CRAFT
Climate resilient value chains for improved livelihoods

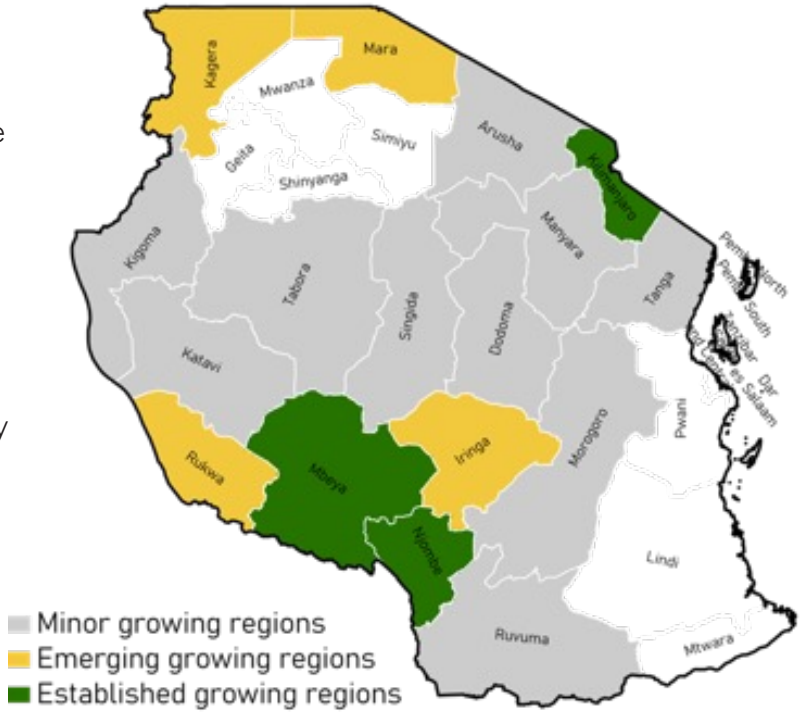
SNV Impact that matters

Climate Risk and Opportunities

Potato in Tanzania

Potato is an important crop for food and income The potato production in Tanzania is a large agricultural enterprise supporting more than 500,000 farmers. Potato is an important food and crop with massive potential in areas with favorable climatic conditions.

Within the Southern Highland zone, the Iringa, Njombe and Mbeya account for 70-80% of potatoes produced whereby the remaining 30-20% is produced in Northern Highlands (Arusha and Kilimanjaro). Due to increase demand, particularly from consumers in urban areas, potato production is expanding, especially within the Southern Highlands region.



The average yields lie below the potential of 40–60MT/Ha. Singida shows the highest average yield (23220 kg/ha) which translates to 94 bags /acre (1 bag represents 100 kg), followed by the major potato growing areas Rukwa, Iringa, Njombe, and Mbeya producing approx. 3000-5000 kg/ha, which translates to 12-20 bags/acre (Musitini, T., 2012).

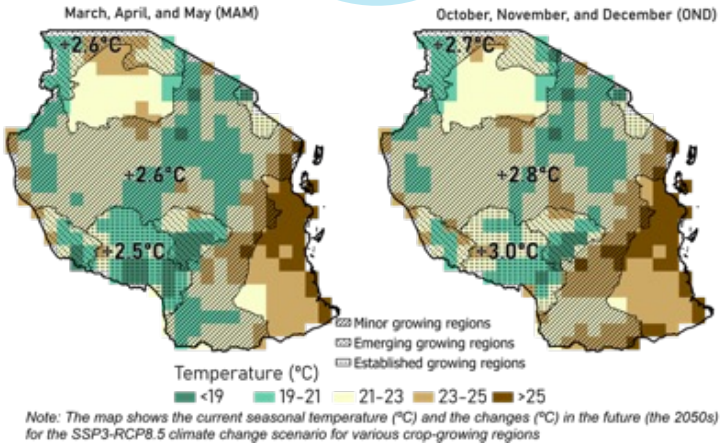
Note: RCP 8.5 emission scenario has been used to assess the climate change events and impacts. For future analysis, the 2050s (2006-2050) timesteps were used. For the current, the period 1981-2005 had been used. MAM refers to March, April, and May. OND refers to October, November, and December.

Data source: Ensembled CORDEX data.

Future climate under climate change

Temperature: Overall, in the 2050s an increase in temperature by more than +2.5°C is expected in both the March-April–May season and the October-November–December season due to climate change.

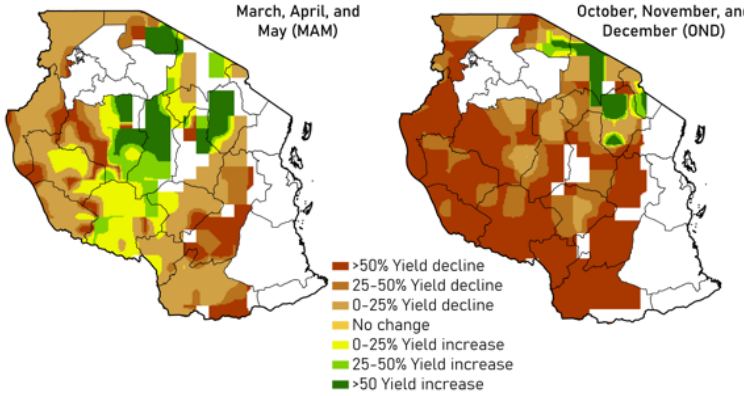
In the major potato growing regions, Mbeya, Njombe, Kilimanjaro, Iringa, Rukwa, and Kagera, temperature will probably increase up to +2.5°C in the March-April–May season and up to +3.1°C in the October-November–December season.



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

Rainfall: Overall, in the 2050s potato-growing regions in the country are expected to receive slightly less rainfall (up to -2.3 %) in the May, April, May season.

In the October, November, December season, the Northern areas will probably face a slight increase in rainfall, however the major potato growing areas in the Southern Highland are expected to have a small reduction in rainfall (-3.4%).



A likelihood of more dry spells and late-onset of rainfall with an implication of more frequent dry periods can be expected in the Southwestern potato-growing areas.

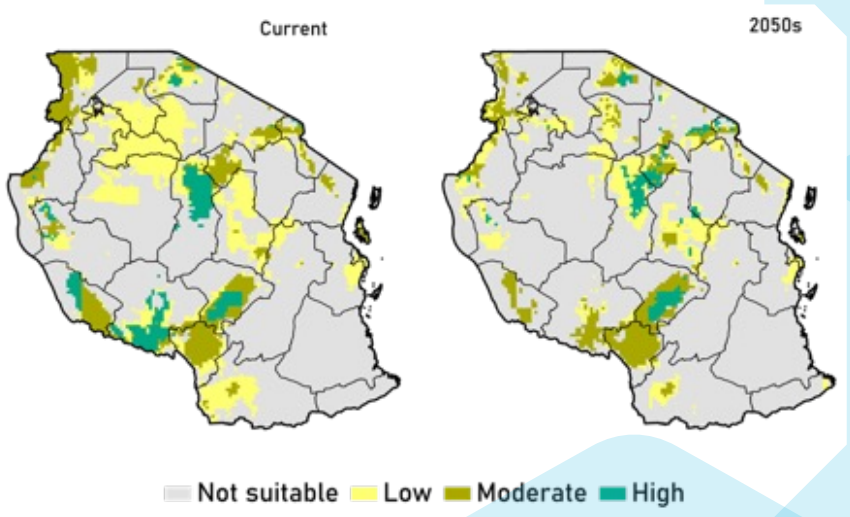
In contrast, the Northeastern potato-growing areas are expected to experience extreme rainfall events that could lead to flooding..

Potato crop productivity changes (%) in the future

Overall, potato yield in the country is projected to decrease in the 2050s. The decline is more sever in the October-November-December season than in the March-April–May season.

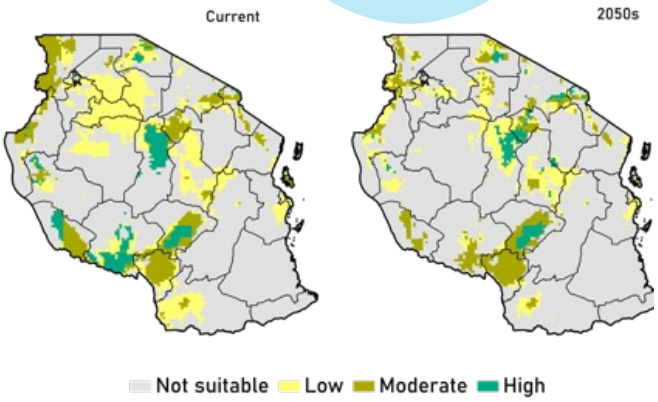
In the October-November – December season the potato yield is projected to decrease (up to -75%) compared with the current, especially in Mbeya and Njombe.

In the March –April –May season, yield reduction is projected to be up to -25% in a few areas. However, there are also positive yield changes projected in the March –April-May in a few areas.



Potato crop-growth suitability

Overall, for the majority (>60%) of the potato-growing regions the suitability has been projected to remain moderately suitable in the 2050s. However, for a few potato growing areas (Mbeya, Songwe and Rukwa), the suitability for potato production will probably decline.



The probability of drought risks

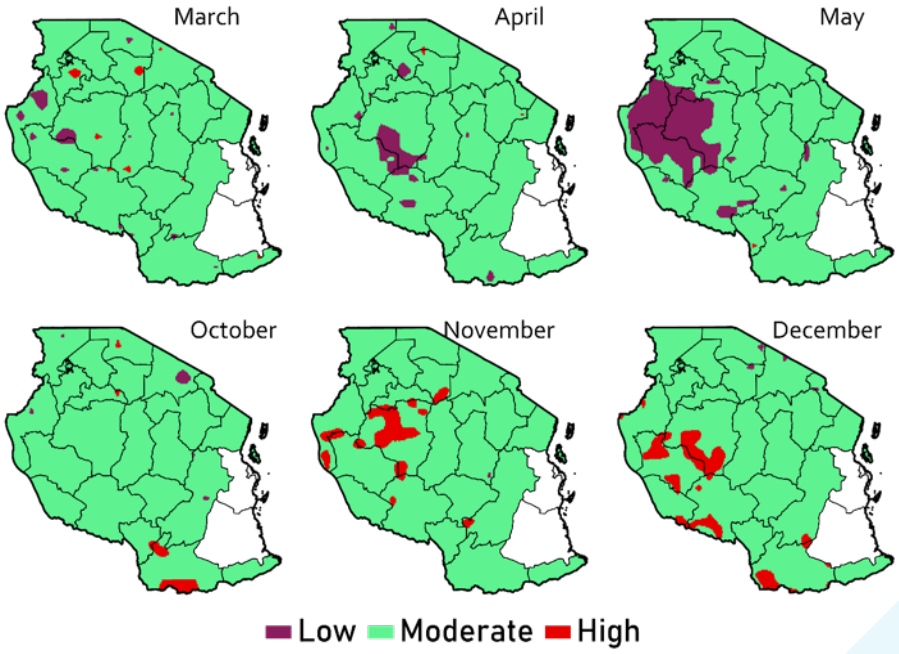
During the March, April, May season, most regions of the country are under moderate drought risk.

In the October, November, December season, most regions are also under moderate drought risk, but few under high drought risk.

In October, the Southern part of Ruvuma will probably face high drought risk.

In November, A small area in the north of Mbeya is likely to experience high drought risk.

In December, areas in the south of Mbeya, Ruvuma and Rukwa could expect a high risk of drought.



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 Tanzania 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 focus on the potato value chain in Tanzania.

Drought 	Off-season irrigation production, drought and disease tolerant varieties (enhanced seed multiplication techniques through the QDS approach)	• Increased resilience • Improved crop yields
Hailst 	Weather/ index-based crop insurance schemes, engaging contract farming with large and medium-scale industries, and farming organizations.	• Increased resilience • Off-take potato more certain • Income more certain • Safety net
Increase in Temperature & Pest and diseases 	Use of disease tolerant varieties, application of certified pesticides, and adopting of proper cropping cycle, weather information.	• Increased resilience • Good Agricultural Practices • Decrease in risk of crop failure
Soil degradation 	Improved farming practices in demo plots (e.g., mulching)	• Increased resilience • Enhanced soil & water retention and conservation • Enhanced soil structure & fertility • Decrease in risk of crop failure

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