

'Farms of the Future': An Innovative Approach for Strengthening Adaptive Capacity

Andy Jarvis¹, Julian Ramirez-Villegas¹, Valerie Nelson², Richard Lamboll², Nick Nathaniels^{2,3}, Maren Radeny⁴, Catherine Mungai⁴, Osana Bonilla-Findji¹, David Arango¹, Caitlin Peterson¹

¹CGIAR Research Program on Climate change, Agriculture and Food Security (CCAFS)/ International Center For Tropical Agriculture (CIAT), ²Natural Resources Institute, University of Greenwich, ³Independent consultant and NRI associate, ⁴CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa

Introduction

Global farming and food systems are increasingly facing unprecedented pressures from climate change, climate variability and environmental degradation. The trend and magnitude of change will surpass the limits of local knowledge and this means that new knowledge and tools as well as learning processes are needed to build further adaptive capacity. However, the inherent climate uncertainty and difficulty of understanding in real terms, what the future climate of a particular area will look like, and how communities may react to that is a major constraint to developing meaningful adaptation practices, policies and technologies.

CCAFS Climate Analogue Tool

There is likely to be 30% novel climates under climate change (Williams et al.2007), implying that 70% of expected future climate already exists somewhere else. The spatial variability in climate can be used as a means of having a real experiment of what the future holds for a site.

The analogue tool (Ramirez et al. 2011) connects sites with statistically similar climates ('analogous'), across space (i.e. between locations) and/or time (i.e. with past or future climates) and helps to address the following questions:

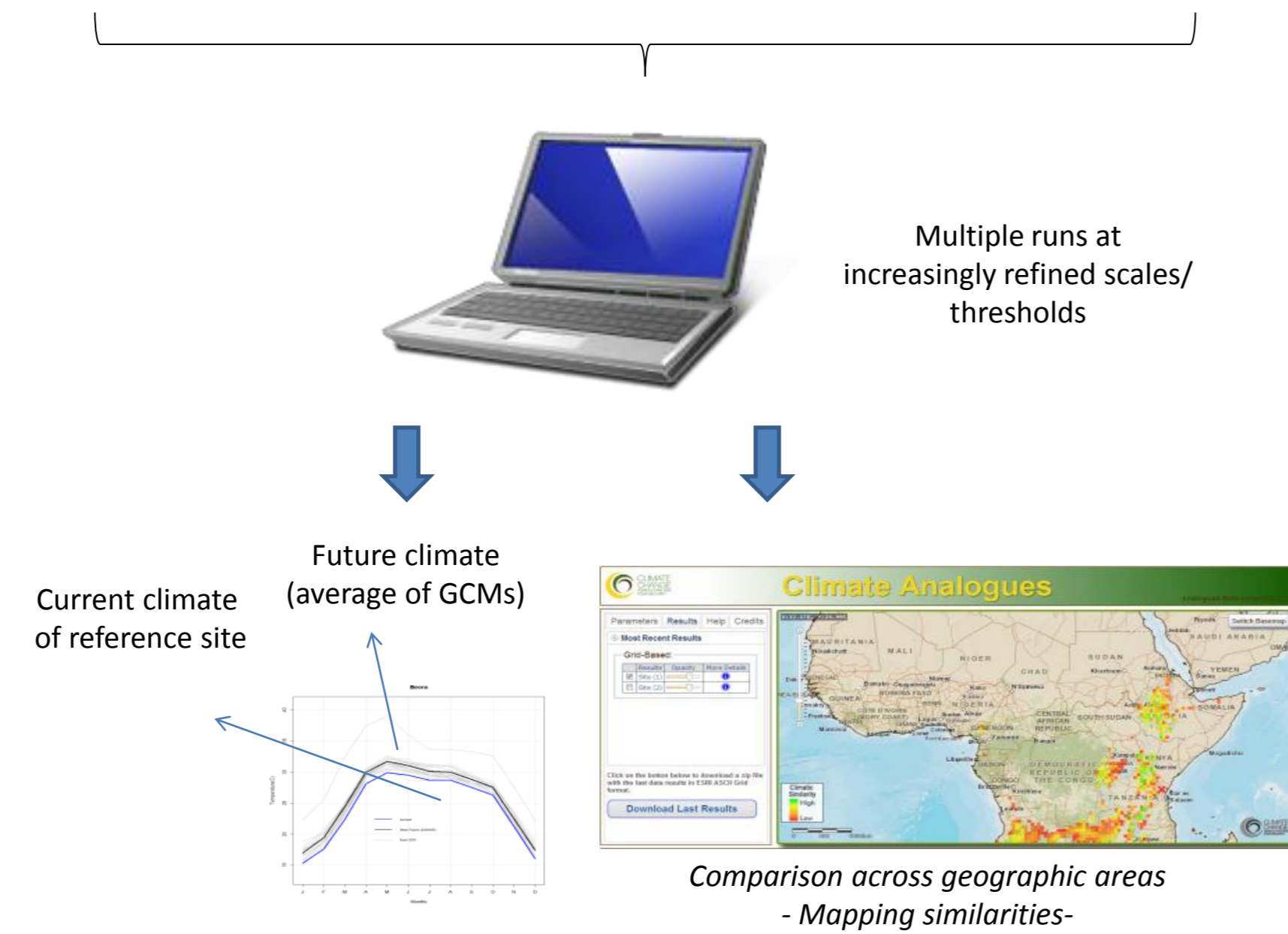
- Where will I be able to find areas with a climate 'possibly' similar to the current climate of my site in the future? (Forward analysis)
- Where can I find a place that currently has a climate that looks like the one expected for my site in the future? (Backward analysis)
- Where can I find similar areas to my site currently or in the future? (No-direction)

Running the Climate Analogue tool

Identifying locations that have, at present, a similar climate to the one that might be expected in a reference site by 2030.

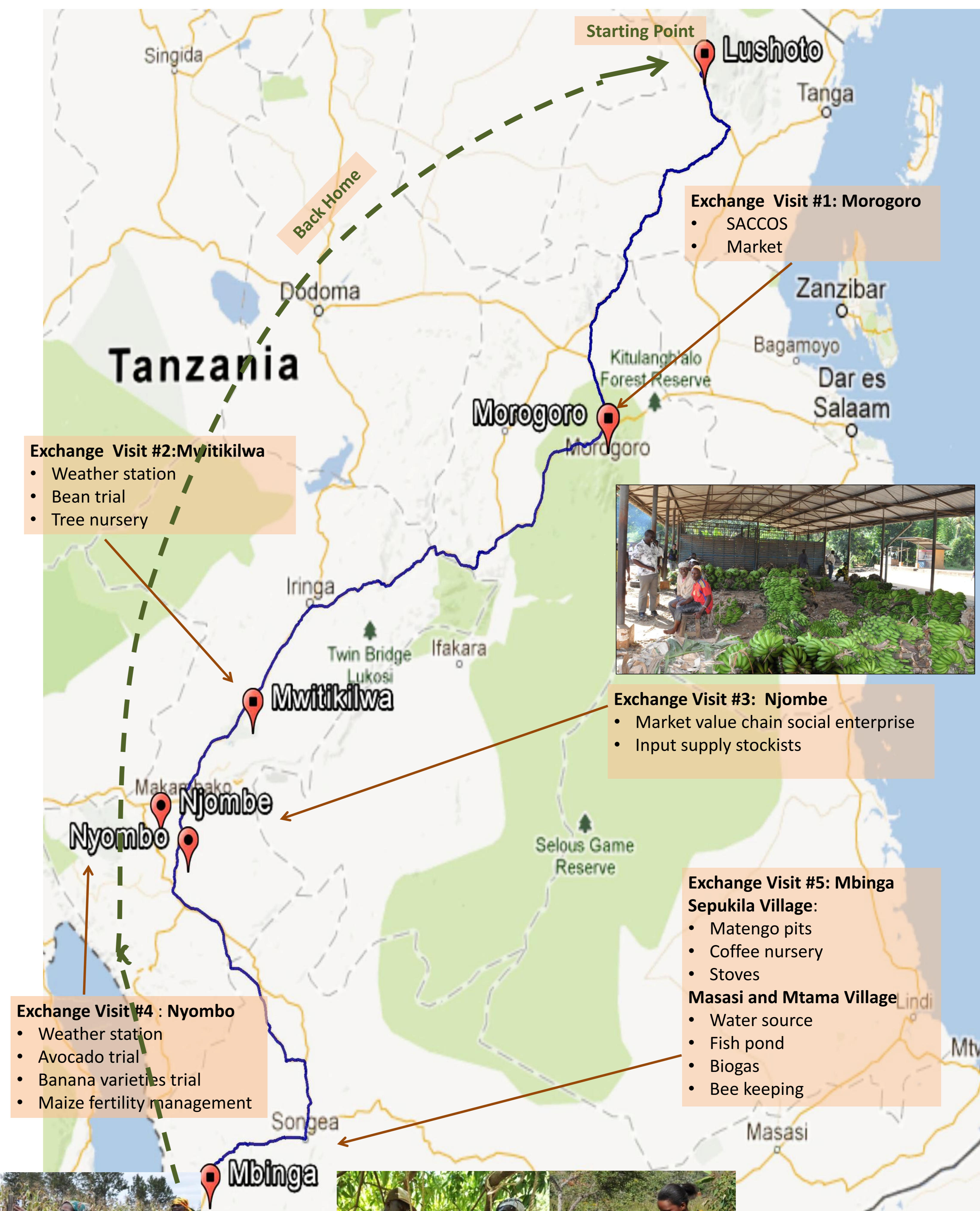
Analysis settings

- Reference site geo-coordinates
- Emissions scenarios
- Analysis direction (backwards, forwards, none)
- GCMs
- Variables: T and P
- Threshold (15% closest)



Results: The Learning Journey

15 farmers and 5 agricultural stakeholders from Lushoto in Northern highlands took part in a 10-day learning journey to several analogue learning sites, where they were exposed to a wide range of on-going community adaptation and risk management strategies – institutional and technological.



Key Challenges

- Climate modelling/projections have inherent uncertainties, especially in upland areas like Lushoto where major changes in altitude over short distances complicate the situation.
- Preparatory communication with the different hosts is important to ensure clarity on the purpose of the visit.
- Social and cultural barriers often restrict women's mobility and participation in study tours and may hinder innovation and change from the learning process.

Lessons and Recommendations

- The climate analogue tool is most useful as a learning rather than a predictive tool. Tool can be used to explore future scenarios and spark learning for adaptive action.
- Understanding climate modelling can be challenging for non-climate scientists and more resources are needed to enable learning (e.g. at district level).
- Significant opportunities exist for more farmer to farmer (and stakeholder to stakeholder) shared learning on adaptation.
- It is important to engage actors from across the agricultural sector. Uncertainties posed by climate change, require more flexibility in responses.

Acknowledgements

Thanks to all the farmers and AIS stakeholders from Lushoto who participated in the study tour, facilitators Juma Wickama (African Highlands Initiative), George Sayula (SARI and CCAFS), Lebai Nsemwa (ARI Uyole), and host communities, district extension staff and other specialists from Kinole village, Morogoro district; Mwitikilwa village, Mufindi district; Nyombo village and Njombe town, Njombe district; Sepukila village, Masasi village and Mtama village, Mbinga district, Sokoine University of Agriculture, Morogoro.

References

- Ramirez-Villegas J, Lau C, Köhler A-K, Signer J, Jarvis A, Arnell N, Osborne T, Hooker J. 2011. Climate analogues: finding tomorrow's agriculture today. Working Paper no. 12. Cali, Colombia: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: <http://www.ccafs.cgiar.org/resources/working-papers>
- Williams JW, Jackson ST, Kutzbach JE. 2007. Projected distributions of novel and disappearing climates by 2100 AD. Proceedings of the National Academy of Sciences 104(14):5738–5742

To learn more

- <http://ccaafs.cgiar.org/our-work/research-themes/progressive-adaptation/climate-analogues>
- <http://www.ccafs.cgiar.org/blog/one-mans-future-another-mans-present-farms-future-hits-tanzania>
- <http://projects.nri.org/farmsofthefuture/>

The FoTF Approach

The Farms of the Future (FoTF) approach aims to connect farming communities to their plausible future climate to strengthen their adaptive capacity. FoTF uses the CCAFS analogue tool to identify the climate analogue sites and farmer exchange visits.

Materials and Methods

In East Africa, the first pilot of the FoTF approach was carried out in Tanzania in 2012 by a team from the Natural Resources Institute, University of Greenwich, in collaboration with CCAFS and a number of local partner organizations and individuals. Additional components were added to the FoTF approach:

- Initial participatory 3D modelling
- Participatory video
- Study tour
- The learning processes

Analogue run with annual precipitation and temperature

Map shows the 15% best analogues to which 80% of the models agreed

