



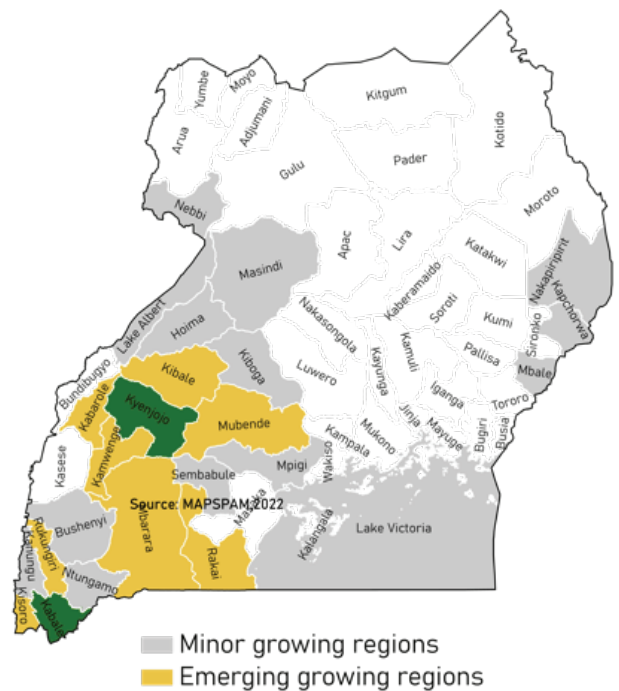
Climate Risk and Opportunities

Potato in Uganda

Potato is an important crop for food and income generation in Uganda and was recognized in the 2010/11- 2014/15 Development Strategy and Investment Plan as a strategic commodity with the potential to make a remarkable contribution both to increasing rural incomes and livelihoods and to improving food and nutrition security. Potato production generally increased from 155,000 MT in 2005/06 to 327,000 MT in 2018. The area of an average smallholder farm is estimated to be 2,4 acres, while other larger farms have an average area of >14 acres.

Despite its potential for sustainable intensification the average yield remains very low. According to FAO statistics, the annual potato output in Uganda is approximately 800,000 metric tons, produced on approximately 112,000 hectares (FAOSTAT, 2014).

Kabale (~9495 ha) is the country's largest potato production area. Kisoro yielding about 28 bags /acre (1 bag~100 kg) is the largest producer in the country. Kabale, Kabarole, and Hoima districts yield around 12 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

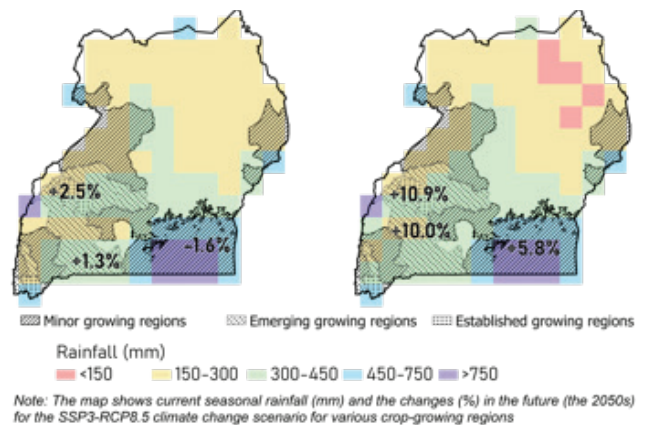
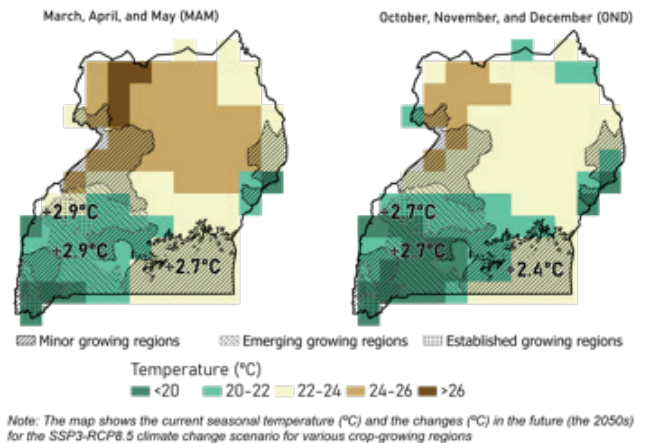
Temperature: In the 2050s, the temperature in potato-growing districts in Uganda is expected to increase by +2.9°C in the March, April, May and +2.6°C October, November, December season.

The temperature in major potato-growing districts, Kabale, Kyenjojo, Kisoro, Mbarara, and Kibale, is projected to increase from +2.8 to +3°C in the March, April, May season and +2.6 to 2.7°C in the October, November, December season.

Rainfall: In the 2050s Potato-growing districts in Uganda are projected to be almost unchanged in rainfall over the March, April May season and a 7.5 % increase in the October, November December season.

The onset of the first rainy season (MAM) is expected to be delayed (3-4 days) in Nebbi and the southwestern potato-growing areas. On the other hand, an early onset of the rainfall (3-6 days) is expected in the Eastern potato-growing regions of the country.

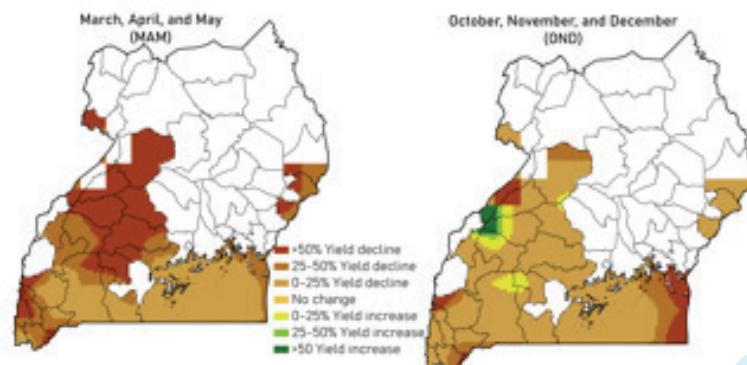
The length of the growing spell in Nebbi, the Southwestern, and the Eastern potato-growing areas is projected to increase by up to 5-10 days during the March, April, May season.



Potato crop productivity changes (%) in the future

Overall, potato yield in the country is projected to decrease (up to -90%) in the March, April, May season compared with the current.

In the October, November, December season, yield reduction is expected to be up to -25% at a regional level. However, there are also positive yield changes expected in the Kibale and Kyenjojo.

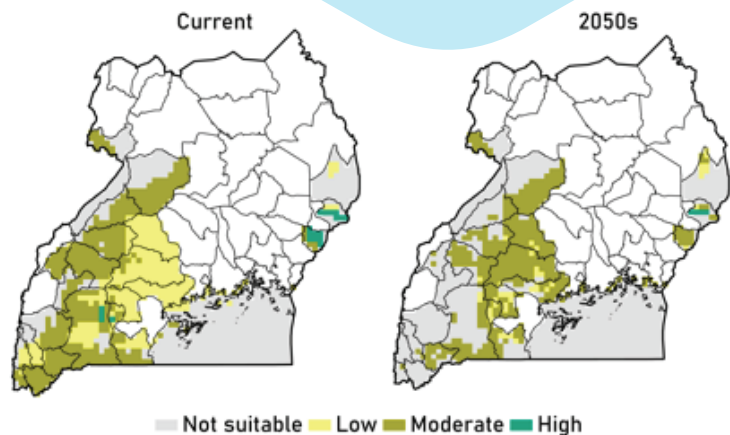


Overall, the decline in yield in the March, April, May season is expected to be more significantly than in the October, November, December season

Potato crop-growth suitability

Overall, in the 2050s most potato-growing areas are expected to be moderately suitable for potato production

Notably, Kabale, Kisoro, and Kabarole districts are projected to be not suitable for over >60% of the area. Likewise large part of Mbarara is expected to become not suitable for potato production.



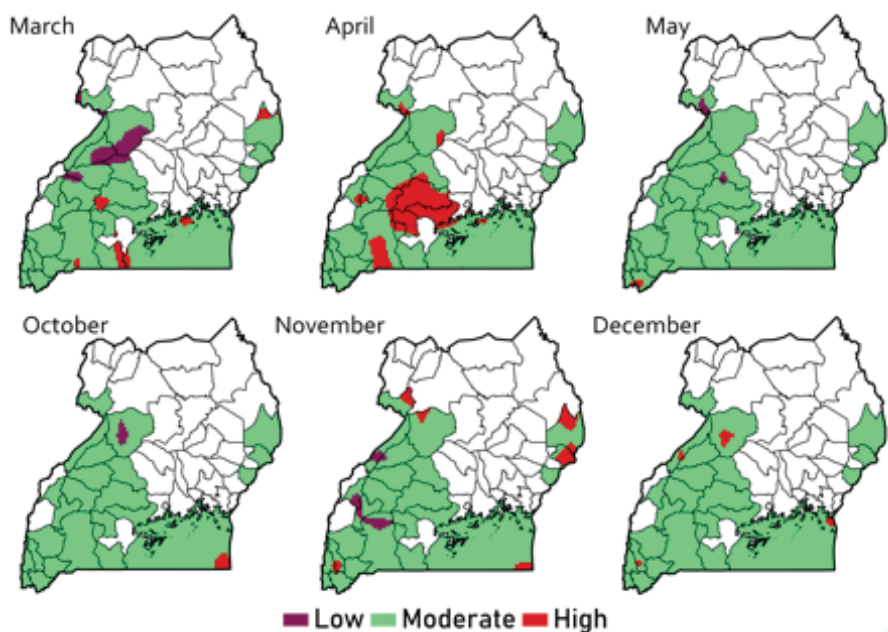
The probability of drought risks

In the 2050s, during the March, April, May season most potato-growing districts are under moderate and high drought risks.

In April, from the major potato-growing districts, a considerable amount of area is expected to face high risk of drought, mainly in Mubende, Mbarara, and Kyenjojo.

In May, small parts of Kabale and Kisoro districts will probably face high drought risk.

In October, November and December most potato-growing districts are expected to experience moderate drought 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 Uganda 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 Uganda.

Potato is sensitive to heat stress but does better than other crops in shorter rainfall regimes (due to shorter growing period and a higher water use efficiency).

Technologies used in CSA value chains 	Promoting mulching, intercropping with leguminous cover crops, crop rotation to maintain the quality of soil resources, crop diversification, residue management, and integrated pest management, reducing the application of Pesticides and fungicides, Organic inputs – Compost, manure, slurry, Irrigation, soil enhancers/ boosters, and mechanization services to optimize time and planting precision that avoids wastage
IMPACTS	
Impacts in production 	Improved, high yielding, early maturing seed, improved soil fertility and Good Agricultural Practices (GAP) "standards of practice".
Contribution to adaptation/ resilience 	Increased resilience, reliable, stable source of income, market linkage
Contribution to mitigation 	Reduction in post-harvest losses/ reduction of food waste, solar power, and efficient waste management plan

Acknowledgment

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