



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



## FARMS OF THE FUTURE GUIDELINES

---

Edward Jones<sup>1,2</sup>, David Arango<sup>1,2</sup>, Julian Ramirez-Villegas<sup>1,2,3</sup>, Osana Bonilla<sup>1,2</sup>, Megan Bailey<sup>4</sup>, Abrar Chaudhury<sup>4</sup>, Chase Sova<sup>4</sup>, Jessica Thorn<sup>4</sup>, Ariella Helfgott<sup>4,5</sup>, Andy Jarvis<sup>1,2</sup>

<sup>1</sup>CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS);

<sup>2</sup>International Center for Tropical Agriculture (CIAT), Cali, Colombia; <sup>3</sup>School of Earth and Environment, University of Leeds, Leeds, UK; <sup>4</sup>Oxford University; <sup>5</sup>University of Adelaide



June 2014

## TABLE OF CONTENTS

---

### CCAFS- Farms of the Future

#### The Farms of the Future (FOTF) approach

#### The FOTF approach:

1. Preplanning
2. Analogue site identification
3. The FOTF exchange
4. Post-exchange

### More information and resources

### Appendix

1. Objectives and pertinent questions for the participatory workshop
2. Analogue site identification
3. Project budget and total man-hours

## CCAFS- FARMS OF THE FUTURE

**THE FARMS OF THE FUTURE (FOTF) APPROACH** is an interactive climate adaptation, knowledge sharing and learning experience that transforms climate forecasts into field-based realities by physically taking participants on a journey to areas that already experience climatic conditions that represent plausible future climate scenarios.

The hypothesis behind this is that the knowledge exchange process can enhance a farmer's/village's capacity to adapt to changing climatic conditions by exposing them to innovative farming communities that have already successfully adapted their agricultural practices to various distinct climatic conditions the reference village might experience.

The process begins with a participatory workshop carried out with the "reference" community aiming to identify climate adaptation challenges and frame socially, culturally and environmentally appropriate responses that align with local visions and aspirations for development. Following this, potential climate analogue sites are identified with the support of the CCAFS team. These areas are then investigated on the ground to identify suitable sites for the exchange experience in a holistic manner. The aim is to identify sites within the analogue sets which are diverse enough to demonstrate future uncertainties, which allow the participants to learn adaptation approaches they consider relevant and which are socially and culturally appropriate.

The actual exchange process involves transporting representatives from the reference village to a number of analogue sites to explore existing adaptation strategies that may be tailored by the reference village to meet their own current and future adaptation challenges. By visiting a number of villages participants may be exposed to a range of plausible future climatic scenarios and different adaptation innovations. The ultimate goal of the program is to increase farmer resilience in the face of future climate change and uncertainty, however, the participatory approach also facilitates exposure to farming techniques that may provide immediate benefit the reference community. Ideally a FOTF exchange will culminate in the production of a strategic plan for the village's future with a focus on the adoption of climate-smart adaptation

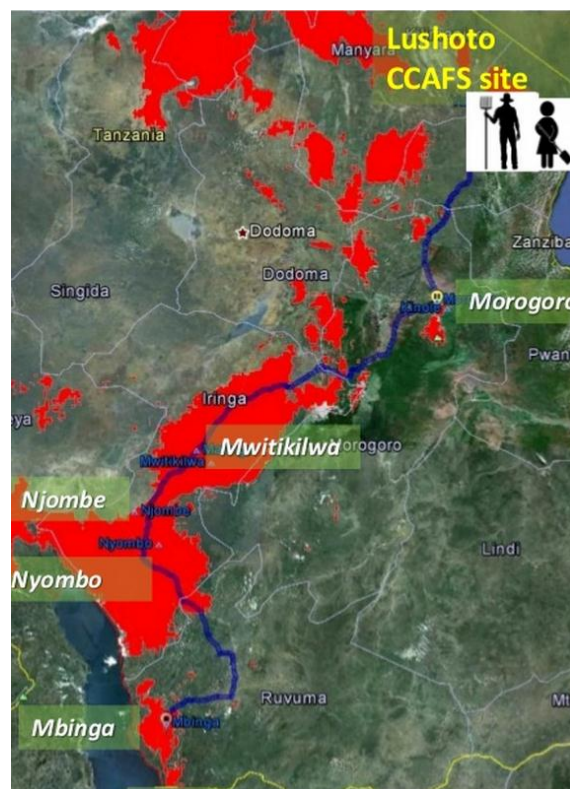


Figure 1 Completed FOTF exchange for Yamba, Tanzania. More information: <http://www.ccafs-analogues.org/one-mans-future-is-another-mans-present-farms-of-the-future-hits-tanzania/>

strategies for immediate and future village benefit. The program may be run in conjunction with local government groups or NGOs to provide on-going support following the FOTF exchange, with progress assessment and revision of the strategic plan at appropriate intervals.

### THE FOTF APPROACH:

The FOTF approach may be summarised into four distinct steps:

1. **Preplanning:** identification of adaptation challenges, current coping mechanisms, local visions and aspirations for the future, as well as the resources available to achieve these outcomes whilst adapting to climate change.
2. **Analogue scoping and exchange site selection:** identification of areas that currently have climates similar to the future projected climate of the village. Exchange sites must show successful adaptation to these conditions and be willing and appropriate for the exchange process.
3. **The FOTF exchange:** participants are physically transported to analogue sites to interact with local farmers and observe climate adaptation strategies.
4. **Post-exchange activities:** the entire village contributes to the production of a strategic plan describing a concerted vision for the village's future with special reference to adoption of climate-smart techniques.

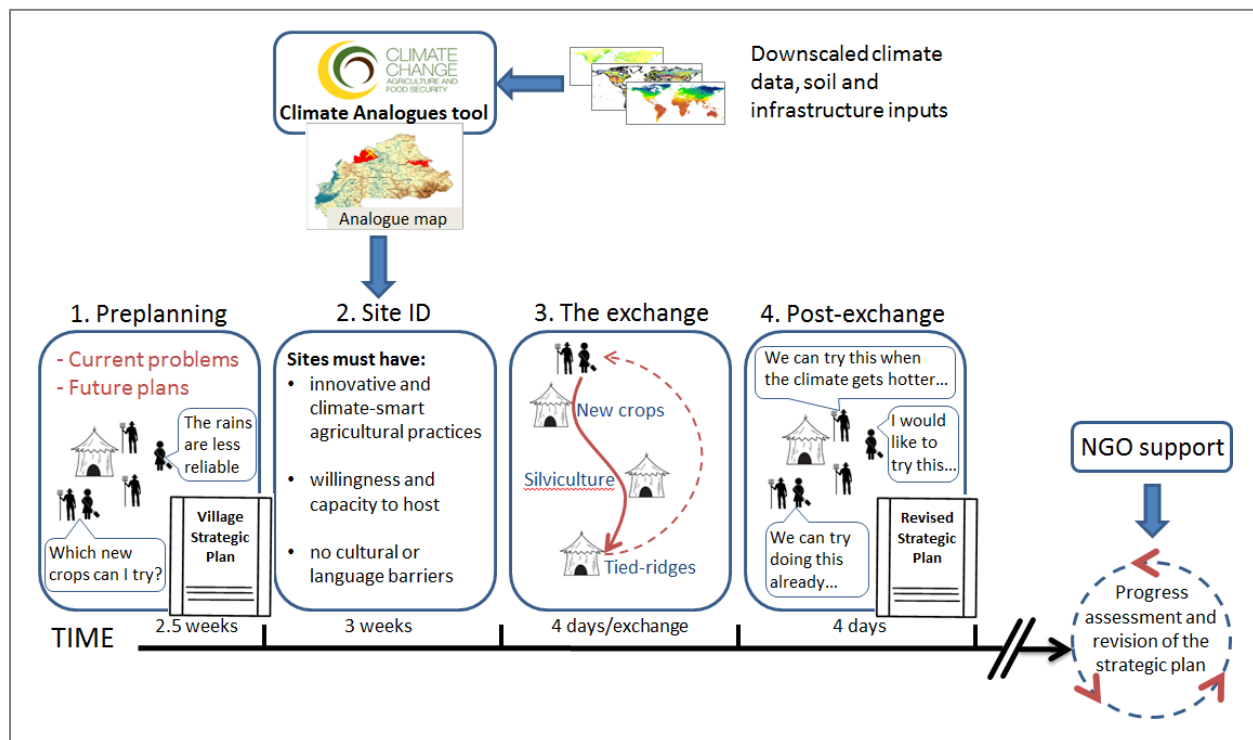


Figure 2 A schematic illustration of the FOTF approach.

The CCAFS Climate Analogue team may provide support during initial analogue site investigation by providing maps indicating areas of potential analogue sites. These areas are to be further investigated on the ground by the facilitator and the analogue data cross-checked with grounded meteorological data. The pre-planning, exchange and post-exchange process are all hands-on processes to be undertaken in the reference and analogue villages respectively. More detail of the individual steps of the FOTF approach are given in the following pages.

## 1. Preplanning

### *Participatory workshop:*

A three day village wide diagnostic, prioritisation and planning workshop is held to identify and discuss pertinent issues including: key adaptation challenges; existing climate coping mechanisms; visions for the future and resources and approaches currently available for achieving these outcomes in the face of climate change. This workshop culminates in the production of a strategic plan that encompasses the village's concerted future vision. This plan will be revised after each analogue exchange. Pertinent questions to evaluate, especially those relevant to the exchange process, are given in Appendix 1.

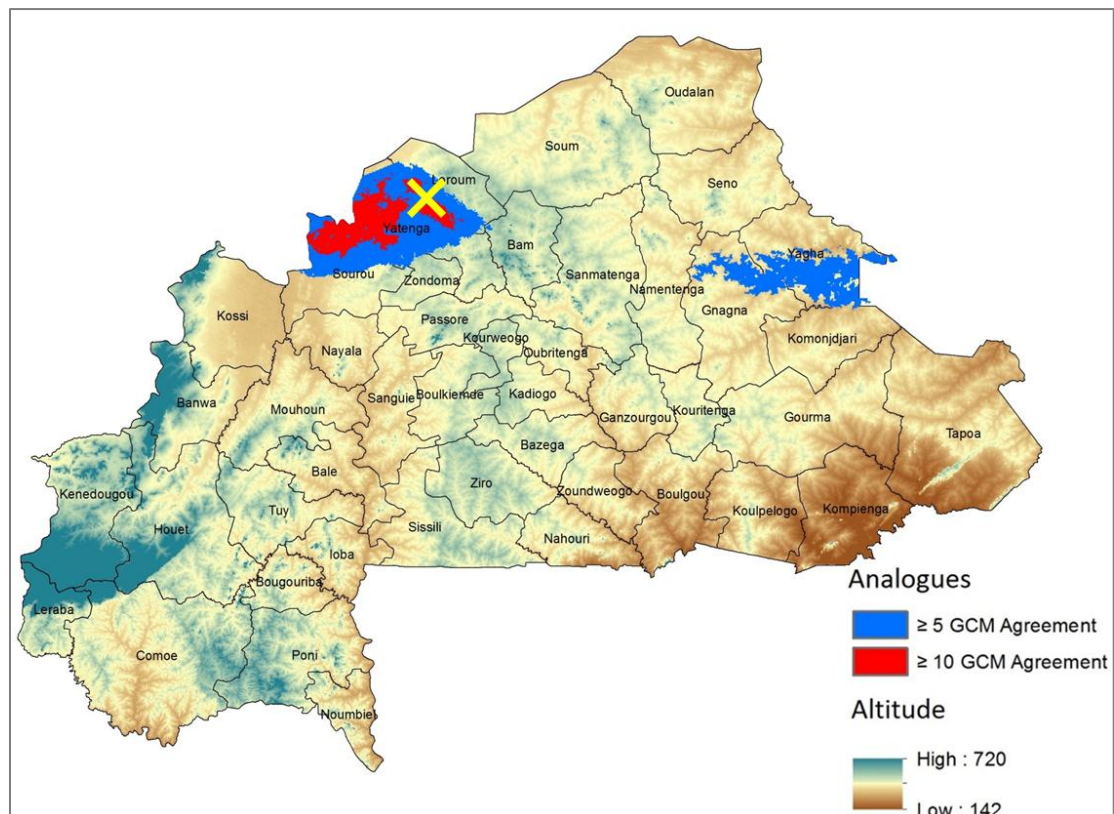
If little information is known about the social structure of the village preliminary ethnographic work should be conducted to identify different forms of social differentiation (gender, caste, ethnicity, disability, age, etc.) and also the social norms of representation and decision-making within the village community. This information will facilitate smooth and effective community interaction for workshop activities and can be used for participant selection for the exchange.

## 2. Analogue site identification

### *Identification of analogue areas using the Climate Analogues approach:*

Analogue areas are identified using the Climate Analogues approach (Appendix 2). The Climate Analogues approach compares monthly mean temperature and precipitation values to identify areas that currently have similar climatic conditions to the future projected climatic conditions of the reference village (for the period 2020-2049). To capture the variability between global climate model (GCM) projections all available GCMs are used to identify a range of plausible future climate scenarios. This process can be facilitated by the CCAFS Climate Analogues team or

The identified analogues areas will be provided in GeoTIFF format as well as KMZ for use with Google Earth. Results will also be provided as a summary PowerPoint presentation which will include a report on the process and variables used, graphs of current and projected climatic conditions of the reference village and a map of the identified analogues areas.



*On the ground scoping and site selection:*

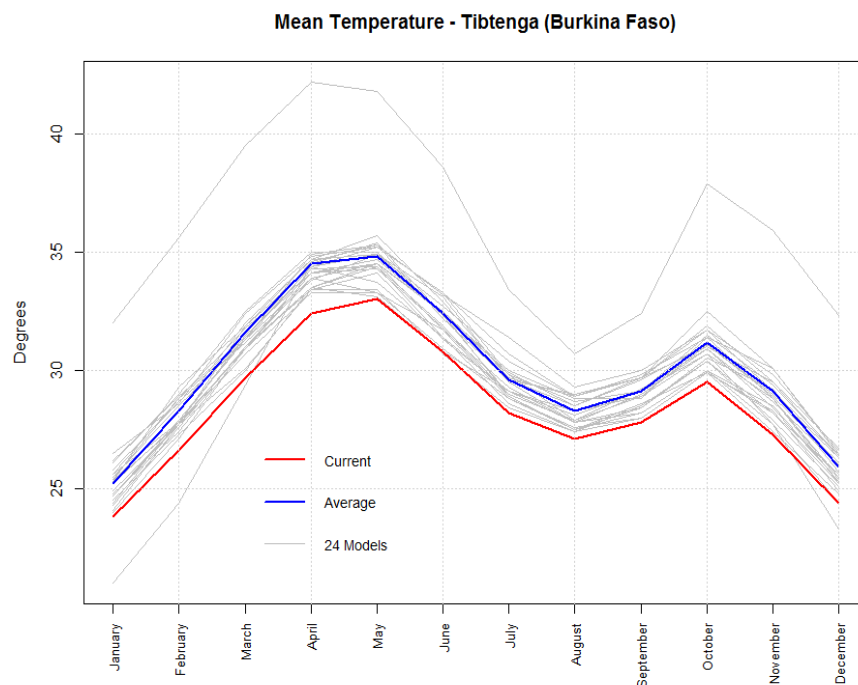
Final site selection proceeds by physical investigation of villages found within the analogue areas to identify villages that show sufficient adaptation and other novel



technologies that may benefit participants from the reference village. The scoping process should also ensure that no problems will be caused by language barriers, ethnicity, differing gender roles, etc. between the participants and the host village. Finally the host village must also have the willingness and capacity to host the event, including a large room to hold meetings and the ability to house the participants if an overnight stay is needed. This process may be expedited by collaborating with extension workers, NGOs or other parties that have existing knowledge of the analogue areas.

As the timing of many crop production activities is most likely seasonal care must be taken during the planning process to ensure that the visit will coincide with these practices but that it also does not disrupt the normal agricultural practices of either the participants or the host village e.g. during sowing or harvest time.

A number of exchanges may be conducted at different host villages to demonstrate the range of plausible future climate scenarios as given through climate model uncertainty (Fig. 3). This also facilitates exposure to a range of different climate-smart technologies and allows the participation of a more villagers in the exchange fieldtrips.



**Figure 4** Extracted mean temperature data for current conditions (blue line), 24 GCMs (grey lines) and the ensemble (red line) of Tibtenga, Burkina Faso. This demonstrates the variability in predicted future temperatures from individual GCMs.

### 3. The FOTF exchange

#### *Participant selection:*

Participant selection is a democratic process with all community members able to nominate participants to take part in the exchange program. Members must be able to effectively represent their village during the exchange, have a strong standing in the community to disseminate information on their return. Participants must also have the capacity and enthusiasm to directly apply the new technologies that they will see and also to have the capacity to provide information from their own experiences to the host village during the exchange process. Each exchange fieldtrip may have different participants to maximise the total number of village members that will have a direct learning experience, who may then transfer this knowledge to the broader community.

#### *Pre-exchange training:*

Pre-exchange training is used to prepare participants for the exchange process and develop their fundamental understanding of climatic processes and issues. Specifically pre-exchange training should be used to: inform participants on the exchange procedure, roles and responsibilities; develop participant's critical thinking skills and ability to question assumptions; teach participants about climate change and climate model uncertainties to ensure that participants comprehend that the sites are projected future scenarios and not prophecies.

#### *The exchange process:*

The exchange process involves the physically transportation of participants to the identified analogue sites to communicate with the villagers and observe climate adaptation strategies first-hand. Facilitated exchange activities may include walking tours to demonstrate host village land and water management practices as well as broader lifestyles. These walking tours may include discussion on how the practices are influenced by climate or other factors and how they may have changed in recent years. An investigation of past and present climatic conditions of the village may be conducted and discussion of changing climatic conditions for both villages may be held to discuss adaptation challenges and response exercises to examine what has/hasn't worked and why.



If the resources are available participants may prepare short-films depicting life and agriculture in their village to share with the host villages on arrival. During the exchange participants may also make short films on the agricultural practices and life in the host village to share with their community on return.

#### 4. Post-exchange

##### *Post-exchange scenario exercise:*

Following each exchange a plausible future scenario for the village is developed by the participants in light of the new information gained from the exchange. This information may be used to revise the original village strategic plan drafted during the pre-planning stage. Development of the strategic plan is an iterative process and the plan may be revised after every exchange as new information and techniques are uncovered.

##### *Village wide dissemination and planning:*

Following the completion of all exchanges a new village wide workshop is held to share key lessons learnt and share participant videos. The revised strategic plans for each exchange may be shared with revision and agreement on final plans to be negotiated. External agencies and NGOs with the potential to support the plan should also be present, with responsibility for continued planning, revision and implementation of the strategic assigned accordingly. Ongoing external support will be essential for substantial change to occur and building appropriate networks to support the implementation of plans after the FOTF process has finished is essential.

##### *Ongoing development:*

Facilitators of the FOTF exchange and/or NGO partners may return to the participant's village on a recurrent basis to assess progress with the support of local partners. E.g. Oxford University facilitators identified many direct and indirect village innovations upon returning to Beora, Nepal one year after they had conducted a FOTF exchange there, including the formation of a group vegetable cooperative, crop diversification, increased tree plantings, improved community organisation and new cropping practices.

## MORE INFORMATION AND RESOURCES

---

You can find all scientific documentation and the R package resources using the online tool in the following link (<http://www.ccafs-analogues.org>) Also there is a blog of the tool, where the users can find information related with the latest project activities, such as case studies (e.g. Farms of the Future project), training workshops, as well as new news about improvements and tool applications.

The Climate Analogues has been developed in collaboration with the Walker Institute and the School of Earth and Environment from Leeds University.



**Project Farms of the future:** <http://ccaafs.cgiar.org/es/farms-future#.VHzDmsnA-iU>

### Blog Posts

- [Farms of the Future hits Tanzania](#)
- [Finding the future for farmers in Beora Nepal](#)
- [Believable climate futures explored by Nepalese farmers](#)
- [Farms of the future: a two-way learning exchange](#)
- [Farmers from climate-smart villages in Lower Nyando and Kericho can now identify adaptive measures for future climate](#)
- [Improving adaptation planning in Tanzania through the climate analogue tool](#)

**Online platform:** <http://www.ccafs-analogues.org/>

## APPENDIX

### 1. Analogue site identification

This essential information is required by the CCAFS Climate Analogues team for the identification of analogue sites:

Essential information required for analogue site identification
Country name
Village name
Village longitude (dd)
Village latitude (dd)
Search area within which to look for analogue sites e.g within same country, within a region or selection of countries, or "Global".
Climate variables i.e. the default of monthly mean temperature and precipitation, or bioclimatic variables
Growing season(s) of interest i.e. all year or May to October only

#### Identification of analogue sites performed by the CCAFS Climate Analogues team:

1. Using the data provided in the Essential Information table above the future climatic conditions at the reference site are plotted for all available GCMs and visually inspected. Outliers are removed from further analysis.
2. Analogue runs are performed using the Analogues R package for all remaining GCMs using the parameters given in the Essential Data table. The default future conditions are calculated as the average of the 2020 to 2049 time period under emissions scenario A1B. The effect of data rotation may be investigated, as well as the effect of using the given variables in combination or individually to elucidate their individual influence on the results.
3. The top 10% most similar sites for each GCM are extracted and compiled to produce a single map describing GCM agreement on analogue sites e.g  $\geq 5$  or  $\geq 10$  GCM agreement.
4. The raw data of sites located within the identified analogue areas should be investigated to ensure that climatic conditions are sufficiently similar to projected future conditions at the reference site.

5. The resultant identified analogue areas may be further reduced by considering soil properties and available infrastructure such as distance to major roads, markets, rivers, irrigation availability, etc.

## 2. Objectives and pertinent questions for the participatory workshop

The participatory workshop is used to identify the village's unique issues that may be limiting agriculture production and innovation now and into the future. This time is also used to develop collaborative strategies with the villager's for their concerted future vision.

### Relevant questions for the workshop include:

- What are current climatic and other constraints to agriculture?
- How have climatic conditions changed in the village in recent history?
- How have farmers adapted to this? Has adaptation been successful/unsuccessful?
- Are there any technologies that the villagers have wanted to introduce but they have not had knowledge/resources/risk capital?
- Are there any technologies that the participants particularly interested in seeing during the program?
- What crops are grown in the area? Are they used for subsistence or sold for revenue?
- How do the participants foresee their agricultural future?
- What is the normal timing of crop production practices? E.g:

Crop	J	F	M	A	M	J	J	A	S	O	N	D
Crop 1												
Crop 2												
Crop 3												
Crop 4												
Crop 5												
Crop 6												

	Sowing
	Growing
	Harvest

### Site characteristics: (this information may assist in analogue site identification)

- Does the village have access to irrigation? What are the sources of irrigation and application methods?
- What are the typical (and range of) soil characteristics of the area? (sandy/clayey, fertile/infertile, well drained/water-logged)
- How far is it to markets?
- What transport options are available?
- What other infrastructure is available?

**Recommended supporting resource:** CCAFS Working Paper 76 “*Systemic Integrated Adaptation: Community Diagnostic, Prioritization and Planning Toolkit: A guidebook for researchers and practitioners working with local communities*” by Ariella Helfgott, Joost Vervoort, Meghan Bailey (Available at: [www.ccafs.cgiar.org/publications](http://www.ccafs.cgiar.org/publications) )

### 3. Indicative figures on Project budget and required human resources

Task	Workers required	Time required
<b>Preplanning</b>		
<i>Preliminary diagnostic work*</i>	2	2 weeks
<i>Participatory workshop</i>	3-4	3 days
<b>Summary total</b>		2.5 weeks
<b>Analogue site identification</b>		
<i>Identification of analogue sites</i>	1	1 week
<i>Analogue scoping and site selection*</i>	2	2 weeks
<b>Summary total</b>		3 weeks
<b>The exchange process</b>		
<i>Participant selection</i>	2	1 week
<i>Pre-exchange training</i>	2	4 half days
<i>The exchange process (one exchange)</i>	2	4 days
<b>Summary total</b>		2 weeks
<b>Post-exchange</b>		
<i>Post-exchange scenario exercise and revisec planning</i>	2	3 days
<i>Village wide dissemination and planning</i>	2	1 day
<b>Summary total</b>		4 days
<b>Grand total</b>		2-3 months

\* Indicates steps which may be greatly reduced with sufficient pre-existing knowledge.