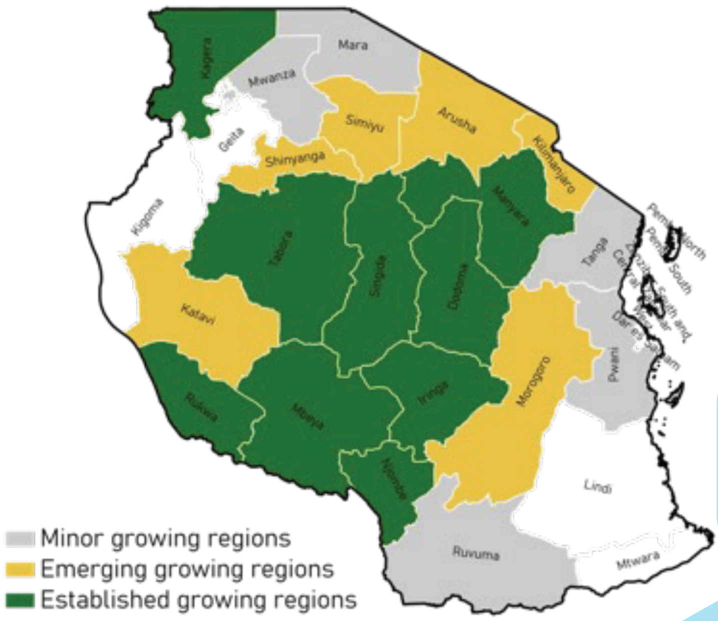
Climate Risk and Opportunities

Sunflower in Tanzania

Tanzania is the 16th largest sunflower-producing country in the world and is, after South Africa, the most important producer of sunflower in Africa. Accounting for 35% of all oilseed production in Tanzania, sunflower is the largest oilseed crop in Tanzania. Due to its potential, sunflower has attracted several investors from the edible oil processing industry, with over 21 medium to large-scale sunflower oil-processing factories in Tanzania.

In the country, sunflower is mainly grown in Singida (234,149 ha). Following, Dodoma, Njombe, and Rukwa are the largest producing-area regions, cultivating (>84,000 ha).

Notably, Rukwa and Shinyanga are regions with the highest sunflower yield (>1000 kg/ha) which translates into 4 bags /acre (1 bag represents 100kg). On average, major producing-area regions (Singida, Dodoma and Njombe) produce approx. 906 kg/ha which translates into 3.7 bags /acre.



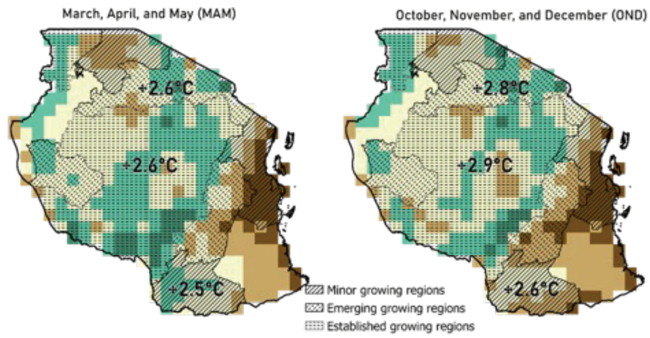
Note: RCP 8.5 emission scenario has been used to assess the climate change events and impacts. For future analysis, the 2050s (2006-2050) timesteps were used. For the current, the period 1981-2005 had been used. MAM refers to March, April, and May. OND refers to October, November, and December.

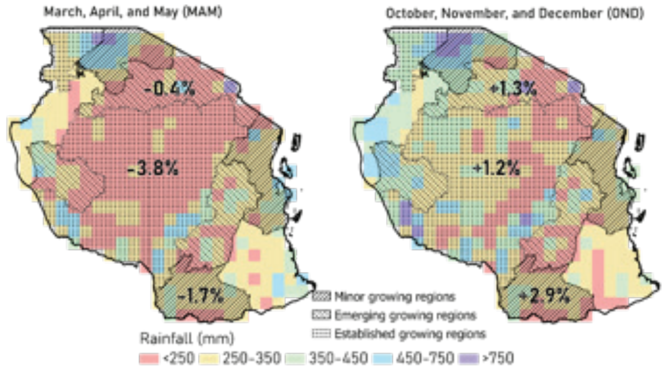
Data source: Ensembled CORDEX data.

Future climate under climate change

Temperature: In the 2050s, the temperature in sunflower-growing regions over the country is projected to increase by 2.5°-2.6°C in the March, April, May season and 2.6°C-2.9°C in the October, November, December season.

Temperature: In the 2050s, the temperature in sunflower-growing regions over the country is projected to increase by 2.5°-2.6°C in the March, April, May season and 2.6°C-2.9°C in the October, November, December season.





Note: The map shows current seasonal rainfall (mm) and the changes (%) in the future (the 2050s) for the SSP3-RCP8.5 climate change scenario for various crop-growing regions

Rainfall: Overall, sunflower-growing regions in the country are expected to receive slightly more rainfall in the 2050s than currently.

In the March, April, May season, sunflower-growing regions in the country are projected to receive 2.6% higher rainfall and 2.8% higher rainfall in the October, November, December season in future.

However, small parts of Iringa, Njombe, Mbeya, Morogoro and Ruvuma regions are projected to have a reduction in rainfall in the October, November, December season.

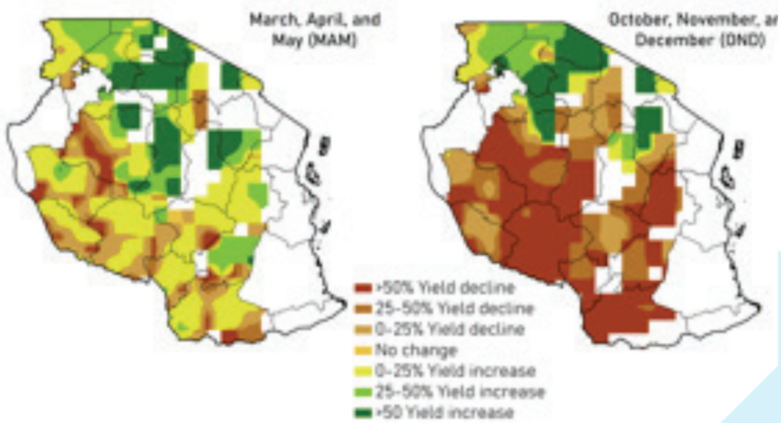
More dry spells with an implication of more frequent droughts are especially expected in the Western sunflower growing areas in Tanzania, during the March, April, May season.

Sunflower crop productivity changes (%) in the future

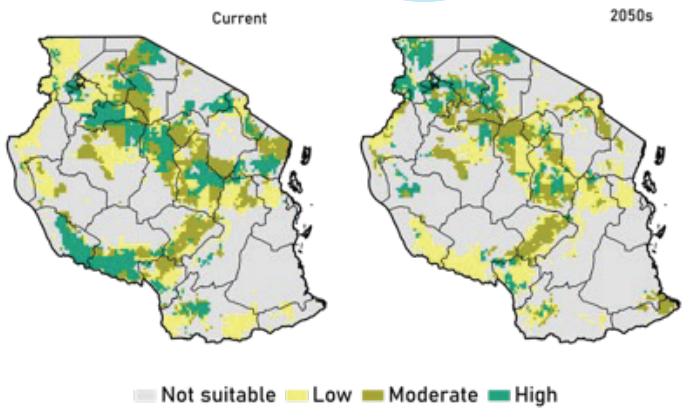
In the March-April-May season, yield reduction is projected to be up to 18% in a few areas. However, there are also positive yield changes expected in the Northern, Central and Southern sunflower growing regions.

Overall, sunflower yield in the country is projected to decrease (up to >76%) in the October-November-December season compared with the current situation, especially in Mbeya.

The reduction in yield in the October-November-December season will probably be higher than the reduction in the March–April-May season.



Sunflower crop-growth suitability

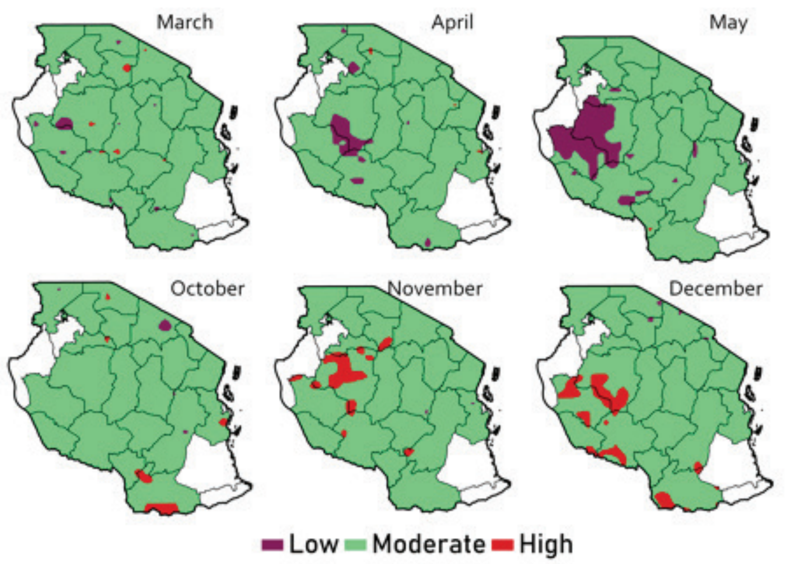


Overall in the 2050s the suitability for sunflower pruduction is expected to reduce.

Parts in Arusha, Dodoma, and Kagera that are currently highly suitable for sunflower production will be less suitable in the 2050s.

Likewise, areas in Rukwa and Mbeya currently with a high suitability for sunflower are expected to have a low suitability for sunflower.

The probability of drought risks



In March, a few areas from Simiyu and Singida are expected to be under high drought risk.

In April, most of the sunflower-growing regions are probably facing moderate risk of drought.

In May, most of the major sunflower-growing regions are expected to face moderate drought of risk.

In, October the Southern and small areas in the North of Ruvuma is projected be under high risk of drought.

In November, areas in central and in the Northwestern part of Tabora are expected to experience high drought risk.

In December, Southern areas in Tabora and small areas in Mbeya, Katavi, Ruvuma and Rukwa are expected to face high risk.

The probability of drought risks has been analyzed based on the Standardized Precipitation Index (SPI). The calculation of SPI is done based on the record of long-term precipitation for 45 years (2006-2050). To assess the risk, we calculated the occurrence of droughts over 45 years (2006-2050) for each month in rainy seasons (MAM and OND) and then calculated the probability by applying the following formula:

$$\text{Probability of drought risks} = \frac{\text{No. of droughts)}}{\text{Total years (45)}} \times 100$$

Note: In drought analysis, more than 30% of drought occurrence are classified as high-risk region, 10 to 30% of occurrences are classified as Moderate risk, and less than 10% of occurrences has been classified as Lower Risk.

Climate change adaptation strategies

Adaptation measures are listed based on the discussion with the CRAFT team from Kenya under the following objective, "To establish suitable adaptation strategies that will increase the adaptive capacity and resilience of the actors within the value chains." The listed adaptation measures mainly focused on the sorghum value chain in Kenya.

Climate risks/ impacts	Adaptation measures	Impacts of adaptation measures
Drought	Irrigation, improved seeds (drought and pest tolerant, shorter growing cycle), providing quality inputs, establishing QDS in promoting contract farming in the local sunflower industry	- Increased resilience - Reduction in risk of crop failure - Off take produce more secure
Low productivity	Diversifying income-generating activities., improved access to finance and insurance	- Increased resilience - Safety net
Higher Post Harvest Loss (PHL)	Improved (access to) PHH technologies, investments in processing technologies	- Increased resilience - Increase in income (if cost/ benefit ratio is beneficial)
Soil degradation	Improved farming practices (in demos) like zero or minimum tillage, timely weeding, intercropping, proper plant population-spacing.	- Increased resilience - Enhanced soil and water retention - Reduction in soil erosion - Improved soil fertility - Increased productivity

Acknowledgment

This document was developed by Wageningen Environmental Research (Ponraj Arumugam, Confidence Duku, and Annemarie Groot) and CCAFS (Teferi Demissie) with contributions from Oscar Nzoka (SNV), Ivy Wainaina (SNV), Harold Mate (SNV), Joab Osumba (CCAFS), the Kenya SNV team, Agriterra, and Rabo Partnerships B.V.

The climate risk assessment was carried out in the context of the Climate Resilient Agribusiness for Tomorrow (CRAFT) project. The project (2018 - 2023) is funded by the Ministry of Foreign Affairs of the Netherlands and aims to increase the availability of climate-smart foods for the growing population in Kenya, Tanzania, and Uganda. The CRAFT project is implemented by SNV (lead) in partnership with Wageningen University and Research (WUR), CGIAR's Climate Change Agriculture and Food Security Programme (CCAFS), Agriterra, and Rabo Partnerships.

For more information: Contact Harold Mate (Project Manager) (craft-info@snv.org: hmate@snv.org)

SNV Impact that matters | AGRI TERRA | WAGENINGEN UNIVERSITY & RESEARCH