MICCA LAUNCHING AND CLIMATE-SMART PRACTICES: LOCAL VOICES AND PERCEPTIONS

A Quick scan report to guide Capacity Development efforts

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1. BACKGROUND OF THE MICCA PROGRAMME

The Mitigation of Climate Change in Agriculture (MICCA) Pilot Project is implemented in the South Uluguru Mountains (in Tanzania) and it is part of the MICCA Global Programme ran by FAO. MICCA Global is formed by a set of Pilot Projects operating in two countries, Kenya and Tanzania. Each pilot project has a particular focus. In the case of MICCA Tanzania, the focus is mainly on conservation agriculture and agroforestry and has a lifespan of 3 years. The Pilot Project in Tanzania started in early September 2011 and will last until August 2014.

Overall, the main MICCA Programme goal is to facilitate developing countries in contributing to the mitigation of climate change in agriculture and moving towards low carbon emission agriculture. MICCA is working with national and international partners to carry out a set of pilot projects designed to integrate climate-smart practices into existing smallholder agricultural development activities. Pilot projects are being chosen which focus on those agricultural activities which tend to have high emissions as well as high potential for their reduction.

Agriculture production must increase if the global food supply is to keep pace with population growth. Yet at the same time, it is clear that if the world is to meet its targets for reducing greenhouse gas emissions and mitigating climate change, agriculture must become 'climate-smart'. Agricultural production systems managed in a climate-smart way, emit fewer greenhouse gases, create significant carbon sinks, and at the same time become more productive and more resilient in the face of a changing climate.

MICCA Tanzania is a partnership between CARE International in Tanzania, The World Agroforestry Center (ICRAF), and the Food and Agriculture Organization from the United Nations. The MICCA pilot in Tanzania is an integral part of the Hillside Conservation Agriculture Project (so-called HICAP) which started in 2009 and it is now in its last year of implementation. It is in the same HICAP project area that MICCA will be implemented, that is in the 15 villages located in Kolero, Kasanga and Bungu wards, Mvuha Division, in the Morogoro region.

The main MICCA project activities that will take place or climate-smart practices that will be promoted at the field level are: strengthening conservation agriculture (already introduced by the HICAP project), soil and water conservation techniques on the steep slopes, tree nurseries establishment and management, agroforestry, avoid

slash and burn, climate change awareness, energy saving cooking stoves, Greenhouse Gases measurement, and the Land Health Surveillance.

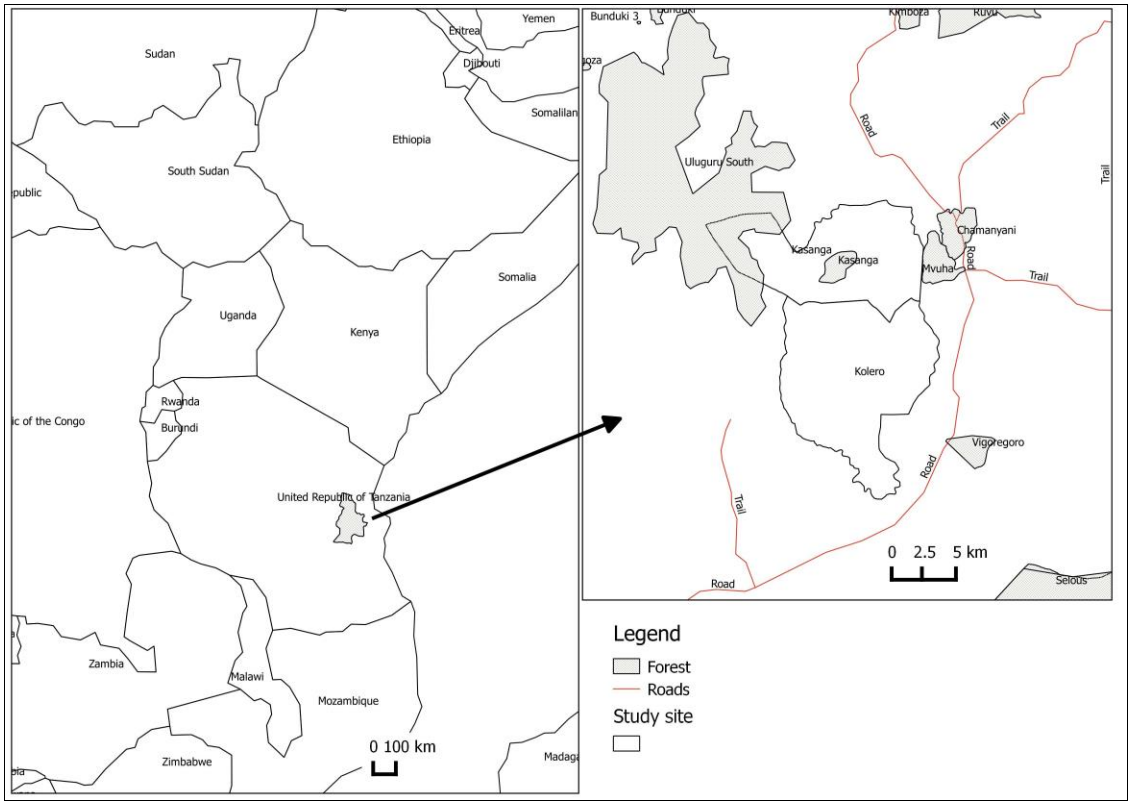


FIGURE 1: LOCATION OF THE PROJECT SITE, MOROGORO, TANZANIA

2. INTRODUCTION

The official launching of the MICCA Pilot Project in Tanzania took place from the 27th November to the 2nd December, 2011 at the conference hall of the Center for Sustainable Living, in Kolero. The Village Leaders, Chair persons and Ward Executive Officers representative from the 15 villages of the project site attended the event. The HICAP/MICCA Team from CARE International together with the ICRAF colleagues led the overall event.

The launching covered topics such as: i) *what is MICCA? ; ii) Who are the MICCA partners?; iii) What is climate change?; iv) Which sectors are the main climate change contributors of relevance to the farming communities?;*

v) Which are the climate risks and related impacts on the agriculture sector; vi) What are climate-smart practices?; vii) What are the main MICCA activities?; viii) What do we want to achieve with MICCA?; and ix) The role of village leaders in making sure a smooth implementation of the MICCA project activities.

A summary of some of the expectations or considerations raised by the village leaders during the MICCA Launching can be summarized in the following box 1:

BOX 1: Expectations for MICCA during the MICCA Launching

- The Village Council should set by-laws on different environmental issues (e.g. slash and burn).
- Demonstration plots should be established in easily accessible areas so that people can see them easily.
- Sensitization meetings for both village leaders and the community shall be made in order to disseminate the information.
- Ward and village leaders should have demonstration plots.
- More emphasis should be put on trainings.

In addition to the official MICCA launching at the Center for Sustainable Living (CSL), focus group discussions (FGDs) and small plenary sessions were conducted in Kolero, Kasanga and Bungu wards with farmers from different villages within the three wards. These sessions were useful to further promote MICCA and introduce the project to other community members. They were also helpful in providing further insights on climate-smart practices in the area, and tailor the future capacity building efforts to farmers. The topics discussed in these sessions complemented previous studies undertaken in the area such as the MICCA Socio-Economic Baseline, the Capacity Development Guiding Report, and the EX-Act report.

3. MAIN GOAL AND OBJECTIVES

The purpose of the MICCA Launching was not only meant to start sensitization activities including the promotion of the MICCA project and climate-smart practices, but also to further complement and guide future capacity development efforts. This quick scan report is purely based on local judgments and perceptions expressed by farmers that attended the FGDs and plenary sessions. Thus, it shall be pointed out that the quantitative data found in this report shall be treated cautiously as it might not be representative for the entire project area and

might be subjected to bias. The findings presented are based on three themes of concern for *Climate-Smart Practices* and the MICCA Programme: agroforestry, slash and burn, and energy. These areas are considered of particular interest because of the relevance to mitigation of climate change.

Methodology and approach

Initially, the arrangements were made to hold 3 FGDs per ward, but after the first round of FGDs in Kolero, re-arrangements were made to accommodate 2 sessions (one FGD and a plenary session) per village to maximize efficiency, but without compromising communication efforts done earlier to the villagers. Thus, in total Five FGDs and two plenary sessions were held in Kolero, Kasanga and Bungu wards comprising of farmers from different villages within each ward. The arrangements of the activity took place and were organized as follows:

BOX 2: Structure of the FGDs and small plenary sessions

Kolero village: participants from Malani, Kolero, Mlagano, Lukange, and Lubasazi attended the session.

- FGD 1: 6 participants (6 women farmers)
- FGD 2: 5 participants (4 women farmers; 1 man farmer)
- FGD 3: 8 participants (4 women farmers; 4 men farmers)

Kasanga village: participants from Ukwama, Longwe, Kasanga, Kizagila, and Kitonga attended the session.

- FGD 4: 8 participants (3 women farmers; 5 men farmers)
- Plenary session: 11 participants (6 women farmers; 5 men farmers)

Bungu village: participants from Bungu, Balani, Mihange, and Koloni attended the session.

- FGD 5: 8 participants (6 women farmers; 2 men farmers)
- Plenary session: 16 participants (8 women farmers; 8 men farmers)

*NB: Only participants representative from Temekelo were missing during these sessions.

The participants included villagers who are Contact Farmers (CFs), Community-Based Trainers (CBTs), Farmer Field School (FFS) members, Village Savings and Loans (VSL) members, and participants who are currently not part of the HICAP project. This was arranged in this way in order to include the voices of farmers coming from all villages. These sessions were helpful to start discussions with farmers about the MICCA project, and it was a

good opportunity to let farmers express their wishes and their thoughts on community needs, priorities, and approaches for community involvement and project success.

The FGDs and small plenary sessions were structured as follows (see Appendix 1 for more detail):

- Overview of MICCA in Tanzania –sensitization to farming community-
- Climate Change perceptions at the local level and locally felt impacts
- Discussions on 3 thematic areas:
    - Agroforestry (tree density, main trees and shrubs found in the landscape, establishment of tree nurseries, factors hindering tree planting, land tenure)
    - Slash and burn
    - Sources of energy (i.e. cooking)

Thus, this report follows the above structure and findings are presented accordingly.

4. MAIN FINDINGS

5.1. Climate Change perceptions: climate variability and change and locally felt impacts

From the discussion sessions, the general perception is that today's local weather has changed if compared to the past. At present, the local weather is characterized by remarked changes in the seasons, with unreliable and insufficient rain, prolonged dry season, and increased extreme events (e.g. strong winds or cyclons –as expressed by the communities).

The participants were also asked to list the climate change impacts felt at the local level on their livelihoods. These were expressed as follows: *increased soil erosion, confusion in planting times, insufficient crops, "increased forest fires which reduces the amount of rain", increased crop diseases, low crop production, low harvests and shortage of food (e.g. less fruits than before), dried water sources, increased crop losses, increased landslides, shrinking forests area, increasing number of people cutting down trees, etc.*

Their understanding and perception on climate change indicate that their views are closely related to observed changes over the past years. Furthermore, their responses also denote increased human pressures and environmental degradation of their surroundings over time (e.g. increasing number of people cutting down trees).

These stated climate change observations are repeated in different villages and the results are consistent with the findings from the MICCA socio-economic baseline study.

5.2. Agroforestry and tree planting

5.2.1. Tree density

At present, farmers are not used to leave trees on farm, only in very limited occasions. The availability of trees on farms (e.g. along the boundaries) mainly depends on the availability of tree seedlings in the project area, and so does the tree density. No clear pattern was shown on tree density as the figures given by the participants were very diverse. Trees are much more common near their homesteads. On average, a typical farmer has between 10 to 20 trees surrounding the house s/he lives; including jack fruit, bread fruit, coconuts and mangoes. In general, high demand for trees was shown among all participants. Particularly, farmers from Mlagano and Lukange showed a great deal of interest for tree planting. Opportunities and support to enable planting of trees seems to be missing. This is also aligned with the findings from the socio-economic baseline, in which only 12.6% of the sample surveyed (333 interviewees) plant or protect trees.

Furthermore, there is clear cut difference between highland and lowland villages in terms of tree retention. In the highlands where multi-strata agroforestry is practiced there is relatively higher number of trees on farms providing shade for banana, cadammomum and other shade tolerant crops (Plate 1).

FIGURE 1 SPATIAL DISTRIBUTION OF TREES IN THE LANDSCAPE OF KASANGA VILLAGE

Photo credit: Mathew Mpanda, December 2011.

5.2.2. Main trees and shrubs found in the landscape and their uses

Participants were asked to identify the most common trees in the farm landscapes and their uses. A summary of trees and shrubs and the uses for each species is shown in the table below:

TABLE 1 COMMON TREE SPECIES FOUND IN THE FARMING LANDSCAPE OF KOLERO, KASANGA, AND BUNGU WARDS

Local name	Scientific name	Fuelwood	Fruits	Medicine	Construction	Timber	Others
Mbako	*Not known*	✓					-
Mbiriti/mjohoro	*Senna seamea*	✓			✓		-
Mchenza	*Citrus sp.*	✓	✓				-
Mchungwa	*Citrus sinensis*	✓	✓				-
Mfenesi	*Artocarpus heterophyllus*	✓	✓			✓	-
Mfuru	*Vitex spp.*	✓	✓				-
Mhembeti	*Sterculia quinqueloba*					✓	-
Mianzi	*Bamboo* sp.	✓			✓		Making ungo, matenga and irrigation pipes
Mibona	*Brachystegia bussei*	✓					Charcoal and ropes
Mibuni/mikahawa	*Coffea* sp.	✓	✓				Shade
Michikichi	*Elaeis guineense*		✓				Cooking oil
Mihamvi	*Millettia usaramensis*	✓			✓		
Misani	*Brachystegia microphylla*	✓					Charcoal and ropes
Mitiki	*Tectona grandis*						
Mkangazi	*Khaya anthotheca*	✓				✓	
Mkarafuu	*Syzygium aromaticum*	✓					Spices
Mkenge	*Albizia gummifera*	✓				✓	
Mkorosho	*Anacardium occidentale*	✓	✓				Charcoal- making
Mkoya	*Not known*	✓					Water catchment
Mkunju	*Harrisonia abyssinica*	✓			✓		Bed making
Mkuyu	*Ficus spp.*	✓					Water catchment
Mkwaju	*Tamarindus indica*	✓	✓				
Mlama	*Combretum sp.*	✓					
Mlimao	*Citrus limonia*		✓				Wine-making
Mnazi	*Cocos nucifera*				✓		Wine-making and spices/oil
Mndimu	*Citrus sp.*			✓			
Mng'ongo	*Sclerocarya birrea*	✓	✓			✓	Ropes and barks for food storage

Local name	Scientific name	Fuelwood	Fruits	Medicine	Construction	Timber	Others
Mninga	*Pterocarpus angolensis*	✓				✓	
Mpapai	*Carica papaya*		✓				
Mparachichi	*Persea americana*		✓				Hair beauty
Mpera	*Psidium guajava*	✓	✓	✓			
Mpilipili	*Sorindeia madagascariensis*	✓				✓	
Msasa	*Ficus exasperata*	✓	✓				
Msamvu	*Not known*	✓					Water catchment
Mshelisheli	*Artocarpus altilis*		✓				
Msonobari	*Cedrela odorata*	✓			✓	✓	
Mstafeli	*Annona squamosa*	✓	✓				
Msufi	*Bombax rhodognaphalon*	✓				✓	Mattresses
Mtomoko/Mtomokwe	*Annona senegalensis*	✓	✓				
Mvule	*Milicia excelsa*	✓				✓	
Mwarobaini	*Azadirachta indica*			✓			
Mwembe (mombaa, tanga, ng'ong'o)	*Mangifera indica*	✓	✓	✓			Shade
Mwiza	*Bridelia micrantha*	✓			✓		
Mzambarau	*Syzygium cumini*	✓	✓			✓	

Multipurpose trees are the most preferred by farmers, especially fruit trees that also provide lumber and firewood such as: *mango trees, coconut, orange, jack fruit,* among others. These examples are also consistent with the most common planted trees that the interviewees from the socio-economic survey cited. Farmers emphasized the need for good lumber trees such as *Tectona grandis.* and M*sombalanga spp*. Timber is the main driving force that would get smallholder farmers to engage in tree planting as the demand for timber is high. In addition, fruit trees are also highly demanded, and hence, more attractive to farmers.

Other preferred trees currently not available in the project site are:

i. Teak *(Tectona grandis* for timber and fuelwood)

ii. Grevillea *(Grevillea robusta* for timber and fuelwood)
iii. Mapeasi/Pears (*Pyrus* sp.)
iv. Mangoes *(Mangifera indica* especially Mombasa and Tanga types)
v. Mkarafuu / Cloves *(Syzygium aromaticum)*
vi. *Miseri*
vii. Cinamommum/ Mdalasini (*Cinnamomum zeilanicum*
viii. Ashok tree *(Polyalthia longifolia)*
ix. Mpogoro/Mkababu *(Faidherbia albida)*
x. Christmas trees *(Thuja orientalis)*
xi. Cyprus *(Cuppressus lusitanica)*
xii. Pines *(Pinus Patula)*

From these results, it is evident that priority will be given to multipurpose trees, especially those that provide fruits, lumber, and that increase the N content in the soil. Additional cash crop trees shall also be introduced (e.g. *Cinamommum* spp. and cloves) as they have the potential to improve the livelihood economic gains.

5.2.3. Establishment of tree nurseries

The best way to establish tree nurseries appears to be through Farmer Field School (FFS), and VSL (Village Savings and Loans) groups, and primary and secondary schools. Suggestions were also made to use individual champion farmers. Some FFS groups have already been involved in tree nursery operations.

The main constraint in running tree nurseries is the awareness level on the importance of trees in the landscape, according to the farmers of the project area. In the past, this had effect in the decline of demand for tree planting.

Only Kitonga and Kasanga village used to have tree nurseries in the past with the assistance of the Uluguru Nature Reserve. The rest of the villages did not have tree nurseries, and this had effect on the tree planting and promotion due to unavailability of germplasm.

One of the participants during the sessions in Kolero, Mr. David L. Mbalamwezi (from Lukange) used to have a tree nursery comprising of *Khaya anthotheca*, and *Cedrela odorata*. He used to collect wildings from the forest as a source of planting material

Education on tree nurseries was claimed to be important and participants requested to be fully involved in the operations and tree nurseries management.

Mlagano, Lubasazi, and Lukange participants expressed high demand for trees. In Lukange, the community has agreed to have a village forest in which the community will be in charge of its management. It is worth mentioning that Mlagano and Lubasazi have also been leading villages in adopting conservation agriculture since HICAP started to work in the area, and are the villages with more land available. Thus, efforts to promote tree planting and agroforestry are highly encouraged in these villages.

5.2.4. Factors hindering tree planting

Several reasons have been put forward by farmers as hindering their attempts to plant and retain trees on farm. These include the following:

i. Termites
ii. Land tenure (e.g. large number of farms are rented)
iii. Spreading of the wildfires
iv. Excessive drought
v. Inadequate awareness on importance of trees
vi. Land scarcity, this limit the number of trees that one can retain or plant on farm
vii. Germplasm supply is inadequate; many farmers do not know the tree species that are useful for their farming systems.
viii. Absence of land use plans at village level which otherwise could have encouraged people to retain trees on their farms
ix. Capacity building is needed which currently is lacking e.g. awareness on forest laws concerning planted trees
x. Fear of the shade that may negatively impact crops
xi. Fear that trees will attract vermin like monkey
xii. Traditional methods of cultivation which involve slash and burn methods do not allow regeneration of trees
xiii. Overexploitation of trees for timber, construction material and firewood.
xiv. Pests and diseases attacking seedlings

This list poses numerous challenges to the introduction of trees, and thus, a great deal of capacity development efforts towards addressing them. Priority shall be given to stop slash and burn, address land tenure issues, and in increasing awareness on importance of trees.

5.3. Land Tenure

The land tenure in the project area is clan-based. It seems that only limited clan members own land, according to the farmers that attended the discussion sessions. Land ownership among the Waluguru tribe is unique in Tanzania and is closely related to the history of settlement in the Uluguru Mountains (Mvena and Kilima 2009).

Due to the nature of land ownership, commercialization of land also appears to be deterred, as it would be difficult for one to sell land that is owned by a clan as all the members should agree on such deal (Mvena and Kilima 2009).

The general perception is that the number of people renting land for cultivation purposes is higher than those who own land, although it is location specific. However, findings from Mvena and Kilima (2009) and Zagst (2011) studies show different ways of acquiring/owning land. The study from the former shows that 67% of farmers acquire land through inheritance, and only 13.5% rent the land from someone. Surprisingly, only 7% acquire land through clans. In the latter study, Zagst (2011) reported that more than half of all farmers interviewed cultivate on owned land and more than a third on rented land. The quantitative data available up to date from different studies conducted including these discussion sessions during the MICCA Launching seem to be somehow confusing. What is important to note is that an (unknown) number of farmers depend on renting land from someone to cultivate crops, and those who own land (from selected clans) are better positioned to make land investments (e.g. agro-forestry).

From what was discussed during the sessions with farmers, it appears that only a few members within a clan possess land. Even if someone is a member of a clan that owns land, s/he might still have to rent it. It all depends on the sort of relationship with the owner regardless s/he is from the clan that owns land or not.

Farmers tend to rent land on seasonal basis (e.g. annually) and pay in kind and/or an annual fee is given to the land owner in return. The land owner tends to cultivate only a small plot of the whole farm. Typically, the land owner would lend the most unproductive land for making business with other farmers in need of a plot. If the land owner observes any considerable profitability on rented land, s/he may claim the land back.

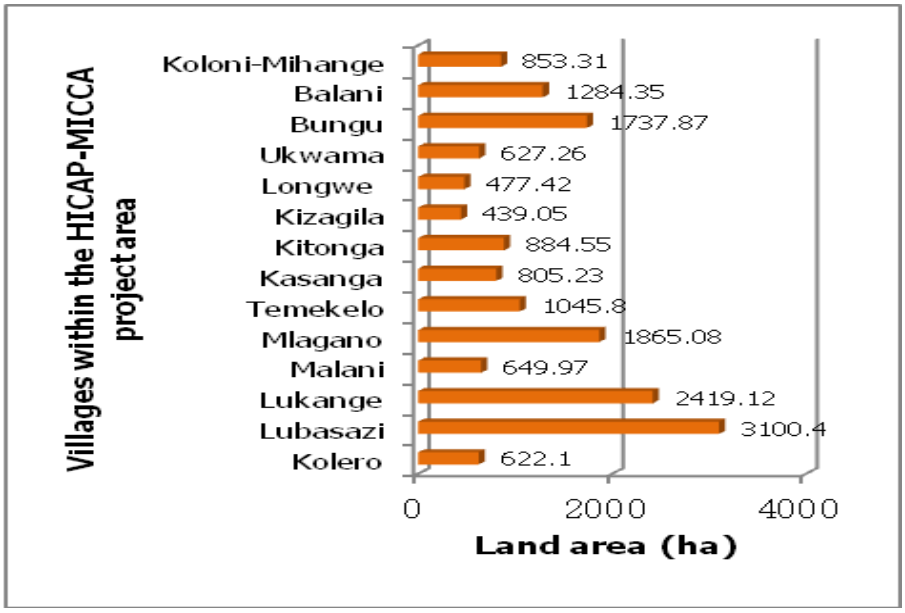
The land owner or clan is who decides the way in which land is managed. The clan land owner is usually involved in the tenant´s farm cultivation and oversees the whole process undertaken on the rented land. Only conservation agriculture and the cultivation of annual crops including cereals and vegetable crops are allowed on rented lands. In general, perennial crops are not allowed on rented lands. For instance, cassava cultivation is not usually permitted as it may take up to three years to harvest and the owner might not be necessary willing to

hold the agreement with the tenant for that long. As stated by some of the participants: *"If the owner is reasonable, he might allow the cultivation of perennial crops in the farm".* In addition, serious investments such as tree planting and terraces are also prohibited on rented lands. The same might apply to banana trees.

Land scarcity poses serious challenges for agriculture and agro-forestry developments in certain locations; especially in hilly areas or upland villages. Those living in the steep slopes are often forced to rent land in areas with more available land such as Mlagano, Lubasazi, or Lukange (as shown in the figure 3 below).

FIGURE 2 LAND AREA IN THE VILLAGES OF THE PROJECT AREA

Source: Land Department, Morogoro District Council (Morogoro, 2011).



It is common to hold a verbal agreement between the clan land owner and the tenant. The length of the "contract" depends on the sort of kinship relation between both parties, implying that clan members might have better conditions and more freedom to manage land if compared to those farmers that do not belong to it.

When asked if the land owner would allow planting trees on farms and be managed by the community, the response obtained by the participants was that it could easily pose issues of ownership (e.g. *Whose trees are these?*), and most likely, the clan would claim the trees ownership. In addition, land owners would fear losing

their plots if tenants do such investments on rented land. Farmers advised to raise awareness and establish discussions with the clan land owners to foster the introduction of trees on farm.

The main determining factor for planting trees is availability of space. However, high willingness and demand for trees in the landscape was shown. Traditionally, the only way to own land was through the clans. Nowadays, people are slowly having independent farms. Since the New Land Act from 1999 and the Village Land Act 1999, there has been a land re-distribution process with clauses which spell out that individuals can acquire land from the government or by people who have land.

A number of recommendations to address the problem of land tenure and favor tree planting and agro-forestry in the landscape were made. Farmers suggested the engagement of both the local and district governments in land use planning. It was also emphasized the need to spur the village councils on supporting tree planting on clan-based land and be managed by the community. Training on use and management of land was recognized as indispensable and specific support from the local government authorities was deemed to be essential for achieving success in resolving the land tenure situation and make it more favorable for tree planting.

5.4. Slash and Burn methods

Slash and burn is a method that is still widely used by farmers in the Uluguru Mountains and is claimed to be a cultural tradition. According to the farmers, the method is practiced to clear (new) farms and for shifting cultivation purposes. A common belief among farmers in the project area is that whenever there are many grasses in the fields, it means there are a lot of pests as well. Therefore, farmers also use slash and burn with the purpose of killing and controlling pests on farm. These statements were also found in Zagst (2012) survey. Furthermore, this land preparation method is also used for rodents control as rats tend to eat their crop harvests.

The general perception among farmers is that slash and burn is decreasing over time (especially in FFS and VSL groups). This trend has been more notably remarked since the HICAP introduction in the project area. Findings from Mvena and Kilima (2009) just before HICAP interventions reported that almost 90% of farmers used slash and burn as land preparation methods. In contrast, in Zagst (2012) survey, 54.5% of the interviewed farmers

answered to practice slash and burn. This suggests that there might have been a decreasing trend in slash and burn since HICAP was introduced. However, as noted by Zagst (2012), whether the remaining 45.5% do practice slash and burn or not could be questionable and biased as publicly desired.

FIGURE 3 SLASH AND BURN PRACTICES IN THE PROJECT AREA

Photo credit: Monica Coll Besa, December 2011.

Farmers who practice slash and burn tend to leave the fire on farm uncontrolled. In turn, the fire is prone to spreading elsewhere (i.e. other farms), including farms that use conservation agriculture practices. Farmers were not in a position to tell a quantitative figure in regard to the number (or share) of farmers that still practice slash and burn as a land preparation method in the area. The practice is mostly used in steep slopes (in small forest patches), and in upland rice fields because it is easily spread.

In an attempt to give an overview of the use of slash and burn in selected villages, farmers provided the following figures on slash and burn:

BOX 3: Slash and burn perceptions in selected villages

Balani: 40% of farmers do not burn; 60% are still burning.

Malani: 25% of farmers do not burn; 75% are still burning.

Kolero: 30% of farmers do not burn; 70& are still burning.

Lukange: 50% of farmers do not burn; 50% are still burning.

Mlagano: 75% of farmers do not burn; 25% are still burning.

On a positive note, it appears that Mlagano, Lukange and Balani are among the top five villages with more available land if compared with the rest of the villages (Cosmas, 2011. personal communication). Thus, it gives a more optimistic picture and it is encouraging to find less farmers practicing slash and burn. However, it should be noted that these numbers shall be treated cautiously as these are based on local judgments and perceptions and could be biased or not reflect the reality. A more thorough study shall be conducted to obtain more rigorous and precise data on the land use change or land area prepared with slash and burn. If these local-based judgments or perceptions on slash and burn are assessed against earlier findings from the HICAP team, it appears that Mlagano, in addition to having reduced slash and burn, it is also a pioneer in adopting conservation agriculture, and hence, it complements earlier studies (CARE Progress Report 2011).

A number of suggestions were emphasized by the participants when asked what could prevent farmers from burning and how this could be addressed. Some of their recommendations include: early farm preparation as there would be less bush on farm; the creation of fire-breaks; awareness raising in meetings through village leaders; support from the village councils such as natural resources committees in burning prevention; and the use of by-laws to ban fires and unsustainable farming practices. In repeated occasions, it was emphasized the role of village leaders in tackling slash and burn and in contributing to the success of project interventions.

Despite all these valuable contributions in avoiding slash and burn, farmers emphasized the imperative need to provide education on alternatives to slash and burn as there is a severe lack of information in the area among the villagers. Some farmers were able to recognize conservation agriculture practices as an alternative to slash and

burn. They also added that knowing the pros and cons of slash and burn and the use and benefits of different tree species could help in preventing burning. It was also said that alternatives that include massive tree planting at the village level would help in awareness creation.

It is worth mentioning that farmers cultivating maize are less prone to use slash and burn methods as they can leave the crop residues (e.g. mulch) on farm, and thus, there would be no need to burn. On the other hand, it was mentioned that in rice fields farmers tend to feel forced to practice slash and burn, especially in the steep slopes. This indicates that there is a specific need to explore sustainable farming practices for upland rice fields in order to avoid burning. It is also advisable to explore conservation agriculture principles and practices in diverse farming systems as a means to mitigating the slash and burn problem and broaden the conservation agriculture perspective and application among the farming community.

5.5. Energy

Biomass fuels (i.e. firewood) are the most extensive source of energy for cooking, mainly through the use of the traditional three-stone fire (see figure 5 below). This is also supported with the recent socio-economic baseline survey undertaken in Kolero, Kasanga, and Bungu wards, in which 99.7% respondents confirmed the use of firewood as the main source of energy. Farmers perceive trees disappearance as a result of slash and burn for farm clearing/shifting cultivation rather than firewood harvesting. Another cause that may trigger the disappearance of trees according to the participants is the use of tree barks to store crops and for beehives. This practice is believed to contribute to the destruction of forest patches remaining in the area.

FIGURE 4 TRADITIONAL THREE-STONE FIRE, KOLERO, TANZANIA

Photo credit: Monica Coll Besa. Kolero. December, 2011.

Although a thorough study in energy cooking methods and practices should be undertaken, the results shown below could give an indication of the sources of energy present in the project site and the use of biomass fuel needed. Again, the results are based on local perceptions and personal experiences and shall be taken cautiously:

TABLE 2: Energy sources for cooking and use

ENERGY SOURCE (FOR COOKING)	EXTENT OF USE	AMOUNT USED
Firewood (traditional three-stone fire)	Most commonly used	up to 3 headload/week (a bundle of 5 to 7 arm-sized pieces half meter long)
Firewood (traditional three-stone fire)	Mainly in Kolero	1 or 2 headload/week
Charcoa	A few (mainly restricted to some middle class households –e.g. teachers)	30 L/week
Kerosene	A few (mainly restricted to some middle class households –e.g. teachers)	(not able to tell)

In order to contrast information, additional households using improved cooking stoves were sought in Kolero to find out the typical amount of firewood used. Again, it appears that current improved cooking stoves used about half the amount of firewood than the traditional three-stone fire. In addition, improved cooking stoves have the

potential to save time for collecting firewood, which in turn, would enable women do other things such as starting or expanding income generating activities and children (often involved in firewood collection) could spend more time learning at schools.

In the same way, cooking time would be reduced and thus, women could spend more time working in the fields or households as well as with their children. It is now acknowledged that in developing countries, women perform reproductive tasks and home-based productive and community tasks, while men are involved in productive tasks outside home and community tasks that involve decision-making rather than caring functions (Balmer 2007). Women not only 'produce' energy, but they are also the household energy users. This means that women´s priorities in terms of energy and appliances may be different from men´s. Therefore, the use of improved cooking stoves should be regarded from the gender perspective (Balmer 2007) and to enhance women empowerment.

Furthermore, the promotion of improved cooking stoves could be regarded as a new income-generating activity by becoming producers and commercializing such products in their areas (GTZ 2007). According to a GTZ (2007) study, the use of improved cooking stoves is not only the best way of burning biomass fuels efficiently and sustainably but it has the potential to save up to 60% of the fuel compared to the traditional three-stone fire. In addition, improved stoves have the potential to improve the health condition (i.e. mainly respiratory diseases and eye infections) of many women as the fuel combustion is improved and thus, the smoke and particulate matter (PM) emitted is lower.

Participants were asked to provide their experience on which trees are best used for firewood and also, whether there are trees disappearing due to firewood harvesting. It was said that tree species such as *Mivule* (*Milicia excelsa*) and *Mibiriti (Senna seamea)* offer stronger firewood, and hence, last longer. Others such as *Misufi (Bombax rhodognaphalon), Misonobari (Cedrela odorata),* and *Mikuyu (Ficus* sp.) are short-lived firewood.

According to the participants, the most common trees disappearing are M*yombo (Brachystegia* sp.*), Msavi, Mng'ongo (Sclerocarya birrea), Misimbolanga, Mbiriti (Senna seamea), Mtomoko (Annona senegalensis)*, *Mwembe (Mangifera indica)* (e.g. used for brick-making), M*ihamvi, Mininga (Pterocarpus angolensis), Mvule (Milicia*

excels), Mikunzu, Mkuyu (Ficus sp.*), Msasa (Ficus exasperate), Mifulu (Vitex* sp.*), Mibapo* -mostly multipurpose trees.

The most immediate need raised by the participants is lack of knowledge on building improved stoves technologies. Figure 6 below shows an example of an improved cooking stove currently present in Kolero.

FIGURE 5 A WOMEN FARMER USING AN IMPROVED COOKING STOVE IN KOLERO

Photo credit: Monica Coll Besa. Kolero. December 2011.

Future studies could be geared to collecting household energy consumption, in particular related to cooking in order to have more accurate data. In addition, a comparative study on the availability of different improved cooking stoves technologies will give a better picture on the type of stoves that could be promoted in the project area and the potential for mitigating climate change.

6. Conclusions and Recommendations for Capacity Development efforts

This report is the output of the MICCA Launching week in the project area. The results provided are purely based on local perceptions and give additional insights for capacity development efforts, but in any case replace existing studies undertaken.

The data presented in this report shows that despite the tremendous HICAP efforts, changes in the project site seem to take place at a slow pace and it takes time to completely change the farming landscape as this is shaped by socio-cultural factors, among others. Conservation agriculture is used by some farmers, especially those that are part of FFS and VSL groups, as an alternative to slash and burn methods. However, the traditional slash and burn practice as a land preparation method is still being practiced in the area due to low environmental awareness on the importance of trees in the landscape.

Climate variability and change is already underway in Kolero, Kasanga and Bungu wards, and its impacts are greatly affecting local livelihood activities such as agriculture, the main climate-sensitive sector for smallholder farmers in the South Ulugurus. If climate-smart agriculture and to a greater extent, climate-smart practices are not implemented at present, these communities will face severe problems in the near future. In addition to climate change, several challenges such as land scarcity and land tenure have implications for MICCA interventions.

Having said that, the following recommendations to be applied in the project area of Kolero, Kasanga, and Bungu wards can be drawn:

i. Tree planting shall be encouraged in areas where there is no conflict on land, and it will depend on the kind of trees and type of soil. Tree planting could also be promoted in communal land.
ii. Target groups (groups MICCA shall work with): clan land owners, village leaders, teachers, VSL and FFS groups, among others.
iii. Agroforestry training, strengthen CA, promotion of home gardens.
iv. Environmental conservation awareness (including slash and burn, importance of trees in the landscape, etc.)
v. Climate change awareness (gender-oriented) and climate-smart practices.
vi. Awareness raising to village leaders (land education on how to use land, responsibilities in relation to land, etc.)
vii. Advocacy: practice good local governance (e.g. awareness raising to village leaders on formulation of by-laws, formulation of active natural resources committees, etc.)

viii. Need to create awareness and training on running tree nurseries as this is currently lacking

ix. Fruit trees are important and should include grafted trees. These should be given high priority.

x. Spreading of technologies (e.g. improved stoves) should cover as wider areas in other villages instead of concentrating in one area

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Appendix 1

MICCA Focus Group Discussions on Agro-forestry, Slash and burn, and Energy.

Topics and Guiding Questions:

- Present the MICCA-CARE-ICRAF partnership under the HICAP project.
- Discuss how the communities experience climate change and the locally felt impacts of climate change and variability by giving examples experienced by farmers.
- Explain climate-smart agriculture and provide examples from current practices or known practices such as mulching, intercropping, cover crop, crop rotation, low energy cooking stoves, agro-forestry, and short maturing maize crop or drought resistant cassava.

AGROFORESTRY

1. How much of an average farmland is covered by trees?
2. What tree species are found in the farming landscapes and their uses:
    - Fuelwood:
    - Fruits/nuts:
    - Medicinal plants:
    - Construction materials:
    - Timber:
    - Other uses (specify):
3. What are the preferred trees in the landscape? For which purpose? *(to cover their fuelwood need, to have extra fruits to sell on the market)*
4. How can tree nurseries be established?
5. What are the factors hindering tree planting at the moment? (concrete actions to support farmers in training)
6. What is the % (nb) of farmers renting their lands to clans? For how long they can use the land? Can they make decisions on how to manage the land?
7. Could trees be planted on clan lands and managed by the community? Could farmer groups' tree nurseries be set up?

SLASH AND BURN

8. What is the % (nb) of farmers practicing slash and burn? Is slash and burn decreasing since the HICAP project was introduced? If yes, by how much (% or nb)?
9. What could limit people from burning? Or what are the alternatives to burning?

ENERGY

10. What are the main cooking methods used?
11. How much wood (*qty in local measure*) is used weekly by an average family (*of 5 members*)? (By cooking methods)
12. Is there a cooking method using less firewood practiced by some people or known? What is needed for this cooking method to be more widely used?
13. Are there tree species disappearing because of firewood harvesting? Which ones?