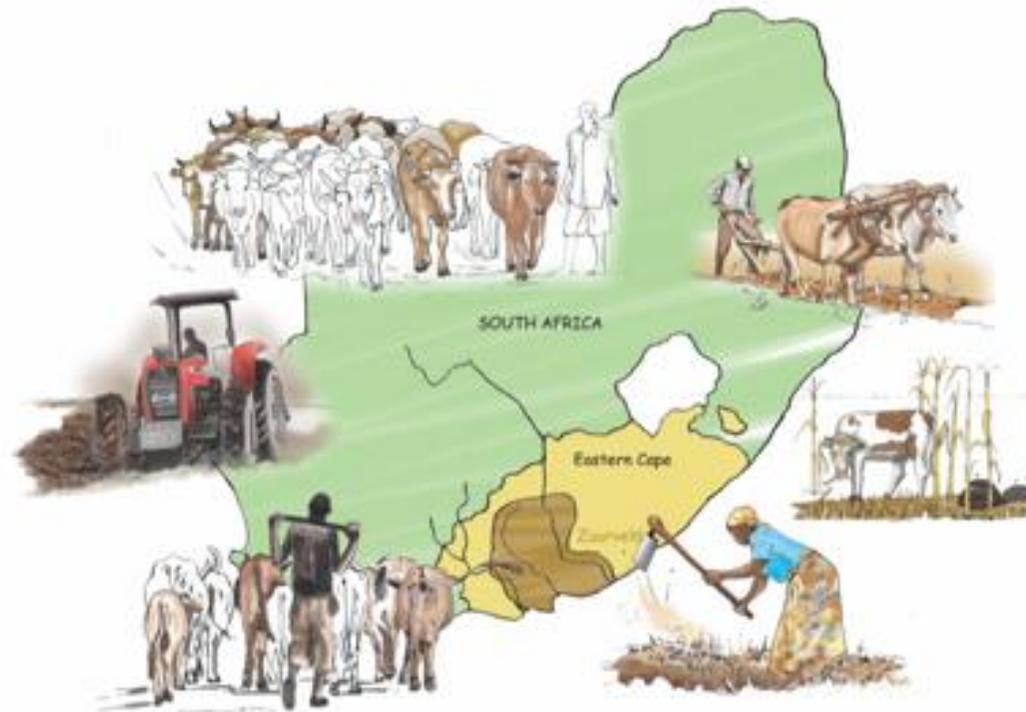


## Picture Story: Puzzling Seasonal Climate Change and Global Warming

### Did the Xhosa live with climate change before global warming?

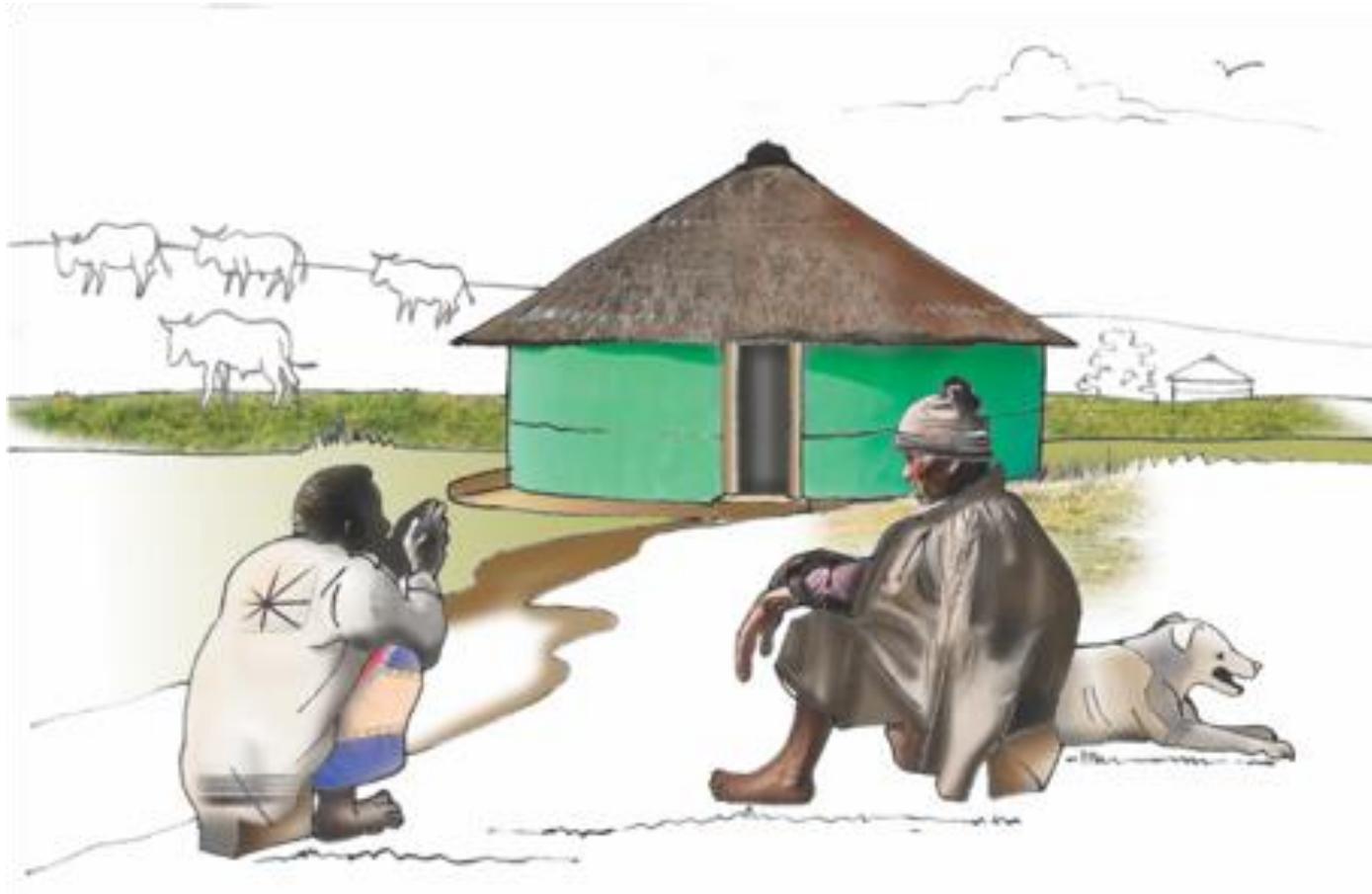
*Picture 1*



Mrs Zondi explained to the class that before global warming was linked to increasing greenhouse gasses in the atmosphere, the Eastern Cape was a site of seasonal climate variation.

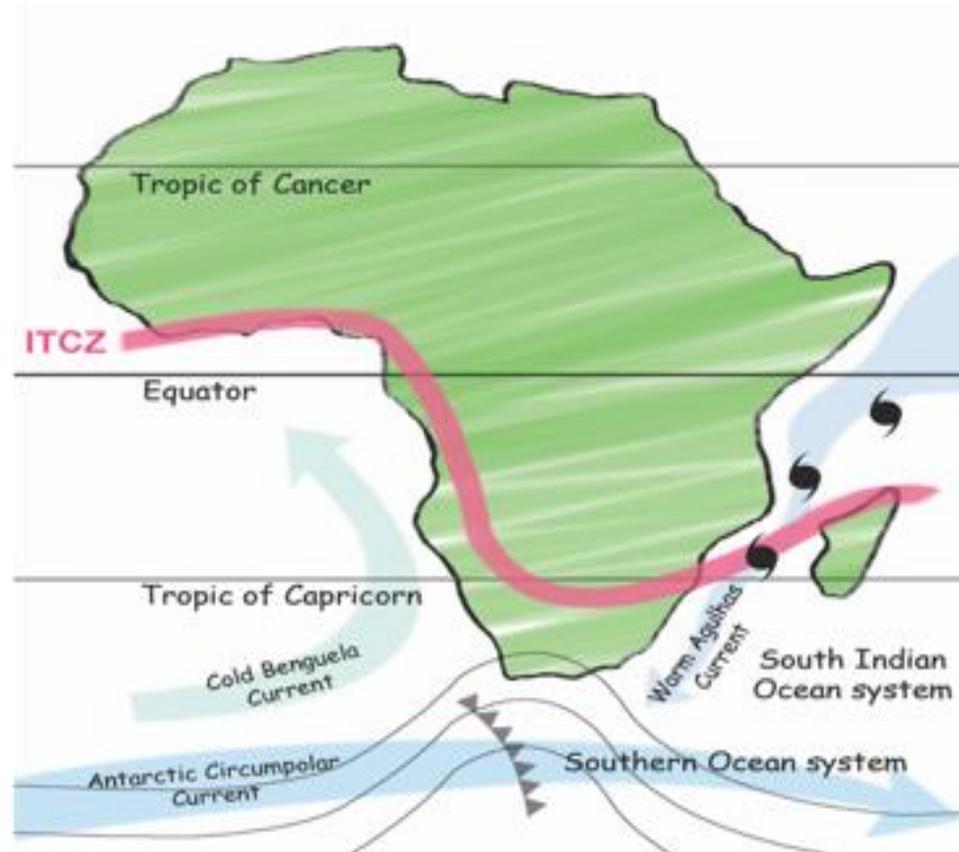
The Xhosa, like many Nguni cultures in southern Africa, had lived with seasonal cycles of drought that they had learned to survive by making provision for climate uncertainties. These seasonal practices have fallen away today but still have relevance in our modern times of climate change

Picture 2



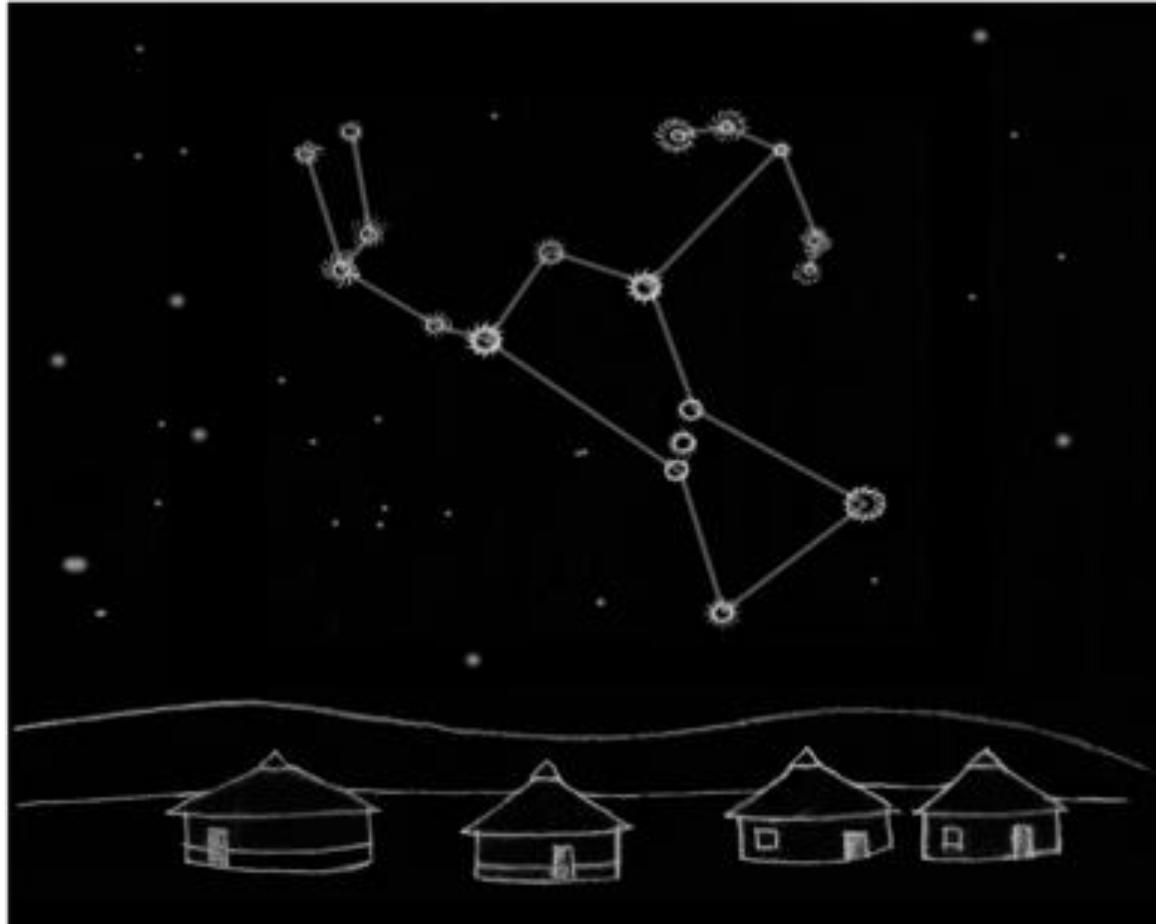
As cattle people the Xhosa lived on the open sweetveld grasslands of the Transkei. They gathered wild foods and grew grains and vegetables in household gardens. Like many cultures around the world, they always had to make provision for the uncertain seasonal cycles.

Picture 3



Mrs Zondi asked the class what they had learned about the regional climatic systems in Geography. Vusi who was good at Geography summarised how there are three climatic systems in the region: the ITCZ that moved fairly reliably with the sun; the southern Indian Ocean system that had cyclones that sometimes landed in Mozambique; and the great Southern Ocean that brings frontal weather systems up from the west. Her description allowed the class to see how the Eastern Cape region of the Xhosa lies in the middle of these systems so that it was a region of high seasonal variability. Here indigenous people had learned to read when the season was changing by looking at it

Picture 4



*Here indigenous people had learned to read when the season was changing by looking at the night sky. The class could not believe that each year as Orion's Belt became visible to the Xhosa in the night sky, they would know that the dry winter season was starting with an uncertain summer rainy season to follow.*

*Picture 5*



Communities would thus prepare to clean their croplands. Cattle would be put into the fields to eat the remaining stalks of the summer crops and also to fertilise the lands for the next season. The cleaning of the lands at the end of the season that followed, was a mystery in early colonial times. Colonists saw it as one of many cultural rituals to close the cropping season.

Picture 6



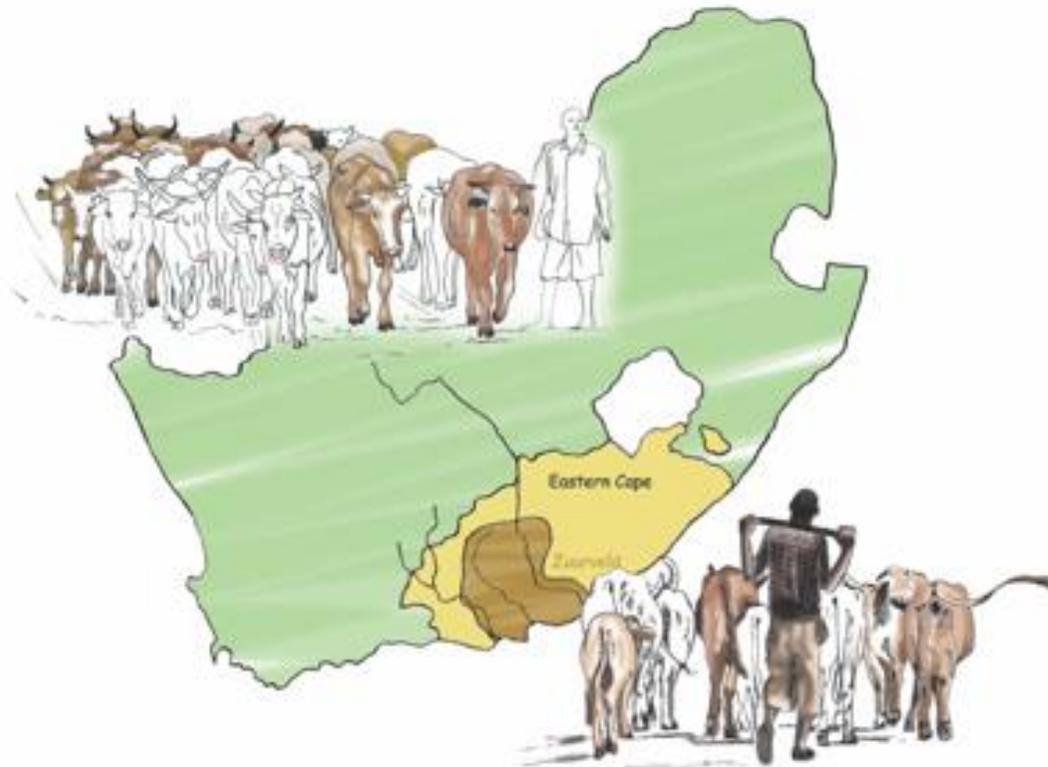
Mrs Zondi explained how it was actually a cultural process of preparation for the uncertainties of the coming summer rainy season. The Xhosa had to prepare for whatever happened so after herding the cattle into the croplands, they would conclude their preparations with *uku gelesha*. This was a communal process of cleaning the lands and breaking ground. The partially tilled soil would allow cattle dung and the light winter rains to sink into the soil and support the crops of the next season.

Picture 7



Mrs Zondi went on to describe how by the mid-20<sup>th</sup> Century *uku gelesha* started to fall away as more and more lands were tilled with tractors. It was too costly in fuel to till the lands at both the close of the season and when the first rains arrived with the summer season. It thus made sense to stop *uku gelesha* and to only plough when the first of the spring rains softened the soil. The mysterious *uku gelesha* practice of the Xhosa thus receded in prominence and a new economy of production replaced it.

Picture 8



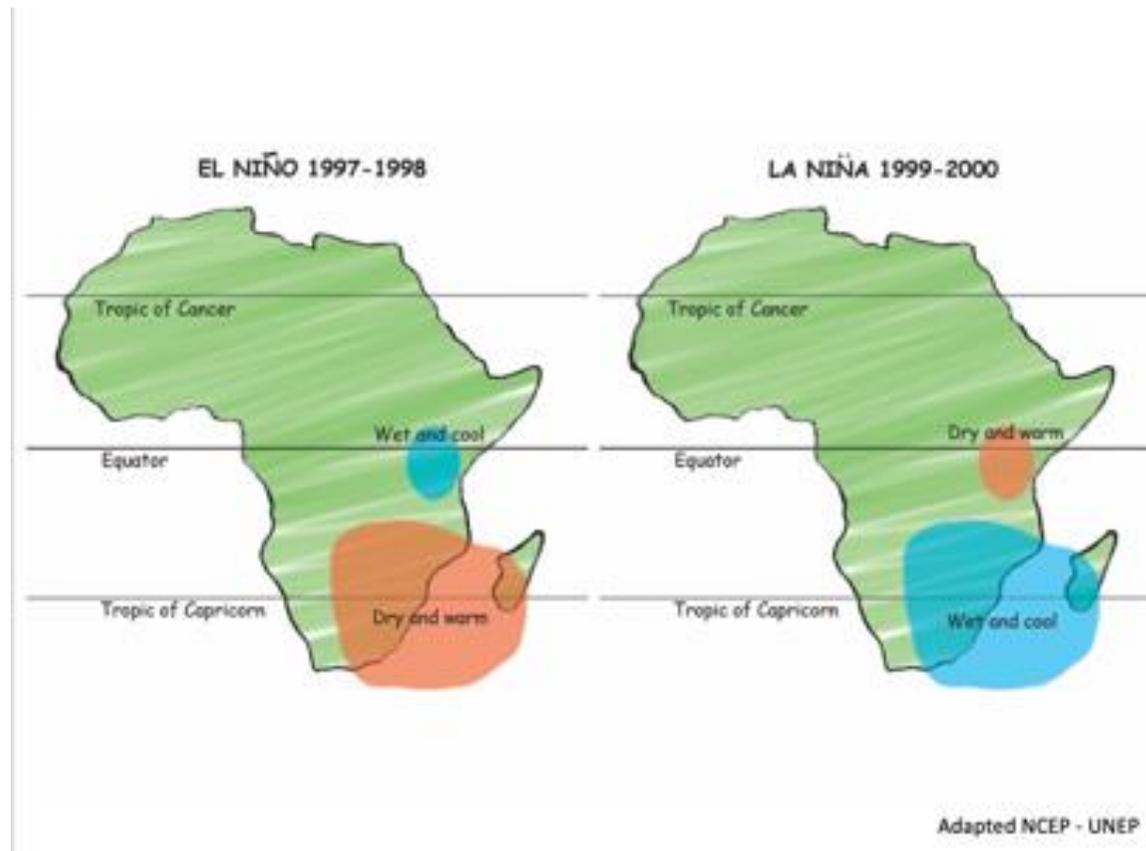
In seasons when there were early light rains or the rain arrived late, this could herald a drought with little or no rain into December and even January. The lack of soaking rain meant that the pasture grasses would not grow thick and cattle would become thin and weak so that they did not have the strength to plough hard ground. The Xhosa would migrate their herds to the **Zuurveld** to graze on the sour veldt grasses from December to March. Sourveld grasses store nutrients in their roots over a dormant winter period so they are high in nutrition at the start of the summer season. The nutrition lasts for a short 3-4 month period of summer rainfall and then the cattle can eat the grass but still grow thin and have to return to the sweet veld pastures that have usually recovered by this time if there had been enough summer rain.

Picture 9



But wisely at the end of the previous season, *uku gelesha* had broken up the soil so that it could absorb and hold what little rain had fallen in the dry winter months. With *uku gelesha* and a small amount of rain communities could still plant some summer crops. In hard years they would have to rely on wild green vegetables (*imifino*) that were nutritious and rich in iron.

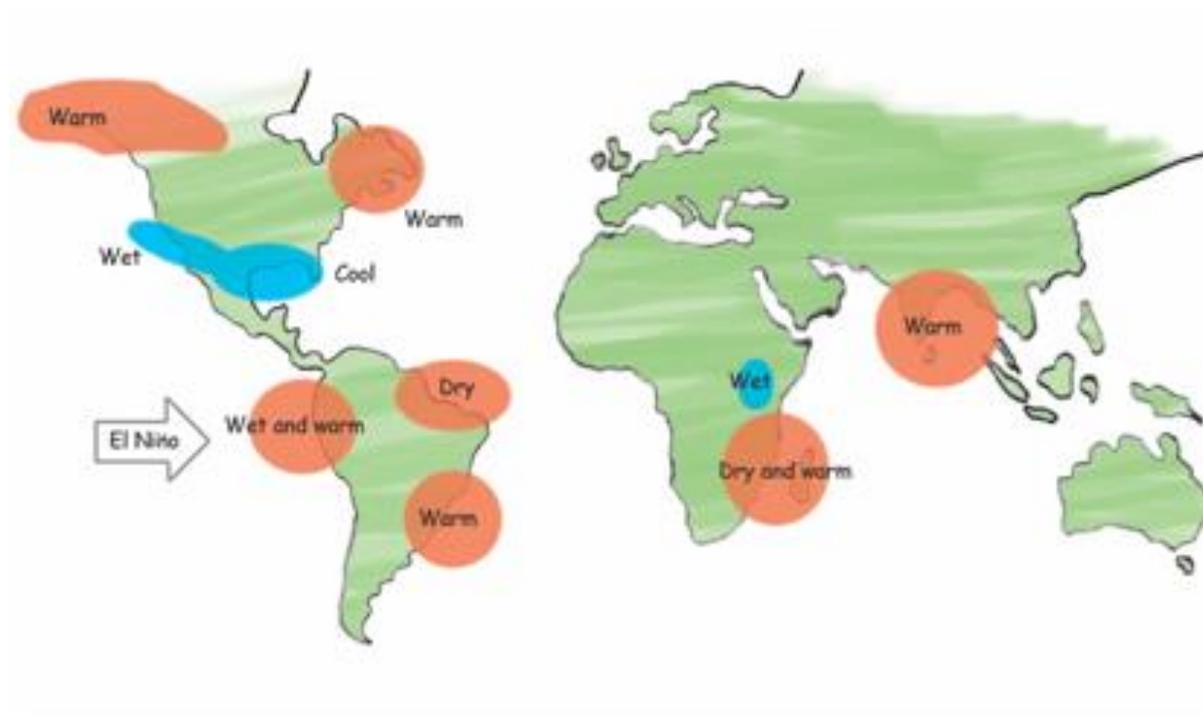
Picture 10



Mrs Zondi then taught the class that in late 20<sup>th</sup> Century scientists, working at a global level, discovered a key climatic driver of the patterns of dry and wet seasonal cycles in southern Africa. They noted how recurring wet and dry cycles in eastern southern Africa was influenced by **ENSO** (El Niño–Southern Oscillation). The map simplified how a complex climatic pattern of seasonal variation could play out in a wet period being followed by a dry, warm drought season. Climate science has advanced our knowledge on cycles of drought but the complex climatic system across the ITCZ, Southern Ocean and Southern India Ocean make it difficult to forecast which areas will have droughts and when.

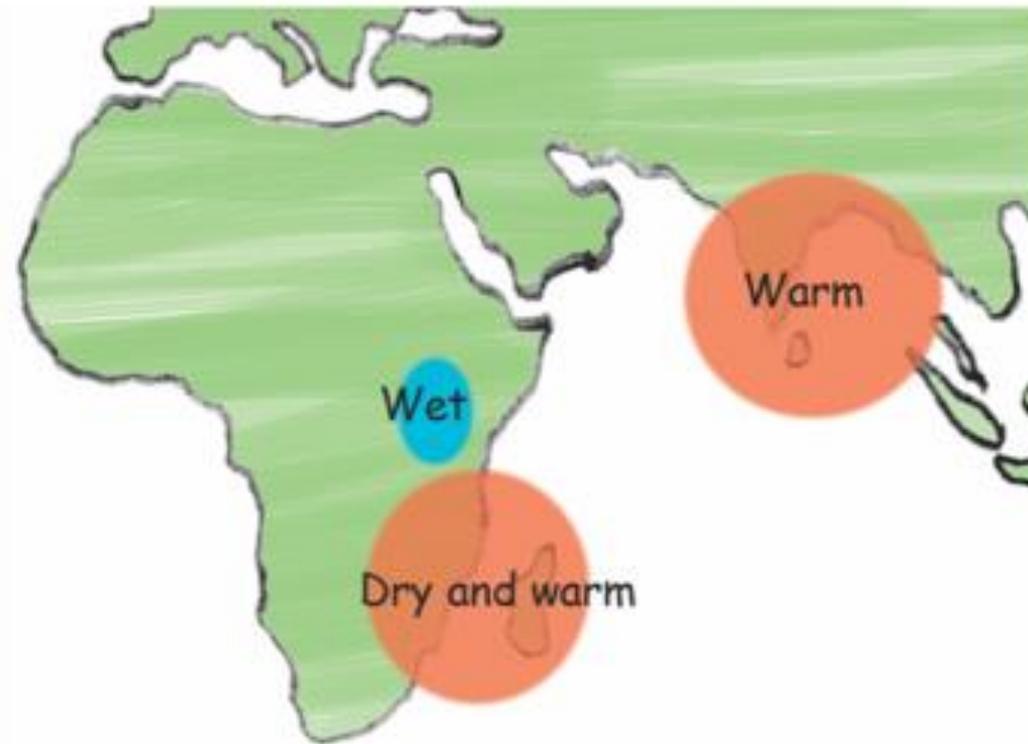
Picture 11

The global climatic influences of an El Niño year



The map showed the **El Niño extreme happens when** warm surface waters of high evaporation into the atmosphere push up and over the cold current waters of the west coast of South America. The warm, moist conditions reaches across the global climatic system. The warming of the Pacific against the coast of South America produce warm, moist conditions. In a warm El Niño year of high evaporation and the moist air is carried in the jet stream and wet conditions can reach into Mexico and even across as far as India. This event on the west coast of South America can result in warm, dry drought conditions in eastern southern Africa.

Picture 12



It was strange to think that extreme wet and warm conditions on the tropical west coast of south America could produce dry, warmer conditions in eastern southern Africa but climate scientists at the University of Cape Town have recently reported that : El Niño events leading to droughts in the region have been particularly marked since the late 1970s. Most have occurred between December and March. Recent studies show that El Niño has affected summer rainfall with increased dry spells, reductions in the flux of moisture from the Indian Ocean to the continent, and by shifting large scale rain bearing systems to the Indian Ocean. All over the world communities are having to learn from the past to re-imagine the future. So, it is important to understand how the wisdom in past practices can be used to understand the present and re-imagine the future (Chikamori et al., 2019).

*Picture 13*



With climate change leading to increased temperatures and rainfall variability. The various **effects of climate change** on rural communities **are** expected to include:

- drought;
- depletion of water resources and biodiversity;
- soil erosion; and
- decreased subsistence economies.

What can we learn from Xhosa seasonal practices?

## Questions for classroom discussions

1. Do other countries like India and Mexico also have similar ways of coping with droughts?
2. What can be done to cope with climate induced extreme events and drought seasons?

## Curriculum ESD extension activities

### Some LoReT tasks:

1. Learning from the Nguni indigenous knowledge practices and modern climate science, research, what people can do to ensure food security in El Niño drought years?
2. Design a drought-relief emergency relief kit for the drought years that are likely to be accompanied by weather extremes in the future.

### Some global challenges

1. What are the seasonal effects of climate change that are evident in your region?
2. Research what is being done to mitigate extreme weather events in other countries like Mexico and India where seasonal climate can be influenced by ENSO.

## References

- Denison, J. and Wotshela, L. (2009). Indigenous water harvesting and conservation practices: historical context, cases and implications. Water Research Commission Report NO. TT 392/09 APRIL 2009
- Rouault, M. (2015). El Niño threatens southern Africa with yet another drought. The Conversation, Africa, November 11, 2015.