CRAFT
Climate resilient value chains for improved livelihoods

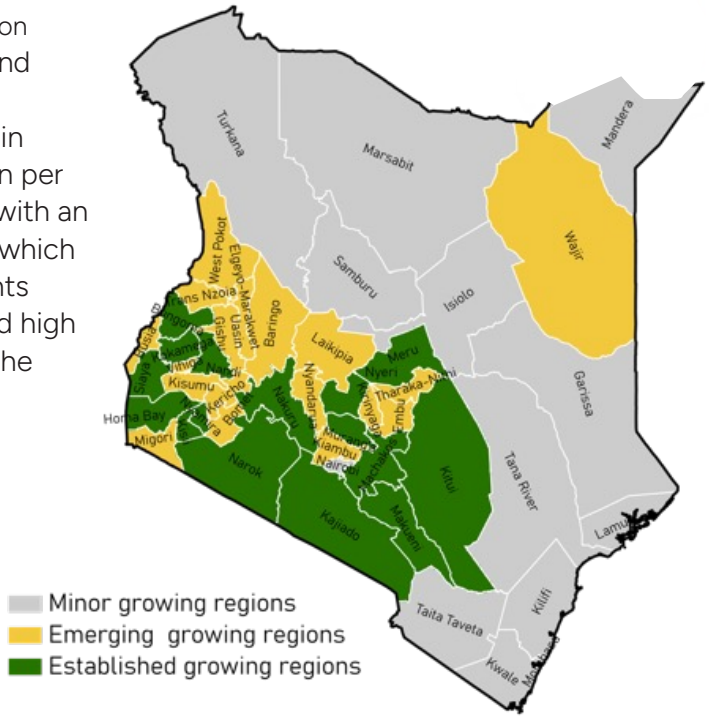
SNV Impact that matters

Climate Risk and Opportunities

Common bean in Kenya

Kenya is the seventh biggest producer of common bean (Phaseolus vulgaris) globally, and the second leading producer in East Africa (KenInvest, 2016). Common bean rank second to maize in importance as a food crop. The consumption per capita is 50-60 kg. Yields are generally low, with an average of 0.72 tones/ha (FOASTAT, 2019), which translates into 3,2 bags/acre (1 bag represents 90kg). As a result of the low productivity and high per capita consumption of beans in Kenya, the country imports over 100,000 MT of beans annually mainly from Ethiopia, Tanzania and Uganda.

The major bean production counties are in Eastern, Rift Valley, Western and Central regions. Meru is the county's largest producing-area county, cultivating around 95974 ha. Laikipia is the country's highest yield-producing county, producing approx. 11 bags/acre.



Notes:
(a) Data source: Ensembled CORDEX data.
(b) SSP3-RCP 8.5 emission scenario has been used to assess the climate change projections and impacts.
(c) MAM refers to March, April, and May. OND refers to October, November, and December.

Future climate under climate change

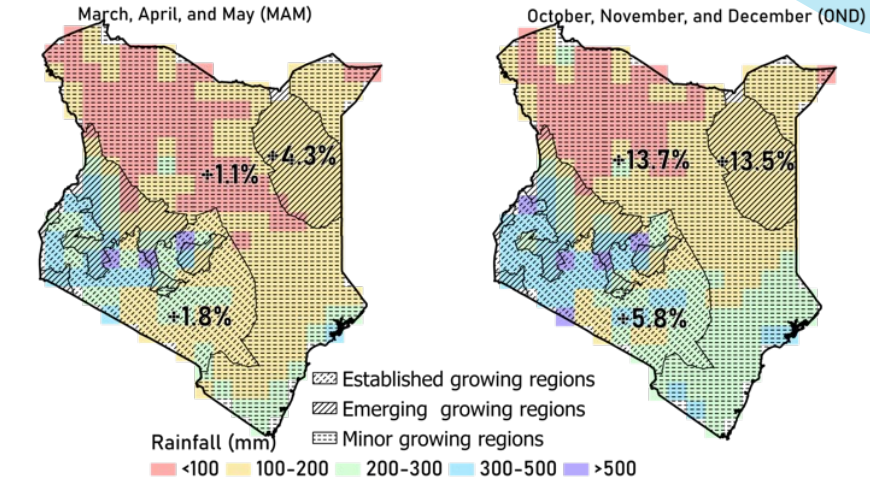
Rainfall: Comparing current rainfall with what is expected in future (2050s), the amount of rainfall is likely to change. The change varies across different growing regions and seasons.

In the Southwestern growing areas, precipitation is projected to slightly decrease (-10%) in the MAM season, but in the OND season rainfall will slightly increase (+10%). In the North–Northeastern growing areas, precipitation is expected to increase, especially in the OND season (> + 13%).

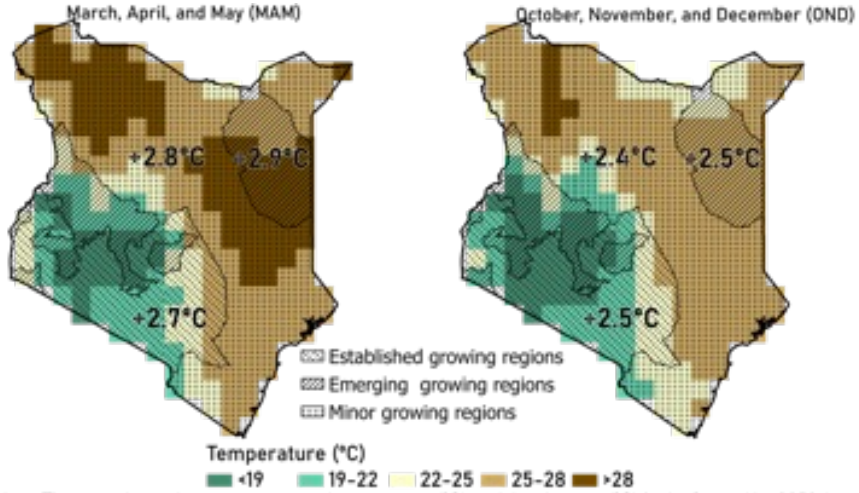
In the Southwestern and Northeastern areas extreme flooding events are expected in 2050, especially in the OND season

Temperature: In future, temperature is expected to rise in all growing areas, especially in the MAM season. In the emerging potato growing areas in the Northeast, temperature is projected to rise up to 2.9°C in the MAM season, whereas in the OND season up to 2.5°C.

In the Southwestern areas temperature is expected to increase up to 2.7°C in the MAM season, whereas in the OND season up to 2.5°C.



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



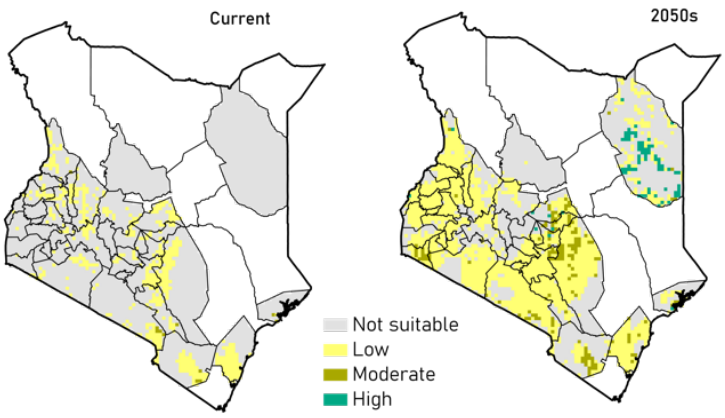
Note: The map shows the current seasonal temperature (°C) and the changes (°C) in the future (the 2050s) for the SSP3-RCP8.5 climate change scenario for various crop-growing regions

Common bean crop-growth suitability

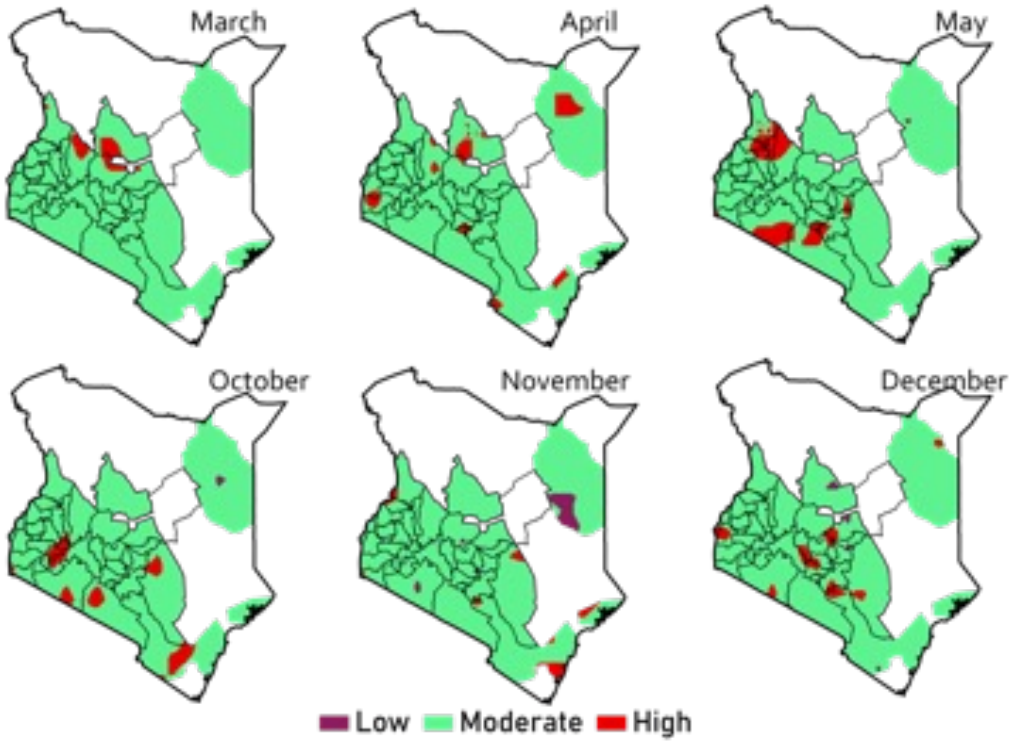
Overall, in the current situation for both seasons the suitability for common bean growing is low due to limited land availability, agronomic and socio economics condition and climate.

In future, however the suitability for common bean slightly increases from not suitable to low suitability, mainly in the Southwestern and Southern growing areas.

In the Busia and Wajir suitability for common bean growing changes from low suitability or not suitable into highly suitable mainly due to an increase in rainfall.



The probability of drought risks



In In March, Meru, one of the major common bean-growing counties, is projected to have 4.1% of the area under high drought risk.

In April, a considerable amount of area from the major common bean- growing counties, Homa Bay (30%), Machakos (3.5%), and Siaya (20%), are projected to be at high risk of drought.

In May, Baringo, Bungoma, and Machakos counties are projected to have 8.5 to 35% of the area under high drought risk.

In October, Homa Bay, Machakos, and Nakuru counties are projected to have 1-6% of the area under high risk.

In November, Machakos is projected to have 3.3% of the area under high drought risk.

In December, a considerable amount of area from the major common bean growing counties, Machakos (13.7%), Meru (15%), Nakuru (7.5%), and Siaya (38.4%), is projected to be at high risk of drought.

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 common bean value chain in Kenya.

Climate risks	Impacts	Adaptation measures	Impacts of adaptation measures
Drought 	Delay in land preparation, forced maturity, crop stress, reduced quality & yield, and less area ploughed.	Drought/Pest and disease tolerant varieties, early maturing varieties, soil water measures (terraces, zero/minimum tillage, mulching, ripping, subsoiling, planting basins, zai pits), and enterprise diversification.	• Increase in resilience • Enhanced water retention • Reduction in soil erosion • Improved soil structure and fertility • Reduction of risk in yied losses
Intense rainfall (Floods)	Delay in land preparation, planting and harvesting, crop destruction, leaching of fertilizers, increased post-harvest spoilage (high humidity, rotting, molding, and aflatoxins.	Minimum tillage by use of herbicides, manual land preparation and weed control (uprooting and cutting back), Soil water conservation measures (ripping, sub-soiling, terracing, and cut-off drains).	• Increase in resilience • Reduction in risk of water logging • Reduction in soil erosion • Reduction in yield losses due to flood risks
Increase in Temperature	Crop stress, flower abortion, poor filling of the pod, reduced quality and yield, and crops susceptible to pests and diseases.	Mulching, cover crops, use of heat-tolerant varieties, and conservation tillage.	• Increased resilience • Reduction in risk of yield losses • Improved soil fertility • Enhanced soil moisture retention
Soil degradation	Crop stress, reduced quality & yield, and crops will be susceptible to pests and diseases.	Fertilization, manure application, crop residual tillage, crop rotation, and pesticide application.	• Increase in resilience • Improved soil structure and fertility • Enhanced water retention • Reduction in risks of yield losses
Pest and diseases 	Crop stress, reduced quality & yield, and crops will be susceptible to pests and diseases.	Fertilization, manure application, crop residual tillage, crop rotation, and pesticide application.	• Increase in resilience • Improved soil structure and fertility • Enhanced water retention • Reduction in risks of yield losses

Acknowledgment

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