UTZ RESPONSE

Identification of Suitable Tea Growing Areas in Malawi under Climate Change Scenarios

By CIAT (in partnership with UTZ)

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Research summary

Malawi is one of the countries that is most vulnerable to climate change worldwide. Natural hazards such as droughts, shorter or more unpredictable rainy seasons, seriously impact the food security of a population that already lives under the poverty line. But how is tea production affected? Tea (Camellia Sinensis) requires very specific climatic conditions to thrive. Malawi is the second largest tea producer in Africa. The tea industry is the largest formal sector employer in Malawi, employing 50,000 workers and providing livelihoods to more than 14,000 smallholders. Will this still be the case in the face of the changing climate? To answer these kinds of questions UTZ partnered with the Center for Tropical Agriculture (CIAT) to create impact maps that can model the degree to which tea production will be affected by climate change in the future (download the report on the UTZ website). The project was organized and funded by UTZ Sector Partnership program and conducted in close collaboration with the sector initiative Malawi Tea 2020.

The analysis focused on the three tea growing regions of Malawi: Nkhata Bay, Mulanje and Thyolo. The maps showed that different regions will be affected to different degrees, but in general it will become harder to grow tea everywhere in Malawi. Nkhata Bay, in the North of the country, faces the highest climate risk because of the prediction of decreased rainfall and higher temperatures, making it most likely unviable for tea production towards the middle of the century.

When it comes to the Southern regions, Mulanje is more humid than Thyolo and is therefore less seriously affected. In Thyolo, which has many peaks and lows, it is predicted that tea growing will become more difficult in the lows due to increased temperatures. Tea bushes ideally need a minimum of 1500mm of rainfall a year with a dry season of no longer than 3 months. Additionally, the bush thrives in an average temperature of between 18 and 20 degrees centigrade. With increased temperatures expected in Thyolo, the bush will need more rain, which is unlikely in these already dry areas. In Mulanje, the higher rainfall could balance out the higher temperatures, so the area could remain suitable. It should, however, be noted that some of the predictions varied because of particularly varying soil conditions in that area as well as the fact that the rapid rate of deforestation on Mount Mulanje was not taken into account. If deforestation continues at its current rate, this could also have a serious effect on the rainfall in the area.

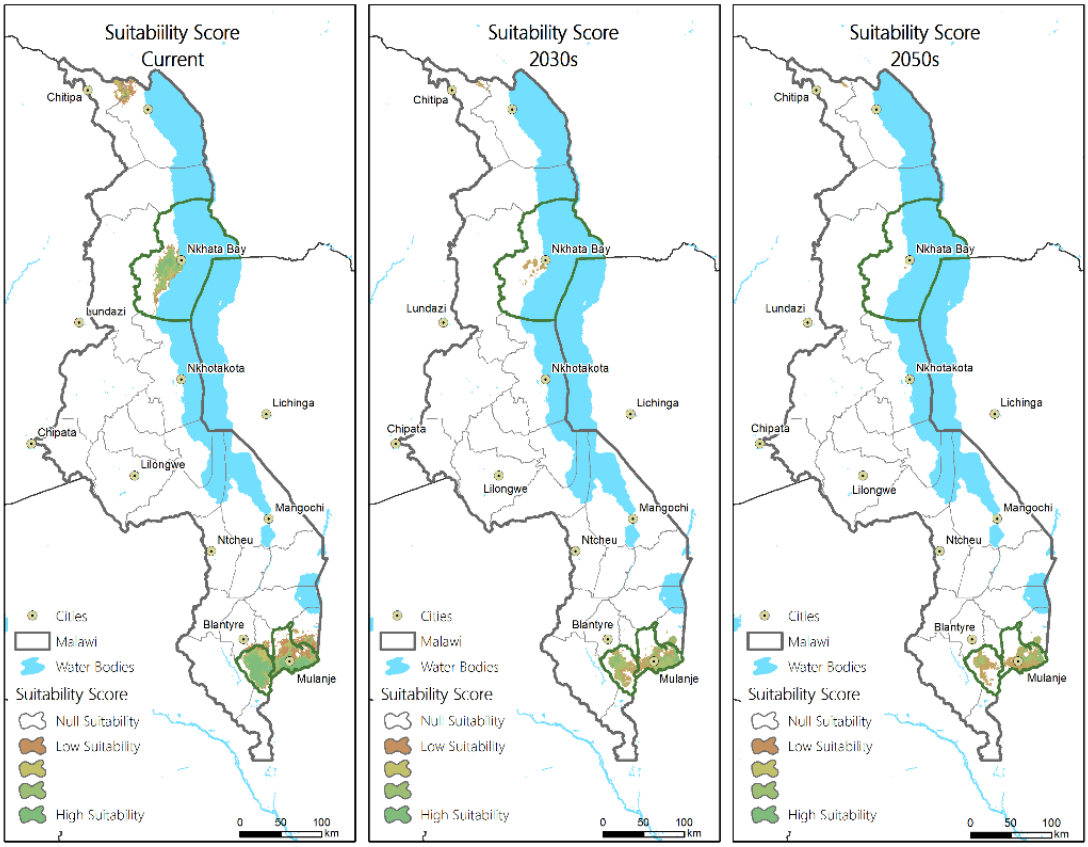

Figure: Combined suitability for tea production in Malawi. Data for future periods is the mean across 19 Global Climatic Models (for the RCP 6.0 scenario, an intermediate climate change scenario).

Why did we commission this study?

Given the long economic lifespan of tea bushes (up to 50 years, and even longer in some areas), changes in suitability for growing tea in 10-20 years will affect plants that are planted and grown today. The predictions are therefore relevant for making decisions on where to (re)plant tea seedlings now to ensure sustainable farming. In addition, the maps highlight the need for research stations to continue developing clones that are more suitable to these variabilities in climatic conditions.

Through UTZ Sector Partnership program we aim at promoting more sustainable farming practices at sector level by partnering up with different stakeholders from the public and private sectors. Climate impact maps are particularly valuable to convene the different stakeholders around the topic of climate change and raise awareness about the need for measures to protect the sector. Those regions that will be affected have to develop strategies to adapt to these impacts in the future. The maps are well suited to empower affected stakeholders to advocate for their needs.

How will we use the climate impact maps?

Knowing the impacts of climate change is the first step to prepare for these changes. Different stakeholders on different levels have different needs and capacities to respond to climate change. While some can use this information to plan ahead and invest in new varieties or clones, or even look into crop diversification to mitigate the risk, for others this might be costly and preferable to apply short term measures to avoid the risk of crop failure. UTZ is therefore engaging in three different follow-up projects:

i) The development of a sector-wide Environmental Sustainability Management Plan (ESMP) for tea production in Malawi which will enable estates and smallholders to develop their own adaptation strategies based on their unique situations.
ii) The landscape-based adaptation planning project with Malawian tea smallholder farmers which will not only address the effects of climate change on tea, but also tackle such environmental impacts as land degradation, deforestation and availability of clean water.
iii) The development of climate change adaptation material for tea smallholders to raise awareness about the issue and assist them to apply practices which will make them more resilient.

UTZ will also use the findings for continuous improvement of its certification program. Many practices that the UTZ Code of Conduct promotes, also aim to make producers more resilient against the predicted effects of climate change, such as higher temperatures and increased frequency of droughts and floods. One example of an adaptation strategy for producers is the planting of shade trees around their fields. This can lead to lower temperatures around tea bushes and increase the capacity of the soil to retain water. UTZ will increase its support for producers on planting shade trees through more specific guidance on the topic, as well as through facilitating knowledge exchange between different countries such as Kenya, Zimbabwe and Malawi.

What research methodology was used to make the reliable predictions?

To make projections of the future suitability of different Malawi regions for tea growing, CIAT researchers taught a machine learning algorithm to identify areas that are suitable for tea production based on their characteristics with respect to temperature, rainfall distribution and soil characteristics. The algorithm is taught based on the current distribution of tea in the country. It is then applied to the future situation as it is described with global climate models. Thereby usually a number of models are used, because they differ due to various reasons such as assumptions on greenhouse gas emissions etc.

An important aspect in the whole process of developing such maps is the validation with local knowledge to choose the right parameters (of temperature, rainfall, soil), or align the outcomes with local perception. This is important to ensure the results make sense for the local context. It also increases the probability that the outcomes will be used in local planning and decision making.

In this study, the researchers were in constant contact with local researchers from the Tea Research Foundation of Central Africa (TRFCA), and validated preliminary results at various stages with other stakeholders, including the Tea Association of Malawi (TAML), estates and smallholder farmers. In this process, the stakeholders pointed out that suitable conditions for tea could potentially be found

in proximity to mountainous ranges and in the existing coffee growing regions. This was looked into as part of the study, but there were no concrete findings that other areas, outside of the three existing growing regions, would be suitable for tea in the future.

What should be researched and developed further?

The results of this study give a good indication of the degree to which different tea growing areas of Malawi can be affected by climate change. This information should be useful for organisations such as TAML to guide Malawian tea sector in implementing climate adaptation strategies (through the ESMP which is being developed). For smallholder farmers, however, it is more relevant to know the tangible impacts they might face in terms of changes in temperature and rainfall in the coming years. This is why the development of local material for the smallholders is an important next step that UTZ is taking.

Currently there is limited information available on the effect of climate change on tea growing regions around the world. To date this mapping has only been carried out in Malawi, Kenya and India. In the future, more investment in different research methods is necessary to gather more information on climate change impact on tea and inform tea industry globally. In the past years, many tea growing regions have been hit hard by prolonged dry conditions and changes in rainfall patterns. It is therefore also important that policy makers and other stakeholders look into large scale adaptation support which could include research into more resistant tea clones, the effect of shade trees and crop and income diversification.