



Food and Agriculture
Organization of the
United Nations

IMPACT OF CLIMATE CHANGE: WHAT FAO IS DOING TO ASSIT THE COUNTRY TO MITIGATE AND ADAPT

PRESENTED TO THE PARLIAMENTARY PORTFOLIO COMMITTEE ON
AGRICULTURE, FORESTRY & FISHERIES
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FAO OVERVIEW

- FAO is an intergovernmental organization, that has 194 Member Nations, two associate members and one member organization, the European Union.
- FAO supports improved governance among others, generate, develop and adapt existing tools and guidelines and provide targeted governance support as a resource to country and regional level FAO offices.
- Headquartered in Rome, Italy, FAO is present in over 130 countries.
- Achieving food security for all is at the heart of FAO's efforts – to make sure people have regular access to enough high-quality food to lead active, healthy lives

FAO's Vision: A world free from hunger and malnutrition where food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially and environmentally sustainable manner

Eradication of hunger, food insecurity and malnutrition

Elimination of poverty

Sustainable management and utilization of natural resources

Global Goals of members



1) Help Eliminate hunger, Food insecurity and malnutrition



2) Make agriculture, forestry and fisheries more productive and sustainable



3) Reduce rural poverty



4) Enable inclusive and efficient agricultural and food systems



5) Increase the resilience of livelihoods to disasters

Strategic Objectives



Outcomes and Outputs



Gender & Governance mainstreamed across all objectives



BACKGROUND ON CLIMATE CHANGE

- **Climate change** *is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions (i.e., more or fewer extreme weather events).*
- Climate change is an integral part of the new 2030 Agenda for Sustainable Development, a set of 17 global goals that countries have adopted to end poverty and hunger, protect the planet, and ensure prosperity for all.
- Climate change is a threat to global food security, sustainable development and poverty eradication. Greenhouse gases (GHG) from human activity are the most significant driver of observed climate change.
- It encompasses and goes far beyond global warming and its consequences – for example the melting of polar ice caps and glaciers leading to sea level rise.
- It has deeper implications such as extreme weather events (El Niño, La Niña, Cyclones, Heat Waves, etc.), disruption of the water cycle, ocean acidification and changes in the function and composition of ecosystems.
- Improving the resilience of food production systems is key to feeding a growing population. For this reason climate change must be addressed as an integral part of the overall development agenda.

BACKGROUND ON CLIMATE CHANGE

- Increases in temperature, more frequent extreme weather events, and greater rainfall variability are expected to increase the occurrence of crop failures, pests, crop diseases, and the degradation of both land and water resources.
- Land degradation, exacerbated by climate variability and change, manifests itself through soil erosion, water scarcity, and loss of vegetation.
- With the advent of climate change: rainfall is becoming less reliable, temperatures are rising, weather is becoming more intense, and the fight against hunger is becoming more extreme.
- One of the main responses to climate change will likely be greater reliance on ground water.
- The management of groundwater and particularly the conjunctive management of surface and groundwater will be a vital strategy to ameliorate the effects of climate change and rainfall variability.

IMPACTS OF CLIMATE CHANGE

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impacts of climate change are multi-layered

- There is a succession of "knock-on" impacts from primary impacts on the atmosphere caused directly by human activities (air pollution through emission of Greenhouse gases).
- These lead to second level of impacts on the climate (such as rising temperatures, heat waves or more heavy rains)
- The third level of impacts are on land and water affecting their ability to provide environmental services. These may include failure of crops and spread of malaria due to higher temperatures and/or waterlogged soils;
- The fourth level of climate change impacts are directly on humans e.g. increased human hunger due to crop failure and increased mortality from disease, loss of jobs, poverty etc.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

- 1) Increased incidents of extreme weather events (statistics and frequency)
- 2) Increased incidents of pests and diseases attributed to climate change
- 3) Impact on food security
- 4) Socio-economic impact
- 5) Land (i.e. Land degradation),
- 6) Impacts on forestry
- 7) Fisheries
- 8) Livestock

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

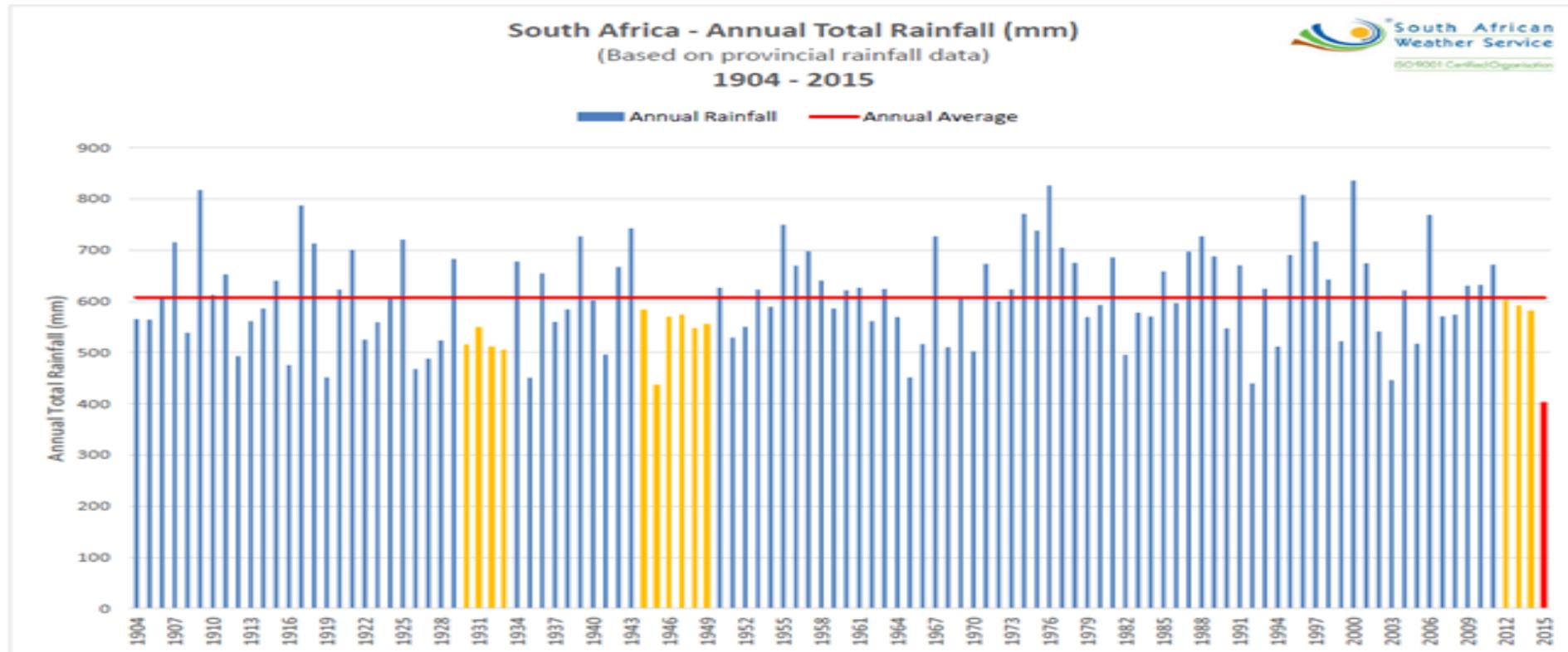
1) Increased incidence of extreme weather events

- Over the full 112-year period (from 1904), the lowest annual total rainfall for South Africa was indeed for the period Jan – Dec 2015 with an annual total of only 403 mm.



General Information

South Africa – Annual Total Rainfall



IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Increased incidence of extreme weather events: HEAT waves

- The South African Weather Service (SAWS) defines it a heat wave “when for three (3) days the maximum temperature is five degrees (5°C) higher than the mean maximum for the hottest month for that particular place”.
- Longer, hotter, more regular heat waves.
- The frequency, intensity and duration of heat waves are increasing in many parts of the globe.
- This has also been attributed to human induced climate change.
- Increase in heat wave events translate to greater health impacts such as heat stroke, heat exhaustion, heat cramps and heat rash
- Climate change has altered the geographical distribution of heatwaves and are now occurring in regions where they have not previously occurred
- In 2015, 19 countries set new national high temperature records; this is the largest number of national high temperature records in a single year. South Africa also reached new record high at 20 locations

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

New High temperatures recorded in South Africa

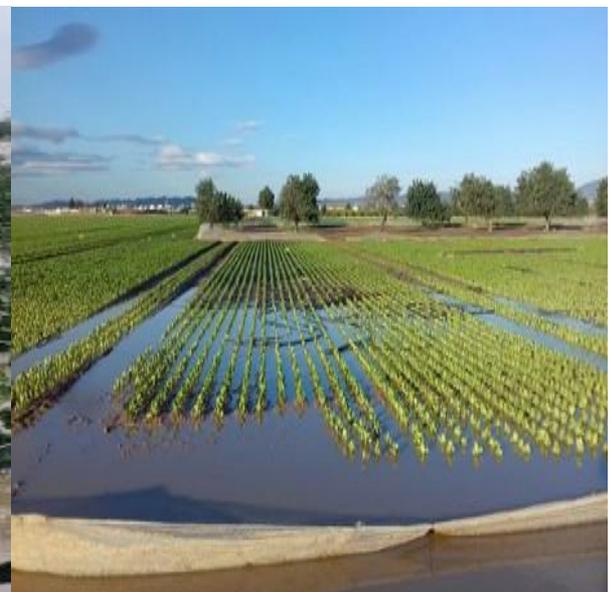
New high temperatures records in South Africa

Old Record	Old Date	New Record	New Date	Difference in temp (old _t -new _t)	Years in between	Station
42.5°C	1999-10-30	48.3°C	2015-10-27	5.8°C	16	Vredendal
39.8°C	2009-10-20	43.4°C	2015-10-27	3.6°C	6	Redelingshuys
41.4°C	1985-10-10	42.4°C	2015-10-27	1°C	30	Wellington
39.6°C	1999-10-30	42.4°C	2015-10-27	2.8°C	16	Poterville
38.6°C	2014-10-05	41.8°C	2015-10-27	3.2°C	1	Malmesbury
40.6°C	2011-10-09	41.7°C	2015-10-27	1.1°C	4	Clanwilliam
39.9°C	1985-10-10	41.5°C	2015-10-27	1.6°C	30	Lammewens
37.4°C	1999-10-30	41.2°C	2015-10-27	3.8°C	16	Paarl
39.5°C	1985-10-10	41.1°C	2015-10-27	1.6°C	30	Robertson
37.8°C	2003-10-12	40.3°C	2015-10-27	2.5°C	12	Cape Town
36.1°C	1985-10-10	39.3°C	2015-10-27	3.2°C	30	Jonkerhoek
38.1°C	2003-10-12	38.9°C	2015-10-27	0.8°C	12	Atlantis
35.9°C	2003-10-12	38.2°C	2015-10-27	2.3°C	12	SA Astronomical Observatory
34.0°C	2003-10-12	35.7°C	2015-10-27	1.7°C	12	Robbeneiland
33.4°C	1985-10-30	34.9°C	2015-10-27	1.5°C	30	Cape Point
44.2°C	1999-10-30	46.9°C	2015-10-27	2.7°C	16	Violsdrif
42.3°C	2014-10-26	43.5°C	2015-10-27	1.2°C	1	Augrabies falls
36.9°C	2011-10-09	41.1°C	2015-10-27	4.2°C	4	Nieuwoudville
36.7°C	1997-10-01	38.4°C	2015-10-27	1.7°C	18	Springbok
37.2°C	2000-10-12	38.2°C	2015-10-27	1°C	15	Calvinia

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Increased incidence of extreme weather events: Increased flooding

- Excessive, precipitation increases risk of localized flooding which could wash away seeds, damage or destroy standing crops, increase livestock morbidity and mortality and damage infrastructure.



IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Increased incidents of pests and diseases attributed to climate change: Fall Armyworm *Spodoptera frugiperda* (J E Smith) (Lepidoptera, Noctuidae)

- First Report of Outbreaks of the Fall Armyworm a New Alien Invasive Pest in West and Central Africa: Sao Tome and Nigeria
- Presence of at least two distinct haplotypes within samples collected on maize in Nigeria and São Tomé suggests multiple introductions into the African continent.
- Weak Border /import regulation Systems+ Stages in its lifecycle favoured by climate change(high temperatures), + Good flyer make it very invasive.



IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Increased incidents of pests and diseases attributed to climate change: *Tuta Absoluta*: Tomato Leaf Miner (TLM)

- *Tuta absoluta* is a devastating pest of Tomato. It is originated from South America.
- This pest is crossing borders and devastating tomato production both protected and open fields. The infestation of *Tuta absoluta* also reported on potato, Aubergine and common beans.
- In Nigeria prices of Tomato have gone up 400% due to impact of the pest

Tuta Absoluta



Anecdotal evidence is suggesting that climate change and weather patterns providing ambient breeding conditions many of these pests

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of Climate change on Food security in SA

- Delayed rains and subsequent late planting severely limited crop production.
- In its early response plan Government recorded 227 000 farming households and 21 000 commercial farming units as affected.
- In addition, an animal mortality of 252 880 throughout the provinces has been reported.
- Combined with the low output of 2015 and limited agricultural inputs available, maize prices have risen to record high levels (nearly double the average price).
- Already an estimated 14.3 South Africans are estimated to be vulnerable to food insecurity, while the food basket has recorded significant increases in recent months -from August 2015 to August 2016, the cost of the basic 23 item food basket increased by approximately 11.8 %.
- With climate change more people could have been affected.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of Climate change on Food security in the region: *Number of Food Insecure people per annum since 2010/11 marketing year*

Country	Marketing Year							2016/17 vs 2015/16 (% change)
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	
Angola			367 190	665 000	755 678	1 253 048	755 930	-40%
Botswana				28 936	29 306	30 318	57 411	89%
DRC	5 860 872	5 445 000	6 395 448	7 318 639	6 591 535	4 456 106	7 500 000	68%
Lesotho	200 000	514 000	725 519	223 055	447 760	463 936	709 394	53%
Madagascar						1 800 000	1 140 000	
Malawi	508 089	272 502	1 972 993	1 855 163	1 312 376	2 833 212	6 500 000	129%
Mozambique	350 000	245 000	270 000	212 000	150 000	375 905	1 980 000	427%
Namibia	42 100	243 474	74 711	778 504	117 662	578 480	729 134	26%
South Africa*	14 547 022	12 871 320	13 625 930	13 798 024	14 060 928	14 349 445	14 349 445	0%
Swaziland	160 989	88 511	115 713	289 920	223 249	320 973	638 251	99%
Tanzania	1 141 214	1 618 795	1 472 127	828 063	424 136	358 505	358 505	0%
Zambia	53 629	74 804	62 842	209 498	351 267	798 948	975 738	22%
Zimbabwe	1 287 937	1 390 000	1 668 000	2 206 924	564 599	2 829 159	4 071 233	44%
SADC	24 151 852	22 763 406	26 750 473	28 413 726	25 028 496	30 448 035	39 765 041	31%

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on fisheries – key observations in recent years (Source DAFF, DEA)

- Rising sea levels have been recorded all along South Africa's coastline, but at different magnitudes in different regions.
- Changes in precipitation and fresh water flow, sea-level rise and increased temperatures and coastal storminess have led to changes in physical processes and biological responses in estuaries with an impact on ecosystem services.
- Range extensions of many species of tropical fish into the estuaries of the temperate transition zone have been reported.
- Shifts in the spatial distribution of cold and warm water intertidal species on rocky shores have been linked to changes in wind, upwelling and sea surface temperature.
- An eastward expansion in the distribution of kelp in recent years has been linked to cooling along the south coast.
- Increased coral bleaching on the north east coast has affected reef health.
- An eastward shift in resource availability of West Coast rock lobster has had serious ecological, fisheries and resource management implications.
- Changes in the habitat for small pelagic fish and hakes off the west and south coasts in response to shifts in winds and upwelling were detected in the early 1980s, mid 1990s and in 2009–2010.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on Fisheries applicable to South Africa : physical changes

1) Water surface temperature rise:

- Changes in ocean dynamics could lead to changes in migration patterns of fish and possibly reduce fish landings, especially in coastal fisheries it can make the ocean waters become unsuitable for fisheries, causing a reduction in and possible collapse of fishing activities in certain areas. Includes inland water bodies

2) Sea Level rise:

- In coastal areas, sea level rise may alter the salinity of estuarine habitats, inundate wetlands, and reduce or eliminate the abundance of submerged vegetation, adversely affecting those species which rely on these coastal habitats for reproduction and recruitment (Hlohowskyj et al., 1996)

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on Fisheries applicable to South Africa : physical changes

3) Increasing water salinity:

- Climate change can cause an increase or decrease in water salinity in multiple ways. While tropical oceans are increasingly becoming saltier, oceans closer to the poles have become fresher.
- This highlights that tropical oceans are very likely to suffer more from the potential impacts of increasing water salinity relative to waters in higher latitudes(IPCC, 2001)

4) Ocean acidification:

- direct effects include changes in physiological processes such as reduced growth of calcified structures, otolith development, and fertilization success.
- These may ultimately lead to direct impacts at the whole-organism level, including reduced growth and reproductive output, increased predation and mortality, alteration in feeding rates and behaviour, reduction in immuno-competence and reduced thermal tolerance.
- Indirect effects include alteration in predator or pray abundance, effects on biogenic habitats such as coral reefs, and changes in nutrient recycling.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on Fisheries applicable to South Africa : Biological changes

1) Changes in Primary Production :

- The relationship between climate change and future ocean primary production is likely to be a key constraint on fish and fisheries production (Dulvy et al., 2010).
- Survival of fish larvae during the planktonic stage is thought to depend strongly on the availability of sufficient and suitable food.
- Therefore, in addition to effects of changes in production, climate induced changes in distribution and phenology of fish larvae and their prey can also affect recruitment and production of fish stocks

2) Changes in Fish Distribution:

- the most commonly reported ecological responses of marine species . Fish species are believed to respond to environmental changes such as warming water temperatures by shifting their latitudinal and depth ranges.
- Changes in ocean dynamics could lead to changes in migration patterns of fish and possibly reduce fish landings, especially in coastal fisheries of many South African fishing communities.
- Marine fisheries are an important food source, and therefore, changes in the total amount or geographic distribution of fish available for catch could potentially affect food security (Cheung et al., 2009)

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Climate change drivers, key responses and predicted intensity of response in the three marine biogeographic regions of South Africa's coastline (estuaries and near-shore ecosystems)

DRIVERS	RESPONSE	SUB-TROPICAL		WARM TEMP		COOL TEMP
		KwaZulu-Natal	Wild Coast	Eastern Cape	Southern Cape	Western Cape
Ocean circulation	Current speed	+	+	+	+ -	+ -
	Current position	?	?	?	?	
	Upwelling	+	+	+	+	+
Precipitation	Runoff	+	+	+	+ -	-
	Mouth closure	-	-	-	+ -	+
	Salinity	-	-	-	+ -	+
	Nutrients fluxes	+	+	+	+ -	-
	Floods & sediment	+	+	+	+ -	-
	Droughts	+	+	+	+	+
Sea level rise	Flushing pollutants	+	+	+	+ -	-
	Salinity	+	+	+	+	+
	Increased tidal prism	+	+	+	+	+
Rising temperatures	Mouth closure	-	-	-	-	-
	Species range extensions	+	+	+ -	+ -	-
Acidification	Community composition	-	-	-	+	+
	Calcifying organisms	-	-	-	-	-
Coastal storms	Mouth closure	+	+	+	+	+
	Overwash	+	+	+	+	+
	Marine sediment	+	+	+	+	+

- Accelerated sea level rise, changes in river flows and increased frequency of high-intensity coastal storms and high water events pose a significant risk to estuarine, inshore and offshore fisheries with potential impacts on linefish, prawns and squid.
- On a regional scale, KwaZulu-Natal and west coast estuaries are likely to be the most affected from a structural and functional perspective .
- Offshore catches of important linefish (squaretail kob and slinger) may decrease if freshwater flow inputs are not maintained to key systems such as the Thukela Banks.

(source, DEA, DAFF, GIZ Climate and Impacts Factsheet Series)

Impact of climate change on Forestry

- Global Climate Models (GCM) show that most of Southern Africa is likely to experience higher temperatures in the coming decades but the picture for rainfall is less clear.
- The International Panel for Climate Change (IPCC) Fourth Assessment Report suggests that Southern Africa's temperature will be 2^o to 4^oC higher than a baseline of 1961-1990, while rainfall will be 10-20% less by 2050.
- Other model simulations show rainfall declining by 5%-20% in 2080 from a 1961-90 average in all the countries major river basins.
- Annual rainfall appears to have changed little over the last 50 years, droughts and floods have become more frequent and severe and the onset of the rains less dependable.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on South African Forestry

- Forestry Commercial plantations, woodlands, natural and urban forests are complex ecosystems providing a range of economic, social and environmental benefits and ecosystem services to a wide range of people, contributing significantly to national and provincial economies and employment (CCSPAFF, 2013).
- Most commercial plantations in South Africa are grown in KwaZulu-Natal, Mpumalanga and the Eastern Cape Provinces with the three major genera being Pinus, Eucalyptus and Acacia (wattle). South Africa's commercial production forests are vulnerable as a result of the following (DAFF, 2010)
- Geographically production forests extend over a wide area, but they are fragmented in occurrence, with only ~ 1.5% of the country climatically suitable for tree crops.
- Individual tree species have climatically optimum growth areas dependent on a combination of rainfall and temperature conditions with sub-optimum conditions the result of either drought conditions, snow / frost damage or pest / disease prevalence.
- Timber farmers and companies are often vulnerable by not matching site and species and thus subjecting themselves to losses and reductions in profit margins.
- Associated with the timber industry are fixed capital investments such as sawmills and pulp mills which need to be located optimally.
- The timber industry is vulnerable to competition from, and conversions to, more lucrative uses for the land, e.g. residential and industrial development, or sugarcane or sub-tropical fruit cultivation.
- Vulnerability and risks are likely to be higher on commercial plantations than on natural forests, particularly when one considers land availability, water demand, environmental sustainability and socio-economic factors.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on South African Forestry

- Plantation are, furthermore, vulnerable to lightning or arson induced fires, more so in some regions than in others, with vulnerability also strongly dependent on the degree by which proactive fuel load reduction strategies are implemented.
- Climatically, forest plantations are also at risk of frost, snow and hail damage.
- Climate influences the survival and spread of insects and pathogens directly, as well as the susceptibility of their forest ecosystems, with inter- and intra-annual variations in temperature and precipitation affecting pest, reproduction, dispersal and distribution.
- Indirect consequences of disturbance from pests and pathogens include the impacts of climate on competitors and natural enemies that regulate their abundance.
- With forestry plantations generally using more water than the native vegetation they replace, they can significantly reduce the flow in rivers, thus making them vulnerable as a competitor for scarce water resources.
- Additionally, groundwater recharge is also reduced by plantations where roots are able to tap into the groundwater table, with forest plantations having been shown to significantly depress low flows.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Increased land Degradation

- According to south Africa farmers weekly(www.farmersweekly.co.za), South Africa loses an estimated 300-400 million tons of soil annually – the equivalent of 10 million fully-loaded 30t interlink trucks
- Dams in S.A. could be losing between R70 and R100 million worth of storage capacity each year due to sedimentation (2005 figures)(FAO, 2005)
- 45 of the river estuaries in KZN are in a serious stage of degradation



IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on livestock

- Climate change is having substantial effects on ecosystems and the natural resources upon which the livestock sector depends.
- Climate change affects the sector directly, through increased temperature, changes in the amount of rainfall and shifts in precipitation patterns.
- The direct impact of climate change on livestock are on its growth, milk production, reproduction, metabolic activity and disease occurrence. The indirect impact is on reducing water and pasture availability and other feed resources.
- Indirect impacts will be experienced through modifications in ecosystems, changes in the yields, quality and type of feed crops, possible increases in animal diseases and increased competition for resources.
- At the same time, livestock food chains are major contributors (18%) to greenhouse gas (GHG) emissions (FAO, 2006) – from animal food value chain i. land use, ii. feed production, iii. animal production, iv. manure management and v. processing and international transport.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on livestock production

- Animals can't survive when the environmental temperature is 5 °C higher than its body temperature
- Pigs - feed intake at more than 25 °C reduced by a 1/5 compared to that of 18-25°C
- Broilers - weight gain decreased at the rate of 1.5%~2% per temperature increment (when above 20°C)
- Layers – with temperature range of 32~38°C, feed intake and egg yield decreased by 4.6% and 9.5%, respectively, for every 1°C ↑
- Dairy cow - 20–27% drop of pregnancy rate can occur in hot summer season (heat stress)
- Drinking water demand increases with temperature e.g. cattle - at 10°C ambient temperature, water requirement was 3 kg/kg DM intake; at 30°C, water requirement will be 5 kg and at 35°C, water requirement will increase to about 10 kg

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE, FORESTRY & FISHERIES IN SA

Impact of climate change on livestock-increased disease incidence

- Climate change may increase the prevalence of parasites and diseases that affect livestock. The earlier onset of spring and warmer winters could allow some parasites and pathogens to survive more easily. In areas with increased rainfall, moisture-reliant pathogens could thrive.
- Morbidity of animals increase in high temperatures
 - heat stress results in ↑ respiration rate —cow becomes more susceptible to acute rumen acidosis
 - higher incidence of mastitis during periods of hot weather
- Vector-borne infections increase - in high temperatures disease vectors, such as flies, mosquitoes, may increase with the changes in rainfall and temperature e.g Rift Valley Fever (RVF) in cattle

WHAT IS BEING DONE TO ADDRESS CLIMATE CHANGE

ACTIONS TO ADDRESS CLIMATE CHANGE

FAO Work on Climate Change

- FAO plays an important role in assisting member countries to understand the challenges and opportunities for the agricultural sectors and the range of possible responses.
- FAO is supporting member countries to develop their capacities in integrated approaches, such as agroecology and climate-smart agriculture, as well as through:
 - Intended Nationally Determined Contributions (INDCs),
 - National adaptation plans (NAPs), and
 - Nationally appropriate mitigation actions (NAMAs).
- These are a part of FAO's commitment to support member countries participate in important international processes under the United Nations Framework Convention on Climate Change (UNFCCC).

ACTIONS TO ADDRESS CLIMATE CHANGE

FAO Work on Climate Change in the region

- Provide support to SADC to strengthen its capacity to provide coordination among member states in terms of better preparedness, early warning and adaptation to climate change and variability.
- It provides climate change and variability knowledge and technical resources.
- Support the sharing and replicability of knowledge on good practices across countries in the region; climate smart agriculture (CSA), Conservation Agriculture, access to appropriate crop varieties (early maturing varieties, drought tolerant varieties, pest resistant, high nutrition etc.).

ACTIONS TO ADDRESS CLIMATE CHANGE

Africa Union Strategy for addressing Climate change

- Whilst Africa at present contributes less than 5% of global carbon emissions, it bears the brunt of the impact of climate
- African Union's Agenda 2063 highlights 'Africa shall address the global challenge of climate change by prioritizing adaptation in all our actions, drawing upon skills of diverse disciplines and with adequate support (affordable technology development and transfer, capacity building, financial and technical resources) to ensure implementation of actions for the survival of the most vulnerable populations, including islands states, and for sustainable development and shared prosperity'.
- The Vision of the African strategy is to provide the AU as a whole, the RECs, Member States and other stakeholders with a reliable source of strategic guidance to enable them effectively address climate change challenges.
- The strategy also proposes to carry out other interventions to address some specific priority areas including adaptation and risk management, Nationally Appropriate Mitigation Actions (NAMAs) and as well as some specific cross-cutting issues.
- The African Climate Change Strategy is organized around four thematic pillars:
 - Climate Change Governance;
 - Promotion of research, education, awareness raising and advocacy;
 - Mainstreaming and integrating climate change imperatives in planning, budgeting, and development processes; and
 - Promotion of national, regional, and international cooperation.

SADC Strategy for addressing Climate change

SADC Regional Indicative Strategic Development Plan

- 15 year strategy approved in 2003
- Environment and sustainable development one of 12 priority areas – to ensure equitable and sustainable use of the environment and natural resources through harmonized policy, legal and regulatory frameworks

The Regional Biodiversity strategy

- To provide a framework for dealing trans-boundary issues to ensure sustainable use and conservation of biodiversity in the region for improved productivity

SADC Climate Change Adaptation Strategy for Water

- – to promote resilience to climate change through integrated and adapted water management.
- Adaptation measures include water governance, water management and infrastructure development

ACTIONS TO ADDRESS CLIMATE CHANGE

Government efforts in addressing climate change

- The Country's National Development Plan already identifies Climate Change as one of the factors impeding development.
- The SA National Climate Change Response Policy (SANCCRP), administered by the Department of Environmental Affairs (DEA) together with other departments,
- Initiated to manage the effects of climate change and to contribute towards the global effort to stabilize greenhouse gas concentrations in the atmosphere.

ACTIONS TO ADDRESS CLIMATE CHANGE

Government efforts in addressing climate change

Projects and programmes being implemented by the DEA

- *The Green Economy*: a “system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities”
- *Green Fund*: aims to provide catalytic finance to facilitate investment in green initiatives that will support poverty reduction and job creation. The Green Fund is additional and complementary to existing fiscal allocations supporting the transitioning of the South African economy to a low-carbon, resource efficient and climate resilient growth path
- *Climate Action Now*: Climate Change Awareness Campaign was launched during COP17 (2011) and is informed by the principles, strategies and policies described in the National Climate Change Response White Paper (NCCRP)

Projects and programmes being implemented by the DAFF

- *Climate Change Sector Plan for Agriculture, Forestry and Fisheries (CCSP)*: The basic approach of the plan is CSA, entailing integration of land suitability, land use planning, agriculture, forestry and fisheries to ensure that synergies are properly captured and that these synergies will enhance resilience, adaptive capacity and mitigation potential
- *Programmes and projects on weather and climate*:
 - *Climate Change*: The Climate Change Programme implemented by DAFF include programmes on raising awareness, policy development, development of sector mitigation and adaptation plans, conducting vulnerability assessments countrywide, and identifying and coordinating climate-related research projects.

ACTIONS TO ADDRESS CLIMATE CHANGE

Government efforts in addressing climate change

- *Early warning unit:* An Early Warning System (EWS) is used to communicate monthly advisories and daily extreme weather warnings in support of disaster risk reduction for farming communities.
- *Risk management:* The National Agricultural Disaster Risk Management Committee provides strategic guidance on policy and advises DAFF on issues relating to agricultural disaster risk management. The department frequently responds to hazards such as droughts, veld fires, floods and outbreaks of pests and diseases (South Africa Yearbook 2012/13).
- *Plant production and food security:*
- *Sustainable resource management and use:* The DAFF and the ARC-Institute for Soil, Climate and Water developed an inventory of soils, terrain forms and climate (land types). The National Land Type Survey was conducted so as to assist and guide land-use planning and decision-making at national level as well as at provincial and local level
- *Land Care programme:* The Land Care Programme is a community-based and government-supported approach to promote the sustainable management and use of agricultural natural resources. The continues to perform a significant role in reversing soil and land degradation through support provided to community initiatives
- *Promotion of the adoption of good agricultural production practices:* various practices are promoted among farmers, to enhance crop productivity through efficient resource use
- *Promotion of conservation agriculture (CA):* The National Conservation Agriculture Task Force (NCATF) constitutes LandCare's contribution towards promotion of Climate Smart Agriculture

FAO support to government of South Africa in addressing climate change

- 1. Co-learning and innovating for climate-resilient cropping systems in Southern Africa**
 - During 2013 – 2016, FAO in collaboration with DAFF implemented a project on supporting smallholder farmers to better manage climate related risks to crop production and post-harvest handling in KZN and Limpopo.
 - The project aimed at improving and sustaining household and national food security in southern Africa through better management of climatic risks by smallholder farmers
 - The project achieved the following:
 - (i) increased awareness of climate related risks and hazards on crop production;
 - (ii) climate smart technologies were demonstrated to communities
 - (iii) Communities/govt. officials were capacitated on climate related risks and how to better manage them; and
 - (iv) communities were also capacitated on the interpretation and use of weather/climate information

FAO support to government of South Africa in addressing climate change

2. FAO Technical Support to the COMESA-EAC-SADC Programme on Climate Change Adaptation and Mitigation in the Eastern and Southern Africa Region

- During 2011 – 2015 FAO in collaboration with DAFF LandCare programme implemented a project on climate change adaptation and mitigation.
- The project aimed at increasing the number of farmers implementing CSA and CA in particular, in the Eastern and Southern African region.
- The project achieved the following:
 - (i) Draft CA policy developed and socioeconomic impact assessment undertaken;
 - (ii) The establishment of the National Conservation Agriculture Task Force (NCATF);
 - (ii) The establishment of Conservation Agriculture Forums in the Western Cape, Limpopo, Mpumalanga, KwaZulu-Natal and the North West Province;
 - (iii) Accredited CA training skill course through AGRISETA;
 - (iv) Farmer led demonstrations and on-farm participatory research;
 - (v) Strategic framework for mainstreaming conservation agriculture into the LandCare programme was developed;
 - (vi) Regional/National information and knowledge sharing to increase the understanding of CA across the region and the country was facilitated.

FAO support to government of South Africa in addressing climate change

3. Emergency assistance for vulnerable small-scale farmers affected by El Niño-induced drought.

- FAO and DAFF have developed a project on the response to the El Niño-induced drought for small-scale farmers
- The project aims to restore agricultural production capacities and strengthened resilience of 16 600 small-scale households affected by El Niño-induced drought in seven provinces.
- The project is currently undergoing approval processes within DAFF.

FAO support in addressing climate change

FAO livestock interventions in the region

- Strengthened institutional capacities to promote adoption and keeping of adapted livestock species and breeds
- Strengthened surveillance of climate-induced livestock disease outbreaks and risks through capacity development targeting Community Animal Health Workers
- Supported promotion of agro-enterprise diversification and mixed crop/livestock systems for resilient and sustainable livelihoods (this entailed e.g. provision of fodder legumes and fruit trees, and related agro-inputs)
- Supported installation of solar-powered water supply systems along drought-induced livestock migration routes with the view to support rotational resting systems within the scope of Community-based Rangeland and Livestock Management (CBRLM) approach

FAO support in addressing climate change

FAO livestock interventions in the region

- Supported initiation/establishment of communal fodder banks through promotion of strategic range reseeding and cultivated pastures at village level
- Supported use of drought-tolerant fodder seeds, coupled with capacity development on sustainable harvesting of fodder seeds (fodder shrubs)
- Strengthening EWS at village level, supported Community-Based Grazing Condition Mapping and Monitoring Systems
- Supported agro-system integration by creating synergies with the Conservation Agriculture (CA) Program particularly on effective and sustainable livestock manure utilization and management
- Strengthened agro-pastoralists skills on fodder harvesting, hay making and sustainable use of crop residues
- LEGS trainings for veterinarians and extension staff

FAO support in addressing climate change

FAO livestock interventions in the region

- There are many options that can help livestock keepers adapt, but there appear to be no options that are widely applicable which do not have constraints to their adoption.
- An **enabling technical and policy environment** will thus be needed to ensure livestock keepers can adapt to climate change and enhance their livelihoods and food security.
- Major opportunities relate to manure management, animal productivity, feed efficiency, and carbon sequestration in soil and vegetation. Pathways include:
 - ✓ **Improved Livestock Management**
 - ✓ **Adoption of stress-tolerant livestock species**
 - ✓ **Cross-breeding**
 - ✓ **Grazing management:**
 - ✓ **Improving pastures**
 - ✓ **Manure management**
 - ✓ **Use of weather information and livestock mapping**

WHAT NEED TO BE DONE TO ADDRESS CLIMATE CHANGE

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

What needs to be done at regional level

- Domestication of protocols and instruments at national level through harmonized policy and strategy development, development of legal frameworks and implementation of plans, projects and initiatives to ensure systematic achievement of environmental sustainability for effective mitigation and adaptation to climate change.
- Establishment of Systems for information sharing and collaboration among member states and national stakeholders
- Establishment of viable regional and national institutions for ensuring coordination and effective multi-sectoral leadership on climate change issues

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

Actions at country level: 1) **Mainstream Climate Smart Approaches into existing government programmes/projects**

- The country will benefit from systematic review of all agriculture, forestry and fisheries policies, programmes and interventions to assess the extent of use of climate smart approaches
- It will be important to facilitate mainstreaming of Climate Smart Agriculture and other climate smart technologies in all agricultural value chain development activities across Government departments
- Specific instruments/incentives/tools to reward innovation in viable Climate smart agriculture and approaches with tangible proven employment benefits
- Research on appropriate and viable climate smart technologies

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

2) Capacity Building

- There is need to support capacity building for transformational change in agriculture and natural resources management through:
 - Knowledge and data on impact and vulnerability
 - Sustainable approaches, practices and use of natural resources
 - Policy harmonization, coordination and intersectoral cooperation
 - Leveraging climate finance
 - Gender mainstreaming
 - Conservation of Biodiversity including genetic resources
 - Disaster risk reduction
 - Monitoring and evaluation framework
 - Need to invest climate adaptation, CSA technologies and services, regional coordination for early warning and surveillance systems for transboundary pests and diseases as well as better climate forecasting.

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

3) Mobilising resources to address climate change

- There is a clear need to channel public and private investments to agricultural sectors – including through flows of climate finance – to harness their transformative potential.
- Pursuing climate-resilient development pathways that can simultaneously contribute to reducing greenhouse gas (GHG) emissions will require integrated approaches and substantial, long-term investment in agriculture, fisheries and forestry.
- These are costs that smallholders cannot bear on their own.
- SA should mobilise both domestic and international resources

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

a) Public/government resources

- Over ZAR **25 billion** is spent on Agriculture, Rural Development and Land Reform(both DRDLR and DAFF(around ZAR6 billion)
- There is positive return on investment in CSA for example economic analysis done using standard application of cost-benefit analysis in 15 agricultural practices in the Trifinio region (crossborder area between Guatemala, Honduras and El Salvador) and the department of Matagalpa, in Nicaragua indicates that all the CSA practices have a cost-benefit ratio greater than 1, that is, the benefits outweigh the costs.(https://ccafs.cgiar.org/blog/are-climate-smart-agricultural-practices-economically-desirable#.WL_by2-GOUk,
- Soil tillage is one of the greatest energy consumers in agriculture and also a significant contributor to CO2 emission. There is growing evidence that farmers practicing CSA experience costs of production. The diesel fuel requirements for a conventional tillage maize production system will be about 50 liters per hectare. Only about 20 liters per hectare are required for a no-till system, a savings of approximately 60 percent.
- Therefore there is a positive case for allocating/earmarking resources to CSA (technology development, capacity development, awareness etc using viable Programme like LandCare)

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

b) International and Private sector resources

2) International efforts

- Green Climate Fund (GCF)
- Global Environment Facility (GEF) etc.
- FAO already working with DAFF, DRDLR and DEA which is the National Designated Agency to apply for GCF

3) Private sector(value chain actors-farmers, SMEs, SMMEs, corporates etc.)

WHAT NEEDS TO BE DONE BY FAO AND PARTNERS IN THE COUNTRY TO CONTRIBUTE TO AGRICULTURE THAT IS CLIMATE SMART

4) Awareness Raising

- Concerted efforts can be directed at awareness campaigns that would inform smallholders about the major factors that contribute towards climate change, principally the greenhouse effect.
- Such knowledge could be critical in enabling smallholder farmers to be effective practitioners of climate smart agriculture.

5) Research

That informs action is needed to address the urgent climate risks to food security and the global challenge of reducing greenhouse gas emissions from all sectors, including agriculture.

CONCLUSION

- Climate change is already putting stress on food systems and rural livelihoods all around the globe.
- Today's response to climate change determines how we will feed future generations.
- By supporting the implementation of the Sustainable Development Goals (SDGs), FAO plays an important role in ensuring that people interact harmoniously with the planet's ecosystems and benefit from their services, while maintaining and sustainably using biodiversity and all the world's natural resources now and in the future.
- FAO has an important role to play in supporting countries and in making sure that links are made between food security, agriculture and climate change
- FAO remains committed to providing technical assistance to the Government of South Africa in addressing climate change and assisting the country to achieve its national Development priorities and goals



THANK YOU