Building Future Governance, Land Use, and Carbon Management Scenarios at the Landscape Scale in the Kilolo District

Global Comparative Study on REDD+ Multilevel Governance and Carbon Management at the Landscape Scale

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April 2015

CIFOR

VITRI

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Report

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1 Table of Contents

2. Acknowledgements

3. Introduction and Objectives

The workshop presented here and other similar workshops were designed in order to meet several objectives associated with CIFOR's study of multilevel governance and carbon management at the landscape scale. Though we reviewed multiple existing facilitation methods, we did not find any that met our specific needs, which were based on *working with multiple stakeholders to develop future land use scenarios over detailed, bounded landscapes that encompass multiple actors and drivers of land use change.* The method we developed draws on the facilitation of landscape scenarios at smaller scales, combining experience from participatory action research and adaptive collaborative management at the community level (Evans et al. 2006), and at much larger (multi- country) scales, adapting important concepts such as "factors of change" from the program on Climate Change Agriculture and Food Security (CCAFS) (http://ccafs.cgiar.org/scenarios), and the methodology "landscape simulation for participatory land use planning" developed by Jeremy Bourgoin and Jean-Christophe

Castella. The resulting method applied in these workshops is particularly useful for landscapes of 50,000 to 500,000 hectares – large enough to comprise multiple drivers and actors, but small enough to build on concrete knowledge of the geographical location. An accurate current land use map is an essential part of the exercise.

The guide detailing the methods (Ravikumar et al. 2014) is provided separately at the CIFOR website, and can be downloaded for free at: http://www.cifor.org/library/5360/building-future-scenarios- governance-land-use-and-carbon-management-at-the-landscape-scale/

In this report, the elaboration of alternative future scenarios is followed by the application of a simplified tool to model the carbon emissions patterns and outcomes of each option; this tool will be provided separately on the project web site, and apart from the findings from analysis of the Kilolo district landscape in Tanzania presented here, the tool itself is not included in the workshop activities. Finally, the workshop concludes with a discussion of pathways for reaching desirable scenarios, including of multilevel governance and the development of criteria and

indicators for change. The methods detailed in the guide mentioned above have been adapted for particular needs of the Kilolo district.

3.1 Overall objective of the workshop:

To develop plausible future scenarios of land use in the Kilolo district, calculate the carbon emission implications of these distinct scenarios, and discuss strategies and activities for moving towards the desirable scenario(s).

3.2 Specific Objectives of the workshop:

- Examine past land uses and change over time in the Kilolo district
- Develop future scenarios of land use at the landscape scale using participatory approaches
- Apply a simple carbon tool to calculate the carbon emission implications of the distinct land use scenarios
- Identify key elements of multilevel governance and take steps towards the design and implementation of a governance monitoring tool

The Iringa workshop included participants that represent different levels and sectors that have an interest in, or influence over, the landscape. This included representatives from the public sectors, private sector, non-governmental organizations (NGOs), and civil society as appropriate. In addition, actors from local/sub national and national levels were involved. Some key actors who participated include:

- Regional Government (key departments including: Forestry, Land use Planning, Wildlife/Game, and Agriculture)

- District governments (key departments – Forestry, Land use Planning, Wildlife/Game, and Agriculture)

- Private Forestry Companies

- NGOs

- Community-based organizations, authorities, and committees

A complete list of participants is provided in Annex A.

4. Presentation and Structure

The workshop was conducted from 3-4 March 2015, in the conference room of Gentle Hills Hotel, Iringa. It was conducted in Kiswahili in order to allow all participants to follow and feel free to participate, given that there were participants from diverse backgrounds (from national to community level), it was agreed that Swahili (or more appropriately referred to as 'Kiswahili'), which is the national language of Tanzania and major medium of communication was the more inclusive language. However, the technical terms were presented in both English and Kiswahili for the benefits of those who are competent in both languages. While this report is written in English, some key technical terms used in the Workshop are also at times presented in brackets – for the benefit of readers who are Kiswahili speakers. A list of key technical terms used during the workshop in both English and Kiswahili is presented below (Table 1).

This workshop took place over the course of two days:

- The first day was focused on developing future scenarios of land use, and several activities were utilized to accomplish this: a visioning exercise to encourage creative thinking and orient participants towards ideas of future scenarios, constructing a timeline of key events in the past, defining key "factors of change" (*sababu za mabadiliko*) that are likely to shape future scenarios, characterization of various scenarios based on these factors, development of scenario narratives, and finally mapping land use changes under the distinct scenarios.
- The second day was dedicated to presenting models of the carbon implications of the scenarios constructed during the first day, discussing multilevel governance, indicators and governance monitoring.

Table 1. English to Kiswahili Translation of Key Workshop Concepts

Factors of Change	Sababu za madadiliko /visababishi vya madadiliko
Scenario	Hali
Landscape	Uhalisia /Mjumuisho wa matumizi ya ardhi
Future scenarios	Hali za baadae
Time line	Historia ya matukio
Important	Muhimu
Uncertain	Isiyotabirika kwa urahisi
Constructing future scenarios of land use	kufikiria hali za baadae za matumizi ya ardhi
Narrative of future scenarios of land use	Maelezo ya hali za baadae za matumizi ya ardhi
Most desirable scenario	Hali unayohitajika zaidi
Most Likely scenario	Hali inayowezekana zaidi
Carbon modeling	Kukadiria kiwango cha hewa ukaa
Implications of future scenarios for carbon	Uelekeo/uashiria wa hali za baadae za hewa ukaa
Indicator	Kiashiria
Identifying strategies to reach desirable future	Kuainisha mikakati ya kufikia hali ya baadae tunayohitaji
Monitoring indicators of multilevel governance	Ufuatiliaji wa viashiria vya utawala wa ngazi mbalimbali
Governance (who makes decisions, and how decisions are made)	Utawala (nani anafanya maamuzi, na yanafanyikaje)
Good governance	Utawala bora
Pillars of good governance	Mihimili/nguzo ya utawala bora
• Transparency	• Uwazi
• Representation	• Uwakilishi
• Participation	• Ushiriki
• Accountability	• Uwajibikaji
Governance indicators	Viashiria vya utawala

5. Framework and Methodology

The methodology used for this workshop is based on the construction of "future scenarios" of land use. Future scenarios (*hali za baadaye*) are not predictions but rather hypothetical futures that could plausibly occur. Taking into account current and past drivers of change, and key existing uncertainties, diverse future scenarios are developed through narratives, images, statistics, and/or maps. Future scenarios can be a useful planning tool, as they allow for consideration of complexity and future uncertainty, taking into account the diversity of factors that may influence planning and future outcomes.

The methodology focuses on a landscape — in this case the Kilolo district landscape — or geographically defined area with multiple land uses, where actors from diverse levels and sectors have a specific interest or influence. Decision-making about land use in the landscape is thus an inherently multilevel process, characterized by multilevel governance. Thus, this workshop aimed to include representatives from most relevant actors for the Unjuja island landscape, from the local to national level, and also across relevant sectors (e.g. agriculture, forestry, urban planning, rural planning, wildlife management, etc).

The methodology for developing future scenarios presented here involved the following activities:
1. Voyage to the future – visioning (*Safari za kwenda siku za baadaye*)
In this activity, participants reflected individually on the characteristics that a desirable future landscape would have. They were asked to close their eyes and imagine a better future 30 years down the line, noting what they see, what changes have occurred, and how the world looks like. The goal of this activity was to orient participants

towards their expectations and the future thinking and to "get the creativity flowing."

2. Trip to the past – timeline of land use change (*Safari za kurudi tulikotoka*)
The goal of this activity was to construct a participatory timeline of events over the past 20 years. The facilitators asked participants in the plenary to name key events that have shaped and changed the land use in the landscape. Identifying what events have been critical in the past was subsequently used to inform the identification of factors of change that are likely to be key determinants of future scenarios in the following activity.

3. Factors of change (*sababu za mabadiliko*)
Keeping in mind the key events identified in the previous activity, and remembering the aspects of a desirable future that were shared in the visioning exercise, participants worked in "thematic groups" to identify about five key "factors of change" that are likely to shape land use in the future. For each factor of change, possible future states were discussed. Thematic groups include actors that work in similar levels or sectors, and were decided by facilitators based on who actually attended the workshop. In the Iringa workshop, participants were divided into (a) regional government, (b) district government, (c) private sectors (d) NGOs and Community Based Organizations

4. Voting for the most important and uncertain factors *(Kupigia kura sababu za mabadiliko zilizo muhimu na zisizotabirika zaidi)*
After consolidating the factors of change to eliminate redundancy, each participant voted for the four factors that he/she found most important, and the four factors that he/she found most uncertain. The five factors that participants considered to be most important and also uncertain were selected.

5. Elaborating the future scenarios *(Kufikiri na kuelezea hali za baadaye)*
The workshop facilitators combined the different future states of the identified factors to present four distinct future scenarios, each with a different combination of factor states, for 30 years in the future. After receiving feedback from the participants and making any modifications, they divided the participants into groups, this time randomly rather than thematically. Each group worked on one of the scenarios, constructing a narrative that describes how the landscape reached this condition, using the states of factors of change presented for their scenario. After exploring the scenario deeply, they drew the physical land use changes that would exist under this scenario on a map.

6. Presentation of the carbon tool *(Kuwasilisha kikokotoaji cha kukadiria hewa ukaa)*
The team presented the methodology behind the carbon calculator (*kikokotoaji cha hewa ukaa*), and then presented the carbon emissions implications of the scenarios developed in the workshop.

7. Strategies and steps
After considering which scenarios are most desirable, the participants reflected individually on key steps that would need to be taken to get to the desirable future scenario. The participants then worked in their groups again to share their reflections, and developed a table answering the following questions for a number of those steps: (1) what needs to be done?; (2) how will this be achieved?; and (3) who will carry out these activities? In addition, each group identified barriers to these steps and how these barriers could be overcome.

8. Multilevel governance: concept, indicators, and monitoring *(utawala wa ngazi mbalimbali: dhana, viashiria, na ufuatiliaji)*
After a brainstorm where participants shared what they understood the term "governance" *(utawala)* to mean, the facilitators presented definitions of "governance," "multilevel governance," *(utawala wa ngazi mbalimbali)* "governance indicators," *(viashiria vya utawala)* and "governance monitoring." *(ufuatiliaji wa utawala)*. Returning to the same groups from the previous activity, participants selected one or two of the steps that they identified, and discussed (1) What indicators of governance should be measured?; (2) who should be in charge of monitoring these indicators?; (3) how should these indicators be monitored?; and (4) when should these indicators be monitored?

9. Open discussion on governance
Finally, the facilitation team and participants shared experiences and observations related to multilevel governance.

6. Day 1: Future Scenarios of Land Use

TIME	ACTIVITY
Agenda	
TIME	ACTIVITY
08:30-09:00	Participant registration
09:00-09:30	Opening remarks, workshop objectives and agenda
09:30-10:00	Participant introductions and ice-breaker, including visioning optionally
10:00-11:00	"Trips to the Past": Construct a timeline of key events in the past 20-30 years related to land use change
11:00-11:15	Coffee break
11:15-12:30	Factors of change (I) Identify factors of change that influence land use and states that they may take on in thematic groups
12:30-13:00	Factors of change (II) Select the factors of change that are most important, and also most uncertain
13:00-14:00	Lunch
14:00-14:30	Presentation of the proposed scenarios, combinations of different states of the factors selected determined by facilitation team
14:30-16:30	Discussion of future scenarios of land use Develop narratives for each scenario in mixed groups and draw land use changes on maps for each scenario
16:30-16:45	Break
16:45-17:30	Present scenario narratives and maps Each group presents their future scenario narrative and map
17:30-18:00	Survey: - Participants vote for both the scenario they consider most desirable and the one they consider most probable to happen - Participants provide feedback on their role on the governance of the landscape

6.1 Welcome, Presentation of the Agenda, and Introduction of Participants

Approximate time and scope: 30 minutes, plenary

The lead facilitator (Martin Kijazi):
1. Introduced the workshop the broader project that the facilitation team is undertaking that led to the workshop
2. Presented the **Kilolo district** landscape that would be the focus of the workshop
3. Described the agenda for the workshop, and mentioned any key ground rules for the workshop
4. Started a round for both the facilitators and participants to introduce themselves. Participants were asked to briefly envision a better future for the Kilolo district to encourage creative thinking early in the workshop.

The introduction was made brief and conversational. The lead facilitator laid out some ground rules for the workshop, noting the diversity of actors present (*different organizations and different government levels*), and that there could be varied perspectives on the issues discussed, pointing out that all participants' perspectives are valuable, and that the workshop should be as safe a space as possible for perspectives to be shared (Fig 1). The map of the landscape (Kilolo district) was described briefly focusing mainly on the current main land uses that would be the focus of the workshop, which included: Natural forest, Broadleaf plantation, Coniferous plantation, Woodland, Grassland, Bushland, Barren/burnt land, Agriculture, and Agroforestry (Fig. 2a). It was also explained that the landscape in question is a mosaic of vegetation types. Each of the foresaid major categories are also made of a mix of different vegetation types. The name of the category represents only the dominant vegetation types in the mosaic. Charts showing how the major vegetation categories are further bracken down into their mosaic compositions were also displayed (Fig 2b).

Fig 1. Workshop introduction - CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Photo by: Ashwin Ravikumar

Fig 2a. Map of the Kilolo district landscape — (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015) Map Source: University of Turku, Finland

Fig 2b. Examples of mosaic compositions of vegetation types within each of the major vegetation category -
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Map Source: Map provided by the University of Turku, Finland

Montane forest

- Agricultural/open land
- Barren/burnt land
- Broadleaf
- Bushland
- Coniferous
- Grassland
- Natural forest
- Woodland
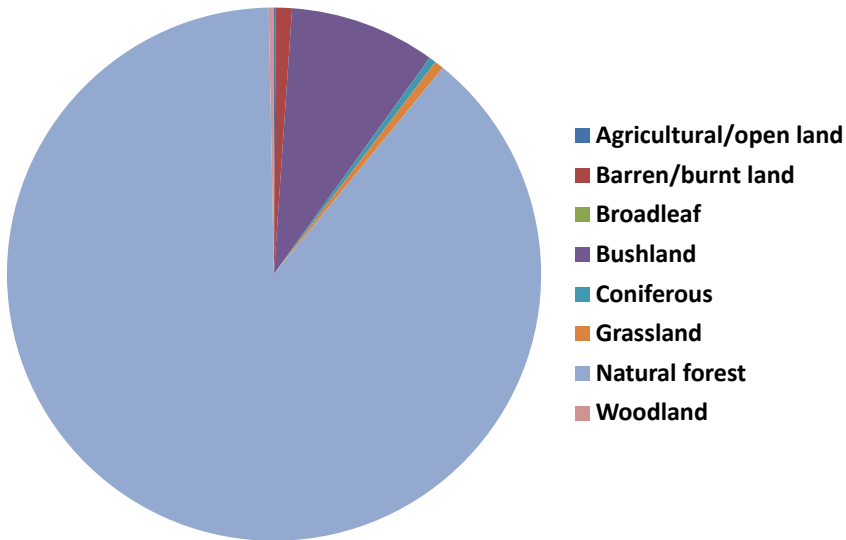
Grassland dominated

- Agricultural/open land
- Barren/burnt land
- Broadleaf
- Bushland
- Coniferous
- Grassland
- Natural forest

Agriculture dominated
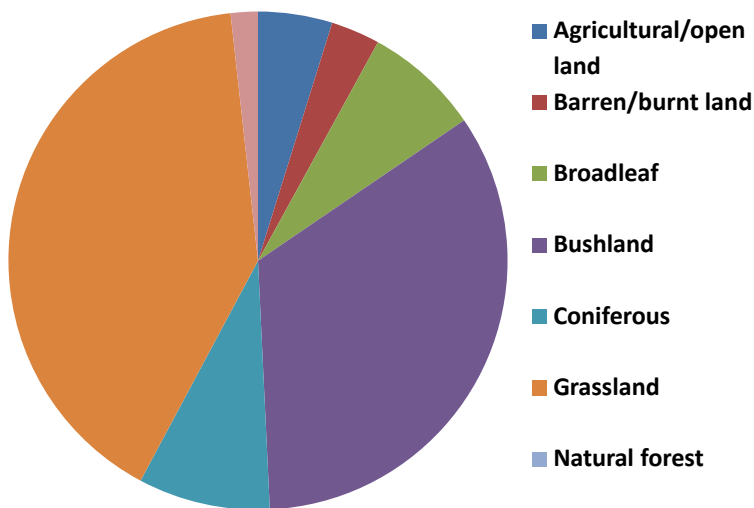
- Agricultural/open land
- Barren/burnt land
- Broadleaf
- Bushland
- Coniferous
- Grassland
- Natural forest
- Woodland
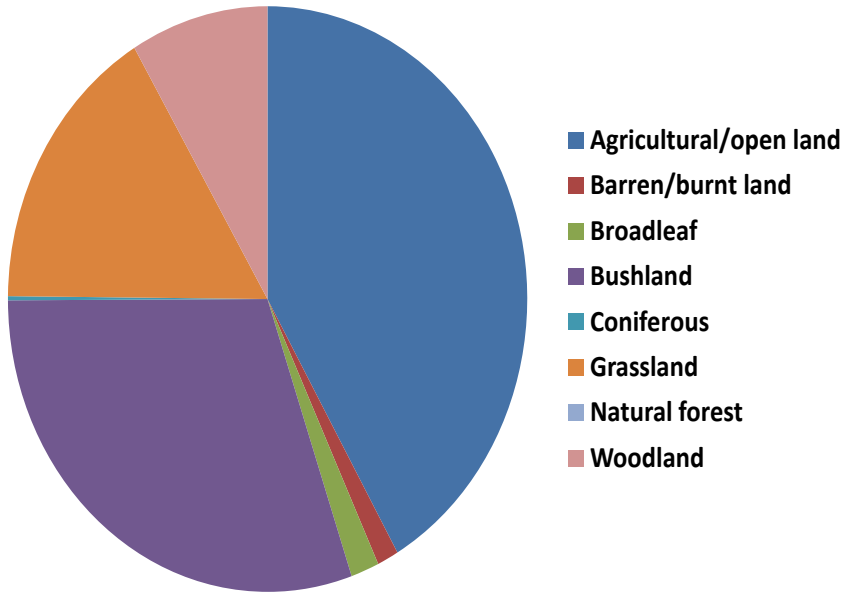
Woodlots and agroforestry

- Agricultural/open land
- Barren/burnt land
- Broadleaf
- Bushland
- Coniferous
- Grassland
- Natural forest
- Woodland

6.2 Timeline and History— "Journey to the Past"/ *Safari za kwenda tulikotoka"*

Approximate time and scope: 30-60 minutes, plenary

Objective

The objective of this activity was to identify key moments, events, and eras in the past 20-30 years that generated changes in land use that explain the Kilolo district landscape as it is today. In addition to bringing everyone to the same page on key historical events, this activity also served to identify the types of events that have driven change historically, and by extension suggest what factors may shape land use changes in the future. This is important because the following activities aimed to identify these "factors of change" (*sababu za mabadiliko*) that will be critical in the future.

This activity consisted of the following steps:

1. The lead facilitator introduced the activity, explaining that the aim is to construct a timeline with the most crucial events and "moments" in the history of land use in the Kilolo district landscape. It was noted, however, by participants that there were also key events that happened not in Kilolo district per se, but also in adjoining lands that would have subsequently influenced changes, or will likely influence future changes in the Kilolo landscape. Therefore, the facilitators took the discretion to allow participants with experiences even from neighboring districts to share them. Such experiences from adjoining landscapes (neighbouring districts), may also be plausibly considered to be potential factors of change in Kilolo district in the future.

2. One facilitator, Dr Danielson Kisanga, asked general questions including different versions of the following questions and followed-up to them:

- *When did land use in Kilolo district's landscape and adjoining landscapes change the most? What caused these changes?*
- *What were the most critical events that led to changes in land use?*
- *Are there any activities that have expanded over time? What are these activities, and why did they change?*
- *Have there been any changes in policies that have affected land use?*
- *Have people migrated over the past 20 years? What has driven migrations and movements of people?*

3. It was considered best to have one facilitator (Danielson Kisanga), to ask these questions to participants, encouraging them to provide new inputs that haven't already been mentioned. As he asked these questions, another facilitator wrote the responses down on large cards and the third facilitator stuck them to the wall along the timeline (Fig 3).

Fig 3. Timeline and History – "Journey to the Past" / "*Safari za kwenda tulikotoka*"
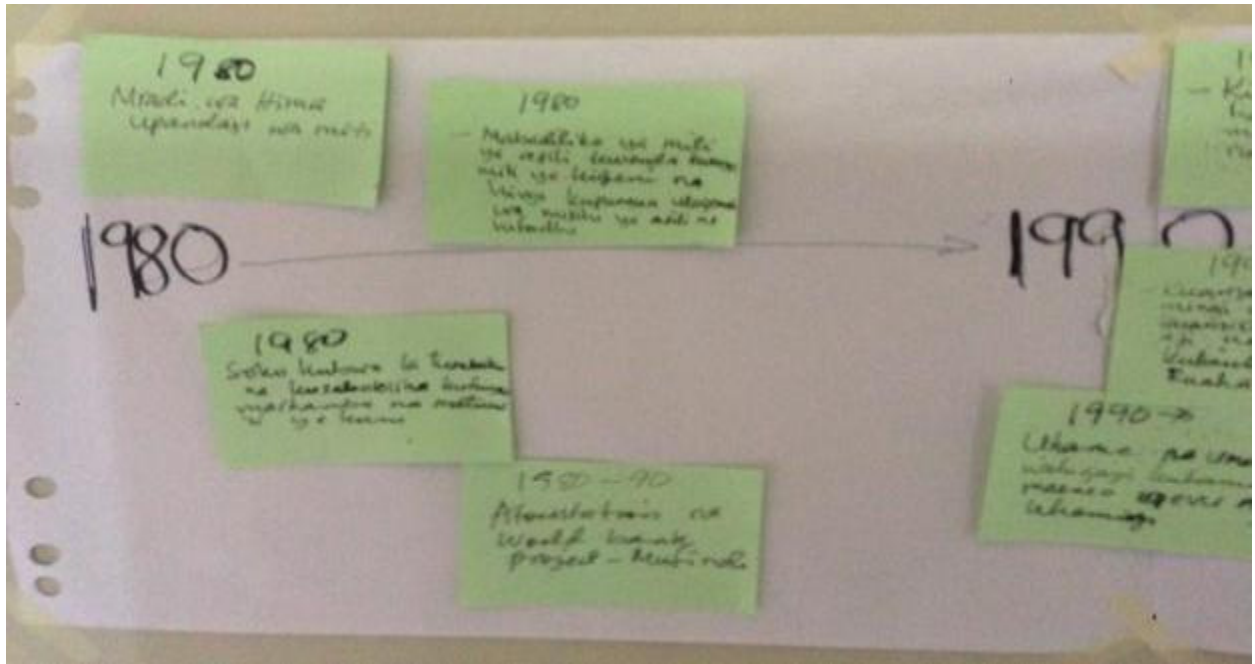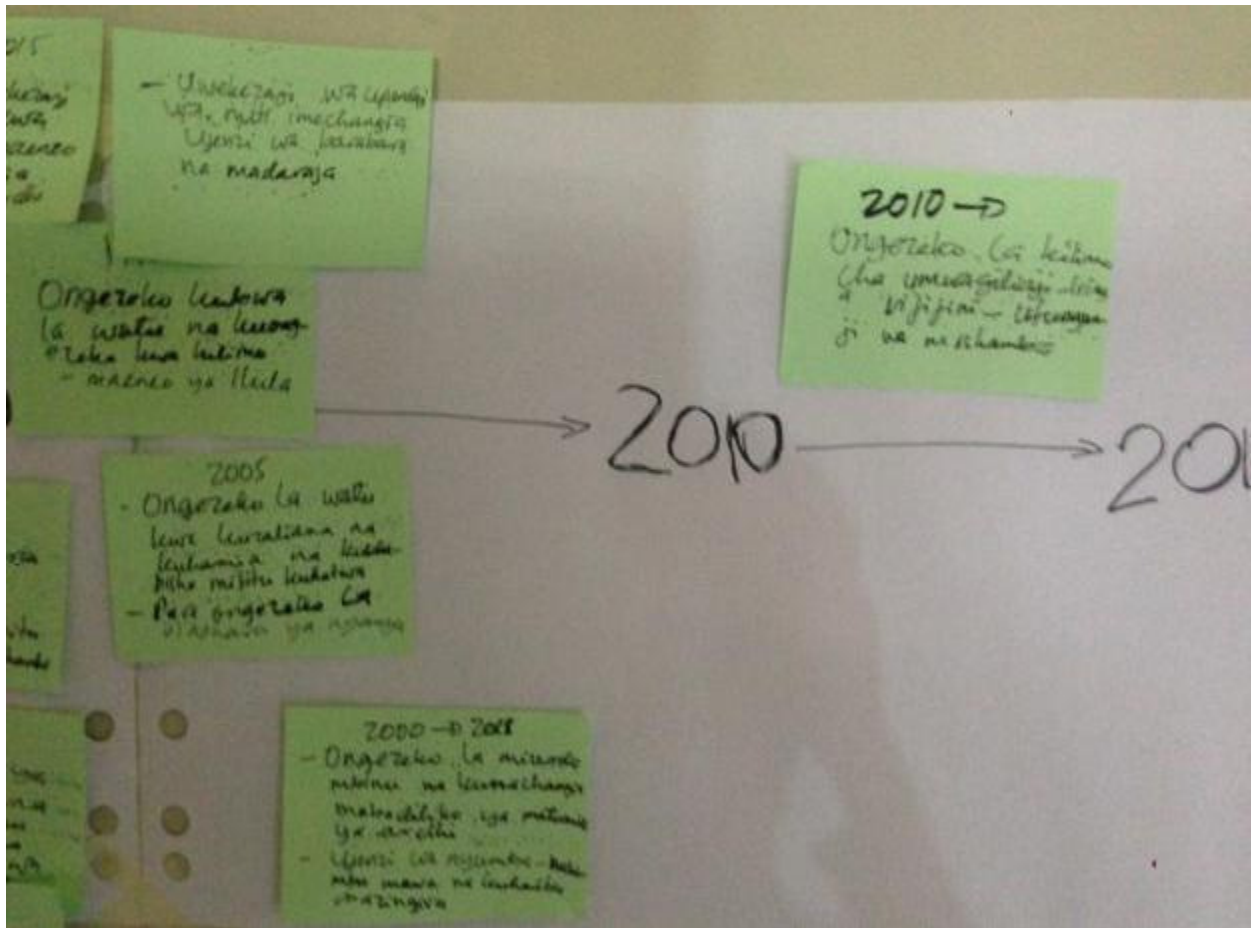
The key events highlighted on the timeline by different periods are the following:

During the 1980s

- Prevalence of shifting cultivation as people looked for more fertile soil and seasonal water sources.
- High demand for tobacco put pressure on existing forests for firewood to cure tobacco, but tree plantations were also established to provide firewood for curing/drying tobacco prior to transportation to processing plants.
- Some afforestation projects led to the conversion of grassland areas to forest plantations. Particularly, the increase of tree plantations by the private sector has influenced these changes, especially in Kilombero and Mufindi districts under Green Resources Company.
- Tree planting (HIMA) project was established in (1980s), which influenced the big changes from exploitation of indigenous species of trees around Kilolo and Mufindi district to the new species of trees which were introduced by the project. The changes provided substitute species, and reduced the dependence on indigenous trees and forests.

During the 1990s

- From 1990 – 2015 a high population growth (natural birth and immigration) led to the rapid expansion of agriculture (food and cash crops) to carter for the growing population and to take advantage of new business opportunities, such as the commercial production of tomatoes and other vegetables. This impacted forests as they were converted to farms. But it has also led to higher demand for forest products, and intensified forest product extractions to supply the growing population in both the Kilolo and Iringa rural districts and elsewhere. Accompanying intensification of irrigation farming has put strain on wetlands. Intensive agriculture schemes were established, including the promotion of irrigation schemes in many areas, especially in rural Iringa, and the Kilolo district. The establishment of paddy irrigation schemes near great Ruaha river caused the destruction of the habitat for wild animals due to clearing of natural forest for irrigation schemes.

- Changes in land policy and higher power given to local political leaders and bureaucrats to make and influence land decisions without adequate over-sights has contributed to destruction of forests. Freedom for the villages to use land with no adequate regulations and restrictions has influenced the occurrences of conflicts on land use. Multi-party democracy has also encouraged laxity in law enforcement, due to political patronage. Politician electorates promise they will relax environmental regulations if they get elected (e.g. promises to open protected forest areas for settlement or farming). When they get elected, they feel obliged to keep these promises so as to ensure future re-elections. The political patronage in Tanzania including the Iringa region has caused environmental degradation and the government has failed to take serious measures on such degradation.

- Climate change has caused draughts as a result of low rainfall and an increase of temperature in many areas. This has led to scarcity of water and pastures availabile to pastoralist and agro-pastoralist societies. In the past, droughts (1990-1995) have influenced the pastoralist societies to move from one place to another looking for areas with water and green pastures. There was also increase in shifting cultivation practiced by agro-pastoralist societies who move from one place to another looking for suitable land for agricultural activities, especially in the Iringa rural district. The movements of pastoralists and agro-pastoralists has lead to an increased pressure on land, and sometimes to land conflicts between the nomads and settled farmers.

- Investments on trees plantation (1990s – 2000s) have improved community welfare (availability of wood, employment, etc.). Communities have also adopted the practice by planting their own small woodlots. Both of these factors have further enhanced environmental conditions.

- Population growth in many areas around Tanzania has caused the expansion of pastoralist communities with large numbers of cattle. This, together with frequent draughts, have caused the scarcity of grazing areas, which caused pastoralists to move looking for areas with greener pastures and water. Some areas of the Iringa region have also been affected by this pastoralist migration, which has intensified land use pressures. In turn, the local population's increase has caused local migrations: e.g. from Ilula to Ruaha Mbuyuni close to rivers, springs and wetlands to establish irrigation agriculture for vegetables like tomatoes and onions.

- The ministry of natural resources imposed a tree-cutting ban in many forests (particularly in natural forests) to curb over-cutting due to the timber demand from neighbouring countries, like Kenya. This led to local scarcity and pushed the timber prices up. Many people moved to areas where timber production (i.e. plantations) was allowed e.g. Sao Hill. Production in such areas increased. People planted more trees to meet the demand. There was also increased planting of coffee as a suitable cash crop.

- In the late 1990s El Niño, rains caused the destruction of farm crops as the result of heavy rainfall. The land became more humid than usual due to this; famers lost income and became more impoverished.

During the 2000s – 2010s

- Between 2000 – 2015, land investment policies have encouraged 'land grabs' by big land investors, and contributed to land conflicts between investors and small-holder land owners and/or local land occupants. Investors are taking large areas for forest plantations, especially in the Kilolo district . This had led to the reduction of land available for food production and other commercial crops due to the priority of forest

plantations. These tree plantations have many impacts and effects to the environment and food insecurity to the communities hence creating another source of conflict between investors and communities. Also, when some local people sell their land to large investors, they often shift land pressures to natural forests where they attempt to encroach to acquire new land.

- Government policies, such as 'kilimo kwanza' (i.e. agriculture first) and 'Big Results Now (BRN)' have environmental impacts, (e.g. setting priority in agriculture in the first, and demanding government ministries, departments and agencies to show quick results in the latter). One outcome is the expansion of irrigation farming in the Iringa rural district, and the expansion of farms targeted for irrigation. These policies have contributed to the conversion of forested areas into agriculture. Also, the expansion of irrigation schemes prior to and subsequently as the results of Kilimo kwanza Policy have contributed to the ongoing decrease of water volume (drying up) of the great Ruaha River
- Global financial crises and peaks in the price of oil have made life more expensive. Urban dwellers have intensified their use of charcoal as a cheaper source of energy. This has led to higher demand of wood, and intensified the degradation of forests for charcoal extraction in rural areas like the Kilolo district.
- Large scale tree plantations have led to the construction of more roads and bridges, which have further influenced changes on land use. Technological changes and improvements in infrastructure such as road constructions have impacted on forests by making remote forested areas more readily accessible leading to an increase in timber extraction to feed urban markets. Road constructions also demand extensive quarrying of road construction materials, impacting the environment as well.

Overall;

The overall trends in land use for the past 35 years have been mixed. The landscape is currently a highly mixed mosaic of agriculture, forestry, agroforestry, and some pastoralism. Natural bushlands also dominate in some parts of the landscape.

Historically, the 1980s were characterized by early conservation activities such as the HIMA project. There was also a growth in the tobacco industry propelled by high global prices. Afforestation schemes were supported by the World Bank in the late '80s and early '90s. As the '90s progressed, population continued to grow due both to a natural population growth and immigrant pastoralists who came with cattle. Tobacco, forestry, and other types of agriculture continued to progress into the 2000s, with some forestry support from NGOs. Overall, no single land use has come to dominate in the landscape. Instead, different activities dominate in different areas, but only in the sense of being the sub-regional plurality use.

There are big changes on social aspects as the results of Investments. Investments have improved the well-being and income of various groups of people, including employment opportunities, energy sources, raw materials and environmental conservation. Various investors including government, private sectors, and non –governmental organisations are providing tree planting and conservation education and extension services to community groups and individuals But these investments are also often criticized for creating land scarcity for agricultural crops and allowing large investors to acquire large areas of land at the expense of smallholders and future generations.

6.3 Identifying factors of change (Kutambua Sababu za mabadiliko)

Approximate time: 60-70 minutes, plenary, individual, and break-out groups

Objective

Keeping in mind the key events identified in the previous activity (Fig 3), participants worked in groups to identify "factors of change" (*sababu za mabadiliko*) that are likely to influence land use in the future landscape.

Part 1: Conceptual explanation in plenary (5 min.)

The lead facilitator briefly explained what a "factor of change" (*sababu ya mabadiliko*) is. This facilitator highlighted that factors of change are variable, and are likely to exert an influence on the landscape in the long term. The facilitator cited some "factors" from the timeline that affected land use in the past (*sababu za mabadiliko ya matumizi ya ardhi ya zamani*), as mentioned by the participants such as the increasing price of timber or coffee *(kupanda kwa kwa bei ya mbao ama ya kahawa)*, land investments policy *(sera ya uwekezaji kwenye ardhi)* and 'agriculture first policy' *(sera ya kilimo kwanza)* in Tanzania. In the future, therefore, the price of timber may or may not be a factor of change. Similarly agricultural/land investment promotion/policies were considered as other possible future factors of change. Another key feature of "factors of change" is that they may take on multiple "states" (sababu za mabadiliko huchukua sura ama tabia tofauti tofauti). The price of timber or coffee, for example, may be either "high," "low," or "in between." The lead facilitator framed as a reference how the price of timber or coffee may "rise," "fall," or "remain constant." Facilitators explained this concept and ensured that all participants understood before moving on into individual work and then breakout groups.

Part 2: Individual work (10 min.)

1. The lead facilitator asked the participants:

- *What is causing land use changes in the landscape? Considering what we know about the landscape, and what we've just discussed about its history, what are the main factors that are likely to be important going forward?*
- *What factors are likely to be important (sababu zilizo muhimu), and also not easy to predict (zisizotabirika kwa urahisi)?*

2. The lead facilitator asked the participants to write down between three and seven factors of change that will affect land use in the future. These factors may be legal and policy-based (sababu *za kisheria ama kisera*), political (*za kisiasa*), environmental (*za kimazingira*), social (*za kijamii*), economic (*za kiuchumi)*, or of another type.

3. Other facilitators circulated to ensure that participants understand this activity and responded to any questions.

Part 3: Group work and plenary (45 min.)

1. Participants were divided into "thematic" groups. Groups consisted of participants that work in a similar sphere. Facilitators discussed and creatively determined how to optimally do this. They agreed to divide the participants into groups based on levels of government (for government employees) and institutional affiliations for others which resulted in the following groups: Regional government, District government, Private sector, NGOs and Community Based Organizations. The following list shows how participants were divided.

Thematic Groups in Iringa:

- Group 1: Regional government
- Group 2: District government
- Group 3: Private sector
- Group 4: NGOs and CBOs

Fig 4. Facilitator, Dr Josiah Katani leading one group to discuss factors of change
Photo by: Martin Kijazi

Each group, with the support of a facilitator, identified five key factors of change (*sababu kuu tano za mabadiliko*). Each individual shared the factors they identified individually, and the facilitator or group leader wrote them down for the group to discuss. Through consensus, or if necessary, voting, the group agreed on the five most important and wrote each one on a card (Fig 5 – Fig 8).
3. The lead facilitators asked each group to think about the following question for each factor of change identified: *"Are there distinct ways in which this factor might behave in the future? (Je zipo sifa ambazo hizi sababu za mabadiliko zinaweza kuzichukua siku za baadaye?) What are the different 'states' in which we might find this factor?" (Ni tabia gani tofauti tofauti ambazo hizi sababu za mabadiliko zaweza kuzichukua siku za baadaye?).* The group discussed, for example, if the price of timber relative to that of agricultural crops might be high or low, stable or volatile, if pastoralist and commercial farmers migration might increase or decrease, if a government policy is more likely to favor large land acquisitions by investors or small-holder villagers land titling in order to protect local users land rights, whether private investors will likely invest more in forest plantation, or whether they will focus on agricultural crops, etc. The facilitators paid close attention to this discussion. For example, it may be that in this landscape, the possible states of forest plantation expansion would be to increase or stay the same, but never decrease. These states were discussed by the facilitators to develop alternative scenarios.
4. Returning to the plenary, facilitators worked with participants to consolidate factors. Each group stuck their cards on the wall and explained them.

Fig 5. Implementation of Tanzania investment policy in agriculture, livestock and forestry was one of the top five factors commonly identified by the groups
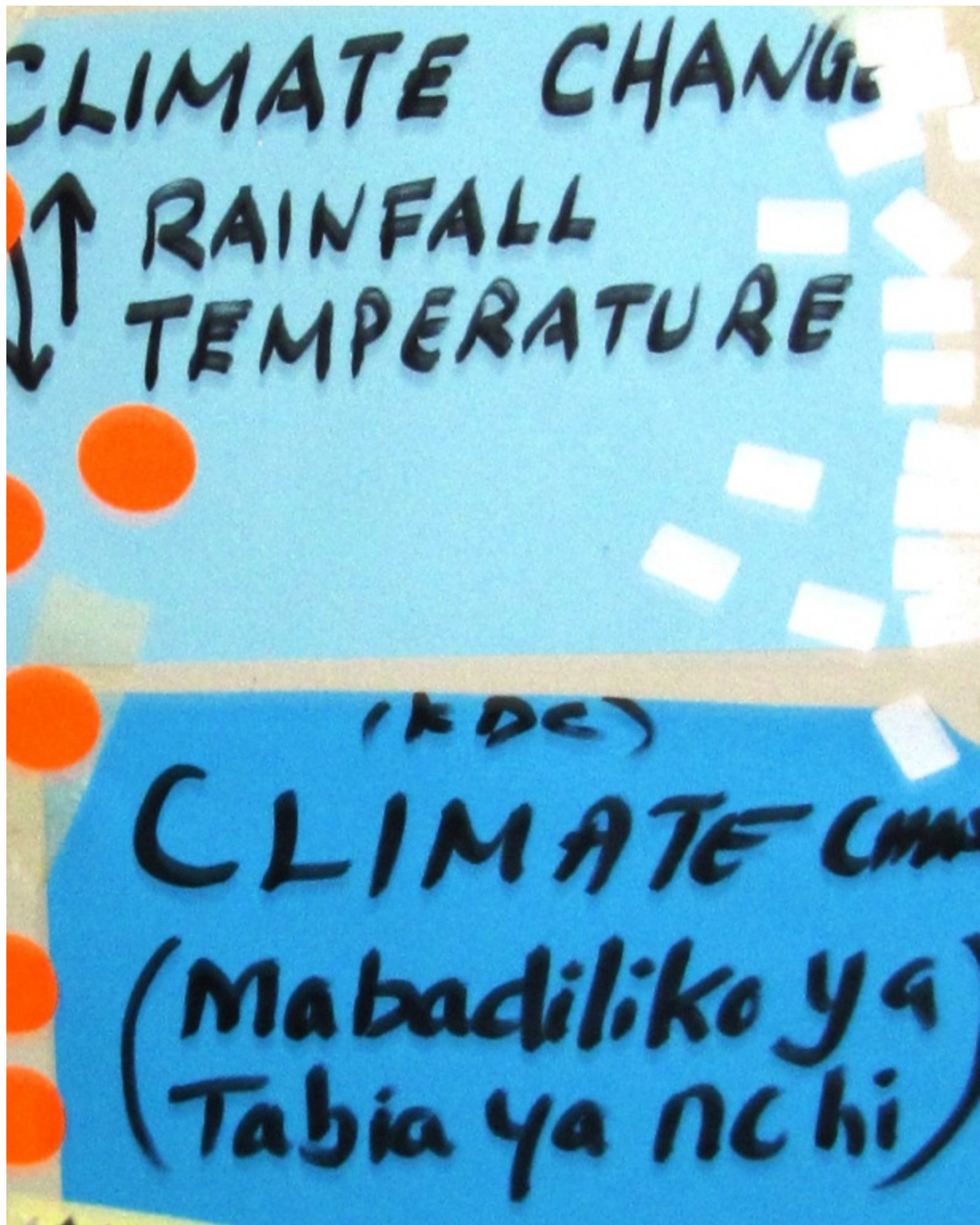
Fig 6. Climate change was one of the top five factors commonly identified by the groups
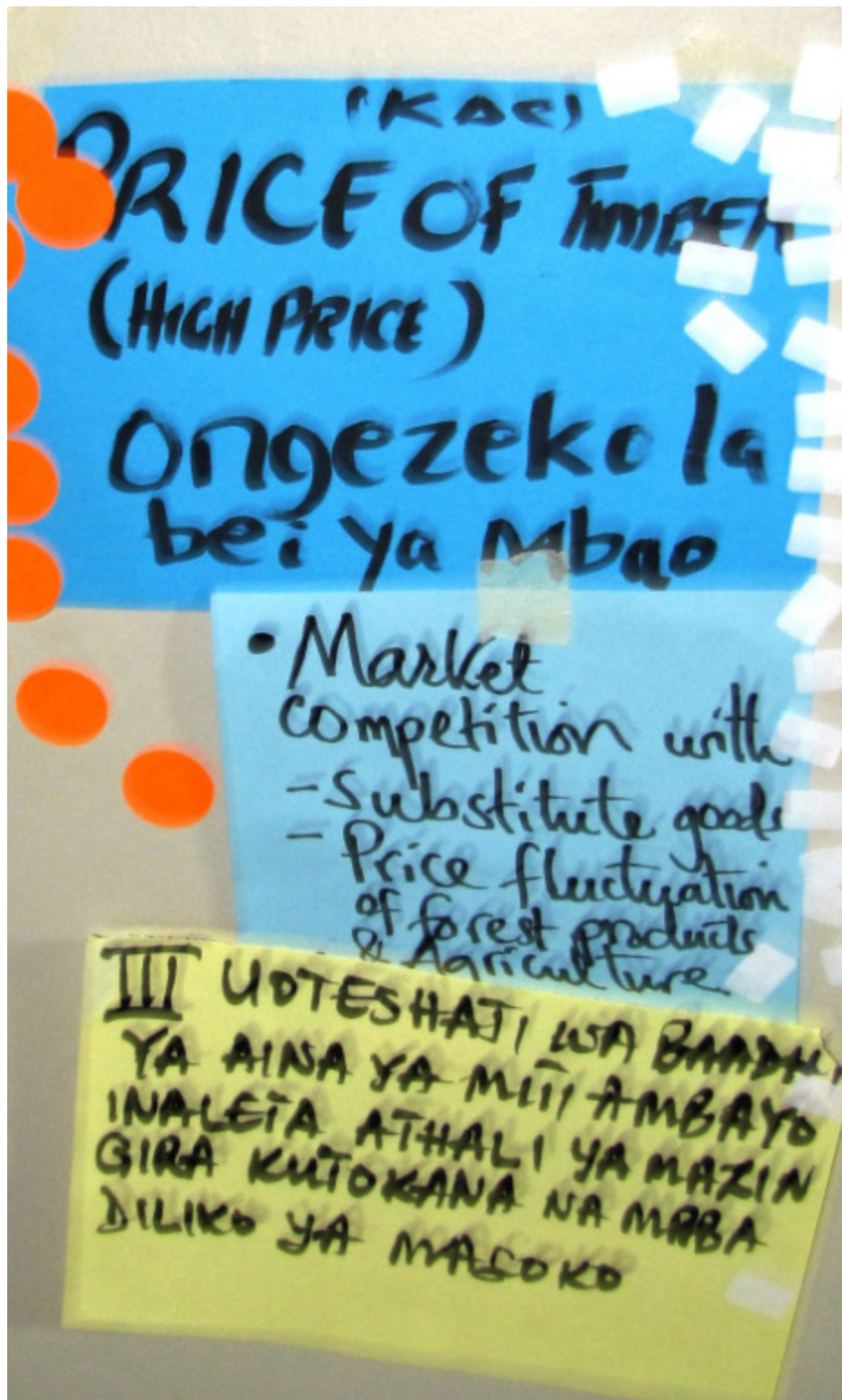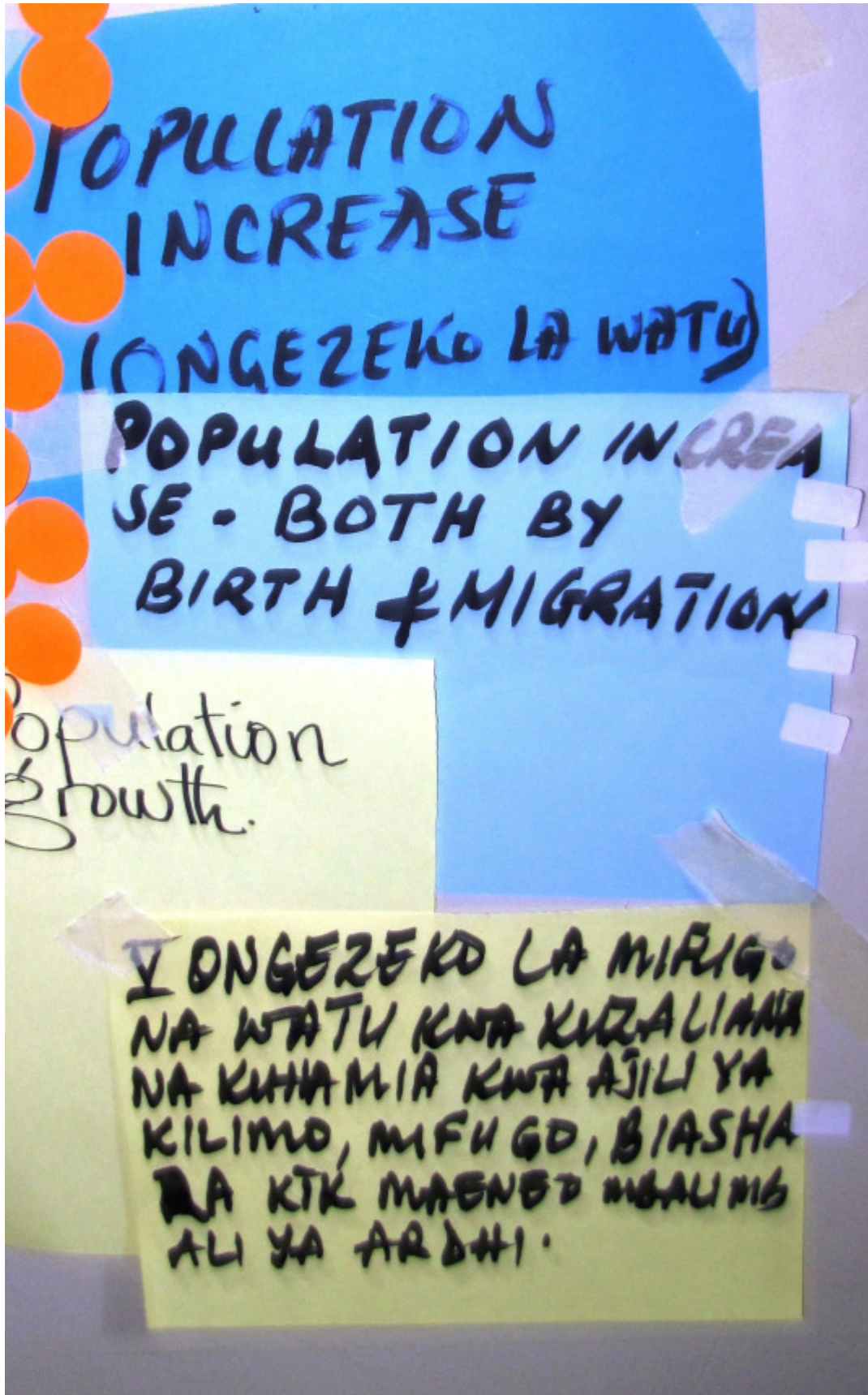
Fig 7. Price of timber relative to that of agricultural crops was one of the top five factors commonly identified by the groups

Fig 8. Population growth (by birth and migration) was one of the top five factors commonly identified by the groups

Subsequently facilitators grouped similar factors (by sticking one on top of the other if they were virtually identical). Where two factors were similar enough, but not virtually identical, a new factor representing the similar factors was written on a new card to describe two or more very similar factors. Facilitators asked groups if they agreed with the suggested consolidation, and ensured that participants feel the outputs from their groups are fairly and completely represented. The outputs of this component of the workshop were key, as they would ultimately shape were used to choose most important and most uncertain factors, and for developing future scenarios of land use. Facilitators ensured that participants understood the goals of this component well. In particular, factors of change that really are likely to affect land use were pulled out through strong facilitation. In addition, factors that are indeed variable were prioritized by facilitators, with input from participants.

6.4 Selecting the most important and uncertain factors of change/ Kuchagua sababu za mabadiliko muhimu zaidi, na pia zisizotabirika kwa urahisi

Approximate time: 30 minutes, plenary and individual

Objective
The goal of this activity was to select the five most "important" and "uncertain" factors from the list consolidated in the previous stage. To accomplish this in a participatory fashion, each participant voted for the five factors that they considered to be the most "important," (*sababu zilizo muhimu zaidi*) and the five that they considered most "uncertain" (*zisizo rahisi zaidi kutabirika*). Based on the vote, the factors that were widely considered to be most uncertain and also important were selected to form the basis of the future scenarios.

In the plenary, the lead facilitators explained the concepts of "importance" (*umuhimu*) and "uncertainty" (*kutotabirika*) clearly. The "importance" of a factor is how large of an impact it will have on land use change in the landscape (*sababu ya mabadiliko iliyo muhimu zaidi ni ile ambayo ikibadilika sifa/tabia zake huleta mabadiliko makubwa ya matumizi ya ardhi*). The "uncertainty" of a factor is how sure we are about which of the various possible states the factor could take on – that is, how unpredictable will the behavior be in the future? (*sababu ya mabadiliko isiyotabirika ni ile ambayo si rahisi kufahamu sura/ama tabia gani itachukua siku za baadaye*) In constructing the most interesting future scenarios (future scenarios = *hali za baadaye*), it is best to have factors that are both important and also uncertain. The facilitators made sure that participants understood that uncertain factors are *desirable* in the context of this activity, and that the goal was precisely to select factors of change with a high degree of uncertainty associated with them.

Five steps were involved in this activity:
1. Each participant received five small orange stickers, and five small white stickers.
2. The lead facilitators explained the concepts of "importance" and "uncertainty."
3. Participants were given five minutes to use their orange stickers to vote for the 5 factors that they considered most important.
4. Participants were given five minutes to use their white stickers to vote for the 5 factors that they considered most uncertain.
5. The facilitators counted the votes for uncertainty and importance quickly – a spreadsheet was used to do this rapidly. Since both importance and also uncertainty were desirable components of the factors of change that were ultimately selected, the five factors that had high vote counts in both categories were selected.
6. In the plenary, the facilitators presented (using a PowerPoint presentation) the factors that had been selected by vote, and welcomed outstanding comments and feedback from the group. This was done so that if there were strong objections to the selection, the facilitators would have made adjustments by way of dialogue, consensus, or other appropriate group decision - making strategies.
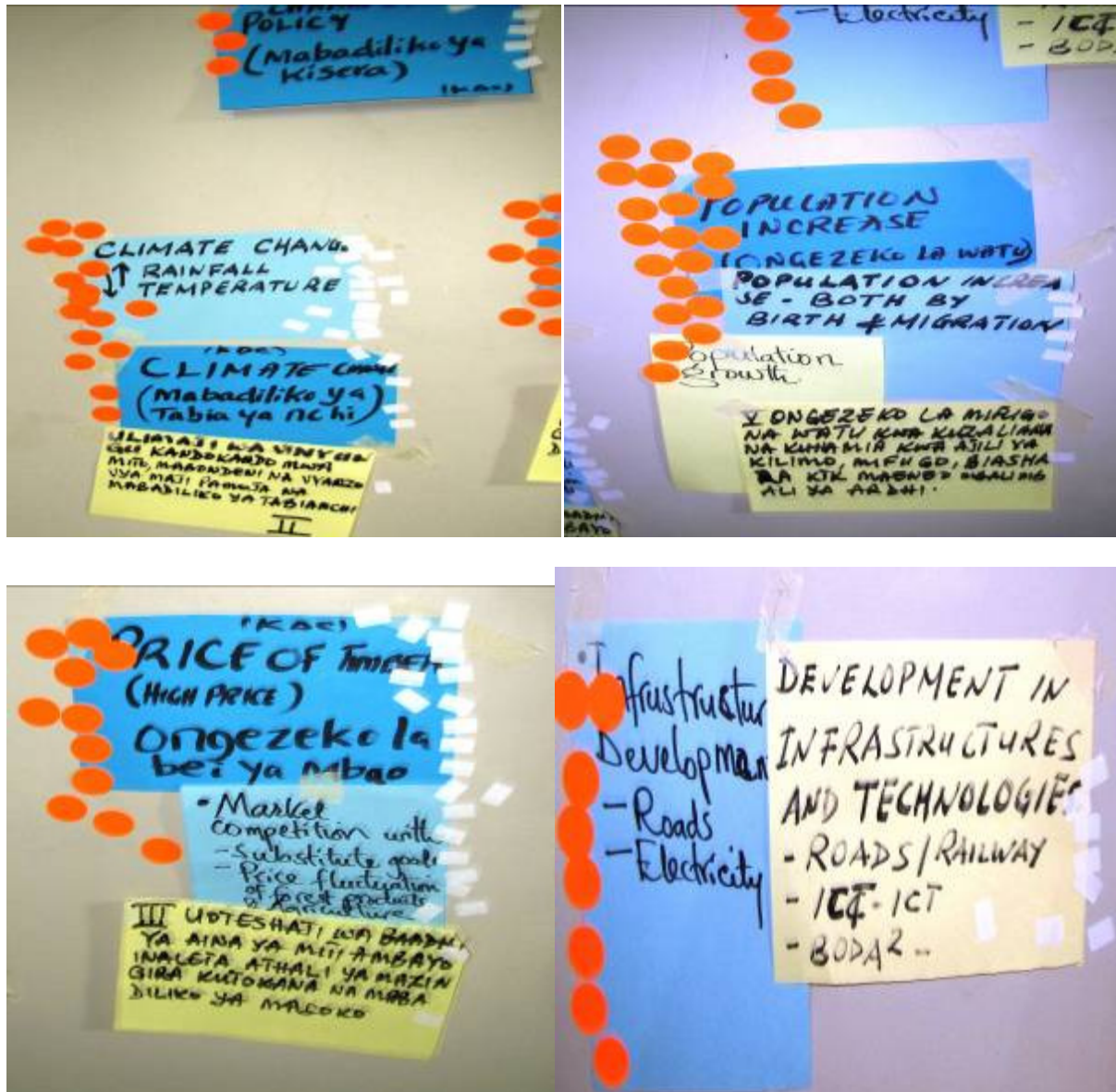
Fig 10. Voting for importance (orange stickers) and uncertainty (while stickers):
(CIFOR-VITRI workshop in Iringa, Tanzania, March 3-4, 2015)
Photo by Martin Kijazi

The participants were made to vote for importance and then for uncertainty in two separate rounds. This helped to avoid confusion between the activities. Facilitators strived to very clearly explain both uncertainty and importance, and ask questions at the end to ensure that all participants understood clearly what these concepts meant. In particular, it was made clear that the factors that were deemed to be both uncertain and important by the group would be selected and used as the basis for the rest of the future scenario building activities.

6.5 Constructing future scenarios of land use/ Kujadili hali za baadaye za matumizi ya ardhi

Approximate time: 3.5 hours, plenary and group

Objective

This activity generated the main outputs of the first day, which the preceding activities were designed to lead up to. Facilitators presented distinct scenarios derived from the factors of change identified previously, and the workshop split into breakout groups, with each group working on one of the proposed scenarios. With the help of a facilitator, each group developed a scenario narrative (*Maelezo ya hali za baadae za matumizi ya ardhi*). This narrative describes what needs to happen to the world to reach the state described by the factors of change in 30 years. Key plausible events in each decade leading to the scenario described were elaborated, with associated land use changes from the events described. Finally, participants drew on a physical map the likely land use changes over time, culminating in a view of land use in the landscape 30 years from the present.

Defining the distinct scenarios – internal meeting of facilitators (45 min.)

The facilitators held an internal meeting amongst themselves. The goal was to use the factors of change developed in the last session and the discussions of alternative states to describe four distinct scenarios. To do this, the facilitators thought creatively about how the factors of change identified previously might look under distinct scenarios. Because diverging carbon contents in the landscape were of interest, facilitators attempted to arrange the states of the factors of change to produce this variation. In addition, facilitators considered divergence in governance arrangements moving forward, so that distinct governance narratives emerge through this process. The goal was to generate scenarios with some plausibility, with divergence in terms of land use, and interesting and useful governance components for the remaining steps of the workshops. It was pointed out to the participants that this was a creative exercise by the facilitators that would differ depending on the landscape, the context, the specific objectives of the workshop from the facilitators' perspective, and the identified factors of change. The outcomes are provided below from workshops conducted in Iringa. In our workshops, we aimed to present divergent scenarios, such as the most and least desirable, the most conservation-oriented versus development-oriented, and the most likely if nothing were to change. These outcomes are presented to provide an idea of how scenarios can be constructed from the factors of change.

Table 2: Four (4) Future Scenarios (Hali nne (4) za baadaye) below: (The original Swahili version, followed by English translation below it)

CIFOR-VITRI workshop in Iringa, Tanzania, March 03-04, 2015

`	S1	S2	S3	S4
Kasi ya Ongezeko la watu	Kubwa, kama sasa	Kubwa kama sasa	inashuka	Kubwa kama sasa
Mabadiliko ya sera	Kukua kwa uwekezaji kwenye sekta ya misitu	Wawekezaji wanaimarisha kilimo chenye tija kubwa na cha mazao ya biashara	uwekezaji kwenye maendeleo jumuishi ya vijijini, kilimo mseto, na njia mbadala za maisha	Sera zisizotekelezeka, kutokukuwepo na ugatuzi/madaraka kwa ya bajeti kwenye serikali za mitaa zinapelekea kutotekelezeka kwa sera
Mabadiliko tabia nchi	Wastani wa mvua unaongezeka kidogo	Msimu wa uzalishaji unakuwa mfupi, na uzalishaji unapungua	Msimu wa uzalishaji unakuwa mfupi, na uzalishaji unapungua	Majanga makubwa na ya mara kwa mara yanaleta uhatarishi

Bei za bidhaa	Bei za mbao na mazao mengine ya misitu inaongezeka ukilinganisha na bidhaa nyingine	Bei za mazao ya kilimo zinaongezeka Zaidi, ukilinganisha na zingine	Bei za bidhaaa zinabakia kama zilivyo ila mabadiliko kidogo sana; hakuna bei moja inayoongezeka sana kuliko nyingine.	Bei zote za bidhaa zinashuka
Miundombinu na teknolojia	Ujenzi wa barabara unaongezeka, na kuongeza urahisi wa kufikia masoko	Ujenzi wa barabara unaongezeka, na kuongeza urahisi wa kufikia masoko; uzalishaji wa kutumia mashine unaongezeka	Miundo mbinu inabakia kama ilivyo	Uwekezaji kwenye miundo mbinu unadorora , na mazingira ya uwekejazi yanadorora

`	S1	S2	S3	S4
Population growth rate	Constant, high	Constant, high	Declines	Constant, high
Policy changes	High support for forestry sector attracts investment	Support for agriculture intensification and cash crops attract foreign investment	Support for integrated rural development, agroforestry, alternative livelihoods	"Policy vacuum": Insufficient decentralized budgets preclude local policy implementation
Climate change	Average rainfall increases slightly	Growing season shortens and/or becomes less productive	Growing season shortens and/or becomes less productive	More frequent and severe extreme events leads to increased vulnerability
Commodity prices	Timber prices rise considerably, comparatively	Agricultural commodity prices rise considerably, comparatively	Commodity prices remain constant with minor fluctuations; no one price rises relative to others	Commodity prices fall across the board
Infrastructure & technology	Road construction increases, access to markets increases	Road construction increases, access to markets increases; mechanization increases	Existing infrastructure maintained	Low infrastructure development and investment, infrastructure decays

Characterizing the four scenarios in terms of land use and estimating the areas of land use change at the landscape scale: plenary and breakout groups (3 hours)

1. Presenting scenarios to participants (10 minutes)
At the plenary, the facilitators presented the different scenarios to the participants and encouraged feedback. Participants were particularly encouraged to point out if they felt that a particular combination of factors was incoherent.

Fig 11. Participant contributing to the discussion of the consolidated scenarios:
(CIFOR-VITRI workshop in Iringa, Tanzania, March 3-4, 2015)
Photo by: Ashwin Ravikumar

2. Explaining the activity to participants (10 min)
At the plenary, the facilitators explained the activities to be carried out in breakout groups in detail. The construction of scenario narratives was described, and the eventual map work that would be done. Facilitators made sure that participants understood the goals of the following activities clearly. More detail on these activities is given below.

3. Analysis, scenario description, and narrative (1.5 hours)
The facilitators led a group discussion to reflect about how the world could arrive to the state defined by the factors of change for the scenario. In particular, the group was guided to think about what key events would need to occur to bring about the world described in the scenario. What policies should be implemented? When would they be implemented? What changes would have to occur and when? Why would these changes occur? What consequences would they have? What will be the key moments in the next 30 years? Facilitators asked respondents to describe the narrative in 10 - year stages. What is likely to happen in each decade? What needs to happen to bring the landscape to the condition described by the factors of change? What does this mean for land use? Participants were told that it would be useful to decompose the narrative into political, economic, environmental, cultural, and social aspects. At the same time, these other aspects of the future scenario narrative should link to land use, especially given the time constraints. Facilitation aimed to bring the discussion back to land use change. If the participants in a group found some aspect of the scenario to be incoherent or problematic, facilitators were flexible and

27

encouraged changes to be made to the factors of change as needed. The scenario narratives were recorded in bullet points on a sheet of poster paper to share later in the plenary.

Fig 12. Participants discussing scenario narratives:
(CIFOR-VITRI workshop in Iringa, Tanzania, March 3-4, 2015)
Photo by: Markku Larjavaara

4. Implications in terms of land use

Once scenario narratives had been developed, facilitators guided the participants to draw land use changes on the grid-box map using colored markers (because the carbon tool was also to be used, the changes from one land use to another were quantified using the grid and entered into the carbon calculator). Any color could represent any land use change type as long as all colors used were indicated in a key. While marking the land use changes, participants were instructed to take into account not only the changes in major/dominant categories indicated in the landscape map (Fig 2a) but also the changes in mosaic compositions within each of the dominant categories taking into account the compositions depicted in charts that accompany the maps (Fig 2b). In addition to mark the changes in vegetation types by shading with marker pens, participants were also required to write the expected percentage compositions of the new mosaics. The presence of these mosaic vegetation types made the exercise more challenging that in previous workshops where the major vegetation categories were clear-cut, and there was no need to address the problem of mosaic compositions. The facilitators, therefore, took extra care to explain the process until all participants understood thoroughly. Facilitators also worked closely with the group members to help them through the process of marking vegetation changes. Since different changes may occur at different times, facilitators made sure to guide participants in marking with different shading when changes for the same land use occur at different times. Participants were instructed to label the key clearly so that the map could be read. Drawing in pencil or pen before coloring was suggested – it was better to arrive at a consensus first rather than coloring the map in too eagerly. Facilitators helped participants count the number of grids painted in a particular color. The different number of grids (extents of different land use changes) were subsequently used by

28

the carbon monitoring tool researchers to calculate carbon implications of different land use changes.

Fig 13.. Participants drawing land use change implication of alternative future scenario:
(CIFOR-VITRI workshop in Iringa, Tanzania, March 3-4, 2015)
Photos by: Markku Larjavaara and Aswhin Ravikumar

5. Selecting a name for the scenario

Facilitators asked the group members to come up with a name that describes the scenario. The following names were chosen: Scenario 1= Economic Growth (*Kukua kwa Uchumi)*; Scenario 2 = Investment (*Uwekezaji)*; Scenario 3 = Community First/People First (*Jammii Kwanza*); Scenario 4 = Catastrophe/Dissasters (*Majanga)*

6. Explanation of scenarios in plenary (50 min.)

In sequence, each group selected a representative to explain the scenario narrative and show the changes drawn on the map. Participants from other groups asked questions and provided feedback. The scenario narratives presented by participants are outlined next (name of each scenario chosen by group members is also included). The corresponding mapped land use changes are present in Fig 14- Fig 17).

Due to time constraints, the exercise of presenting scenario narratives was moved to the second day, and presented alongside the carbon outcomes of scenario. The carbon outcomes were scheduled for the second day – the detailed carbon outcomes are therefore presented under the second day program. However, a summary of those outcomes are presented below alongside the scenario narratives:

Scenario narratives, land use change and carbon outcomes:

Scenario 1 – "Economic Growth" (*Kukua kwa uchumi*) [this is very much a timber/forestry scenario] (9 'desirable' votes)

Population growth will increase (factor 1) at a constant rate albeit with some family planning. The implication is a critical shortage of agricultural land in 30 years. Encroachment of national forests for agriculture will therefore occur around Kilolo. Traditional irrigation systems will be improved in lowlands.

Woodlands will also be converted to agriculture across the 'agriculture-dominated' part of the landscape, and 30% of bushland will be converted into forests and plantations. Similarly, 5% of grasslands will be converted into plantations as the government favors plantations and forestry. Even as forestry increases in the part of the landscape currently dominated by agriculture, agriculture itself will proliferate in other parts of the landscape – including natural forests.

With increasing support for forestry plantations (factor 2) and also population growth, agricultural lands will be squeezed. Investment will be spurred by the private sector. Community livelihoods will be improved, implying that 15% of the natural forests will be converted to plantations, and half of the southern bushlands. About 40% of the southern grasslands and 20% of woodlands will also be converted to plantations (limited by climatic constraints).

Climate change will slightly increase average rainfall slightly, and as trees are planted, rainfall will increase further – this would lead to 5% or so of bushland being converted into forests over time (factor 3).

Timber prices will increase over time in relation to other commodities (factor 4), further incentivizing forestry over agriculture. Other crops like coffee will be dropped as actors across the landscape rush to get in on a fast-growing and profitable sector. Per-capita incomes will rise from these higher prices, permitting development.

In terms of carbon, this scenario shows great increases in coniferous and broadleaf plantations until they cover nearly half the landscape – agriculture also rises over time. Most of these changes come at the expense of bushlands, grasslands, and woodlands. The carbon increase is close to 25%.

During this scenario presentation, and also scenario 4, there were questions from Haule (facilitator) about how plantations and agriculture would be established in the natural forests/protected areas. Katani (another facilitator) later responded that these encroachments are already happening, and are quite plausible.

Map (Fig 14) summarizes these changes as drawn by group participants.

Fig 14. Map of land use change in Kilolo district of Tanzania under a distinct scenario named "Economic Growth" (*Kukua kwa uchumi*)
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Map Source: Map provided by the University of Turku, Finland

Scenario 2 – Investment / Uwekezaji (5 'desirable' votes)

Increasing population will aksi increase the demand for land and agriculture (Factor 1). Unused land will decrease over time.

The government will favor investments in land and agriculture (Factor 2), which will shift land use types over time.

Climate change will make previously productive lands less productive, which will lead to a shift to lower lands and also cachement areas. (Factor 3).

Increases in agricultural prices and activities will also incentivize agricultural expansion across the landscape, including in areas that formerly had other land uses (Factor 4).

Finally, roads and infrastructure will facilitate access to markets, leading to more settlements and development within the landscape. Roads will also provide access to new areas that promote settlements. The new agriculturally intensive landscape will surround a much more developed center. Given the scarcity of land, mechanized agriculture will dominate.

In terms of land use, the area currently dominated by agriculture will see expanding settlements – some of the current agricultural land will also be replaced by settlements. This will affect agriculture, bushland, woodland, and also some natural forests. Agriculture will expand into bushlands and grasslands as well, albeit in other areas outside the settlement. In addition, plantation forests will expand into bushlands, grasslands and woodlands.

In terms of carbon, the changes stem from bushland and grassland decreasing, while broadleaf plantations and agriculture increases. The carbon sequestration over 30-40 years is close to 5 megagrams (10%).

Mapping Scenario 2: **Investment (*Uwekezaji*)**
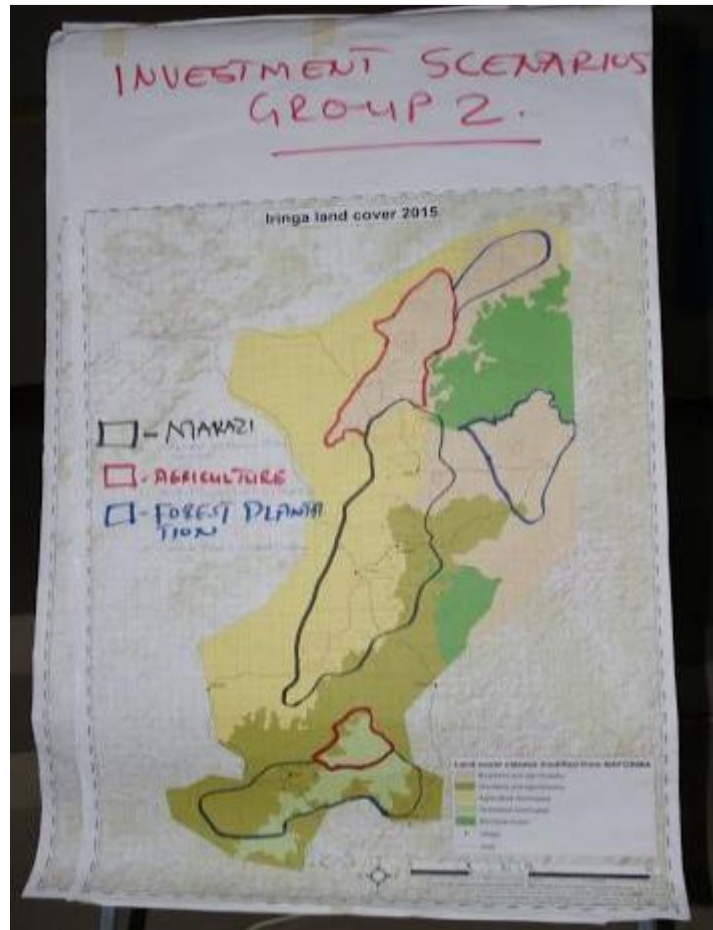
Fig 15. Map of land use change in Kilolo district of Tanzania under a distinct scenario named Investment (*Uwekezaji*) (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Map Source: Map provided by the University of Turku, Finland

Scenario 3 - "Community/People First" (*Jamii Kwanza*) (6 'desirable' votes)

Population will actually decline slightly or remain constant in this scenario due to migration and family planning (factor 1).

Policy changes will support agroforestry, but with little impact on land use overall (factor 2).

32

Climate change will also have a minimal impact, albeit lower rainfall will spur some changes towards agriculture. Policies may support better irrigation and seeds to deal with changing rainfall patterns, allowing current mosaic agriculture to persist (factor 3).

There will be no changes in land use due to commodity price shifts in this scenario (factor 4).

Similarly, roads, infrastructure and technology will have a limited impact, as there will be no changes (factor 5).

The conversion of the natural forest into agricultural lands will happen to some extent, as the changing climate renders former farmlands will not be arable. A small area of agriculture will also shift to agroforestry. The bushland will be converted to grassland due to the shifting climate as well.

Given the relatively small areas that will actually be altered, changes are very small overall. The carbon content of the landscape is therefore more or less maintained.

Mapping Scenario 3: **"Community/People First" (***Jamii Kwanza)*
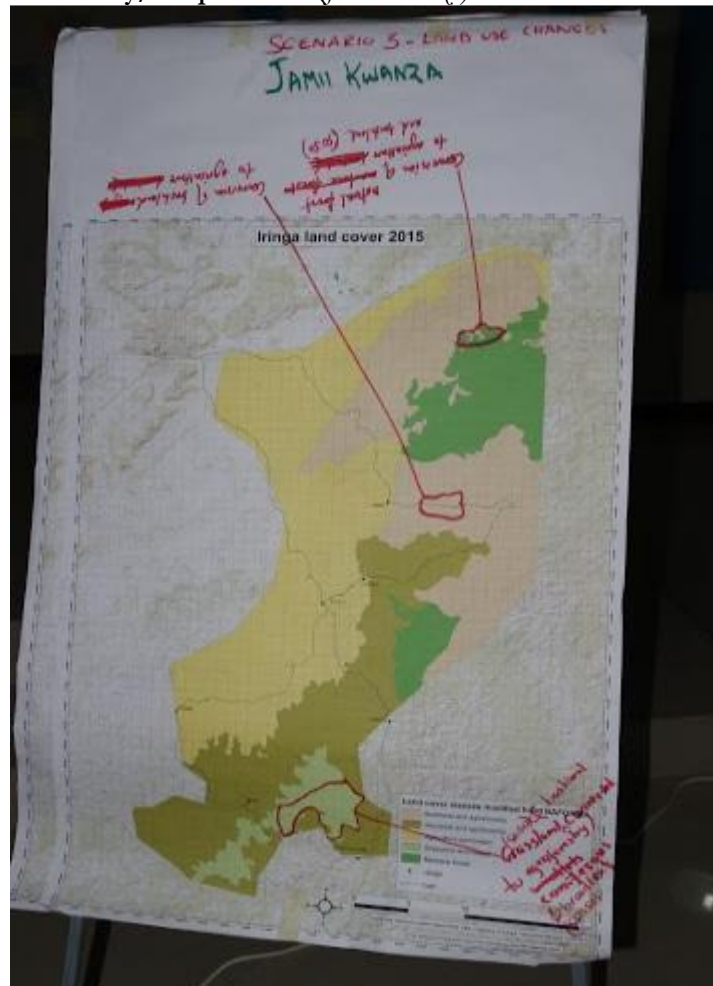
Fig 16. Map of land use change in Kilolo district of Tanzania under a distinct scenario named **"Community/People First" (***Jamii Kwanza)*
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Map Source: Map provided by the University of Turku, Finland

Scenario 4 – "Catastrophe"/ Dissasters (*Majanga)* (3 'desirable' votes)

Population growth will lead to more demands on the land (factor 1).

There will be policies from the government, but they will not be implemented because there will be no budget at the local government (factor 2).

Climate change will lead to extreme conditions such as frequent and severe droughts and floods. Wetter areas will become dryer, which will then lead to land use changes. In addition, as previously arable lands are no longer arable, people will move to catchment areas, wetter areas, and also forests (factor 3). Another effect of climate change will be flooding, which will push people into higher areas. Because most natural forests are in these higher areas, there may also be human impacts like deforestation and forest degradation.

Falling agricultural prices will shift people away from agriculture and towards other activities such as brickmaking and charcoal production. These activities will have impacts on forests (Factor 4).

Areas that are inaccessible will remain inaccessible without any infrastructure (factor 5).

The landscape will change closer to settlements. Agroforestry, agriculture, and tree planting will increase in areas currently dedicated to other uses. These include bushlands and grasslands. There will be land grabs in areas that are not currently occupied, including natural forest areas. Also because of the high price of timber (relatively), there will be tree planting in various places, including current agricultural lands and grasslands. People will continue to encroach into natural forest lands to plant conifers.

In spite of the degradation and associated carbon losses in the short term, plantation and agroforestry growth compensate in the long run.

Carbon results:

26% increase in scenario 1 (economic growth/forestry), basically maintained in scenario 3, and somewhere in the middle for scenarios 2 and 4.

Mapping Scenario 4: "Catastrophe"/ Dissasters (*Majanga)*

Fig 17. Map of land use change in Kilolo district of Tanzania under a distinct scenario named **"Catastrophe"/ Dissasters (*Majanga)***
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Map Source: Map provided by the University of Turku, Finland

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6.6 End of day survey: Linking scenarios and governance
Approximate time: 30 minutes, individual work

Objective
The goals of the survey are (1) to assess which scenario(s) the group deems most desirable to guide activities on the following day, and (2) to gain perspective on the participants' perceptions of their role in the governance of land use in the landscape in practice.

The following questions were asked to participants to vote which scenario they deemed most desirable – which is also presented alongside the question:

Survey on future scenarios	
Take a moment to reflect on the scenarios developed today:	
Which of the scenarios that were described today would you consider to	Survey outcome: Most to Least frequent Response (i.e. Most desirable

	to Least desirable scenario):
be most desirable? Which would make for the best future? Mark the name or number of the scenario.	1. Scenario 1: "Economic Growth" (*Kukua kwa uchumi*) (9 'desirable' votes); 2. Scenario 3 - "Community/People First" (*Jamii Kwanza)* (6 'desirable' votes) 3. Scenario 2 – Investment / (*Uwekezaji)* (5 'desirable' votes) 4. Scenario 4 – "Catastrophe"/ Dissasters (*Majanga)* (3 'desirable' votes)

In addition, the following survey was administered to better understand the role of participants in land use governance in the real world. 22 workshop participants participated in the survey. Below, under each question both total number of responses corresponding to it and as a percentage of total number of respondents are included.

Please mark the degree to which you agree or disagree with the following statements about land use decision-making. On a scale of 1-5 (1= strongly disagree, 5 strongly agree), how do you feel about the following statements?

	1.(strongly disagree)	2.(disagree)	3.(neither agree nor disagree)	4.(agree)	5.(strongly agree)
• I have the information I need to participate out in decision-making about land use			5 (22.7%)	12 (54.5%)	5 (22.7%)
• If I need information I can get it		1 (4.5%)	3 (13.6%)	14 (63.6%)	4 (18.1%)
• My organization or institution is well represented in land use decision making	1 (4.5%)		2 (9%)	12 (54.5%)	7 (31.8 %)
• My organization or institution has influence in decision making about land use		1 (4.5%)		10 (45.4%)	11 (50 %)
• I should be more involved than I am in decision making about land use		1 (4.5%)	1 (4.5%)	4 (18.1%)	16 (72.7%)

The findings of the survey indicate that quite high percentages of the participants have good access to information related to land use decisions; their organizations or institutions are represented in (and exert influence on) land use decisions; but very significant numbers feel that they should be involved more than they are now in decision making about land use.

7 Day 2: Carbon Modeling and Governance Monitoring

Agenda	
TIME	**ACTIVITY**
08:30-09:00	Participant registration
09:00-09:30	Recap of day one, and day two agenda
09:30-11:00	**Modeling carbon emissions** Presentation of the VITRI methodology for modeling carbon emissions from distinct land use scenarios, and demonstration of the carbon implications of the scenarios developed in day one
11:00-11:15	Coffee break
11:15-13:00	Activities and steps towards desirable future scenarios
13:00-14:00	Lunch
14:00-15:00	**Multilevel Governance** Discussion and presentation of key aspects of multilevel governance
15:00-16:00	**Multilevel Governance: Monitoring and Indicators** Discussion of multilevel governance monitoring and elaboration of indicators
16:00-16:15	Break and "energizer"
16:15-16:45	Preliminary results and observations from multilevel governance study
16:45-17:30	Workshop Evaluation
17:15-17:30	Closing remarks and group photo

1 Review of previous day

Approximate time: 30 minutes, plenary

The lead facilitator summarized the previous day's activities, and gave a brief overview of the agenda for the day. The facilitator also reminded participants about the findings of a survey on desirable scenarios, and mentioned that this scenario will be used for most activities during the second day.

7.1 Carbon Modeling: Implications of future scenarios for carbon (*Kukadiria kiwango cha hewa ukaa*

Approximate time: 1.5 hours, plenary

Objective

The goal of this activity was to explain the link between land use and carbon emissions and show the carbon implications of the scenarios developed during the previous day using a simple carbon calculator.

Activities:

1. Prof. Markku Kanninen presented the carbon modeling methodology (30 min)

This included explanation of the carbon calculator, and the pieces of information it requires:

a. Carbon density of different land use classes

b. Rate of change in carbon density of land as land use changes

c. Current land use

d. Future land use

The facilitators explained that the first three pieces of information were gathered through previous research, while the final piece – future land use scenarios – was ascertained the previous day through this workshop.

2. Presentation of preliminary results from previous day (30 min)

Results from the carbon calculator using the scenarios developed on the first day of the workshop were presented by: Prof. Markku Kanninen.

3. Round of questions (30 min)

Feedback was given and questions were asked by the participants.

Photo by Markku Larjavaara

Scenario 1
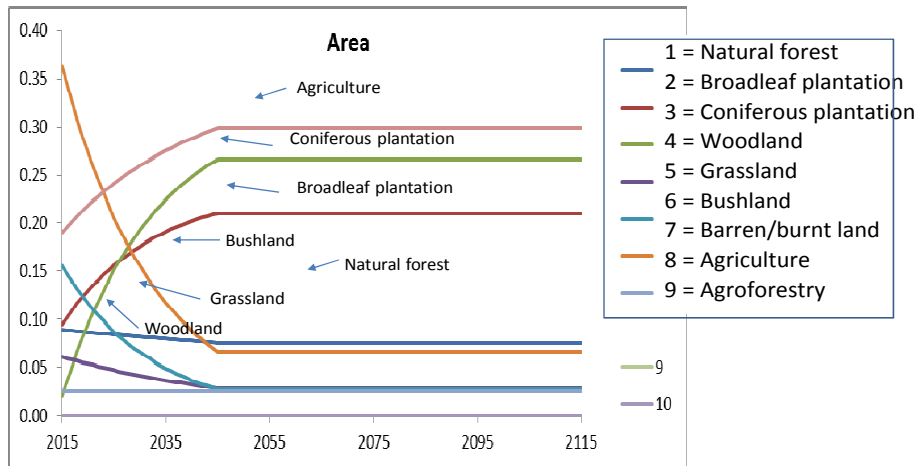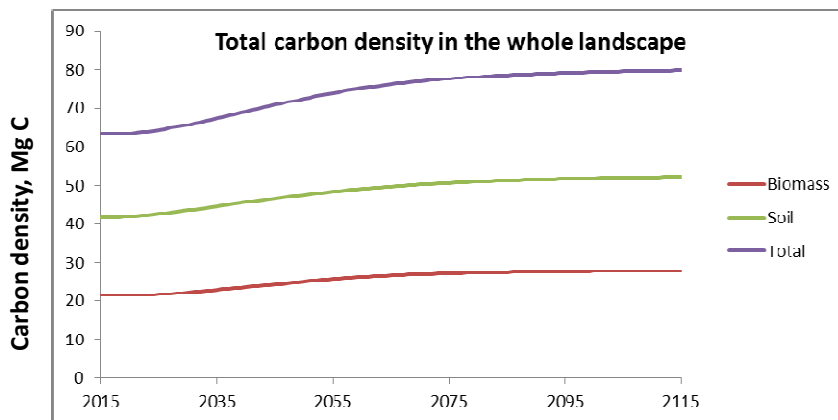
Scenario 1

Fig 18. Carbon implications in Kilolo district of Tanzania under a distinct scenario named Economic Growth (*Kukua kwa Uchumi)*
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Presentation by: Prof. Markku Kanninen, Viikki Tropical Resources Institute – VITRI, University of Helsinki
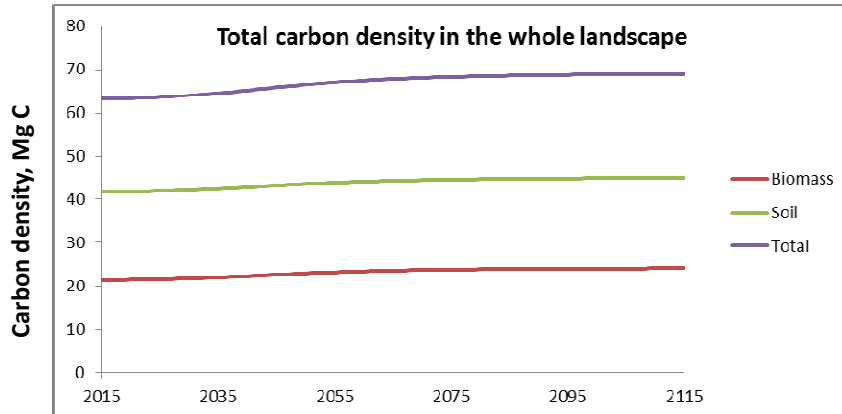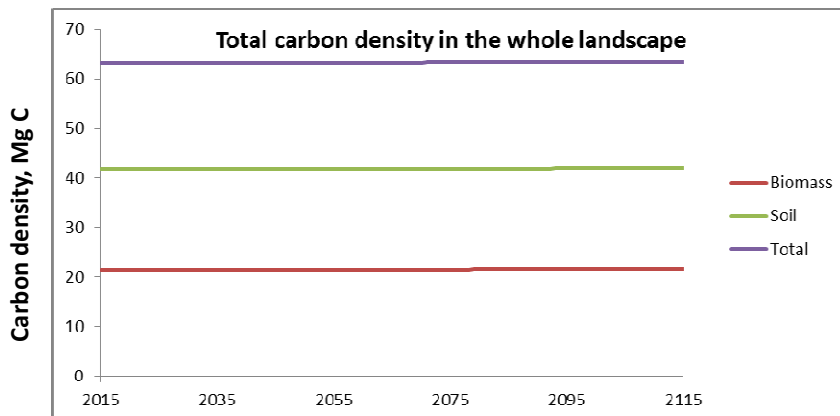
Scenario 2
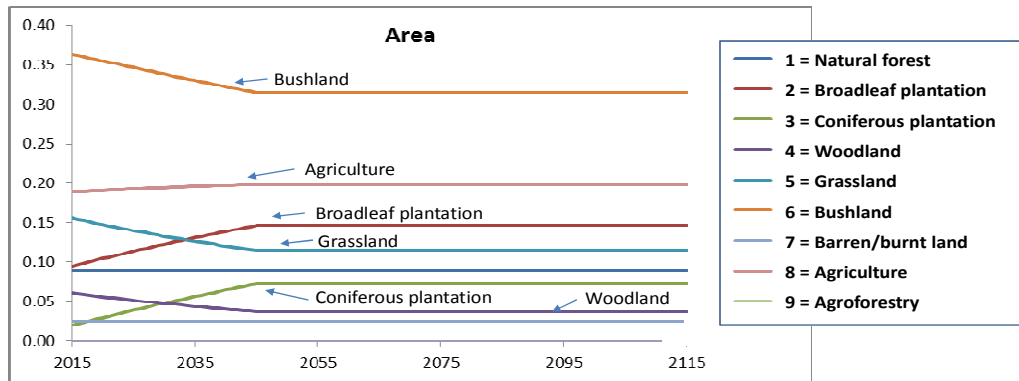
Scenario 2

Fig 19. Carbon implications in Kilolo district of Tanzania under a distinct scenario named Investment/Uwekezaji (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015, March 24-25, 2015)
Presentation by: Prof. Markku Kanninen, Viikki Tropical Resources Institute – VITRI, University of Helsinki

Scenario 3
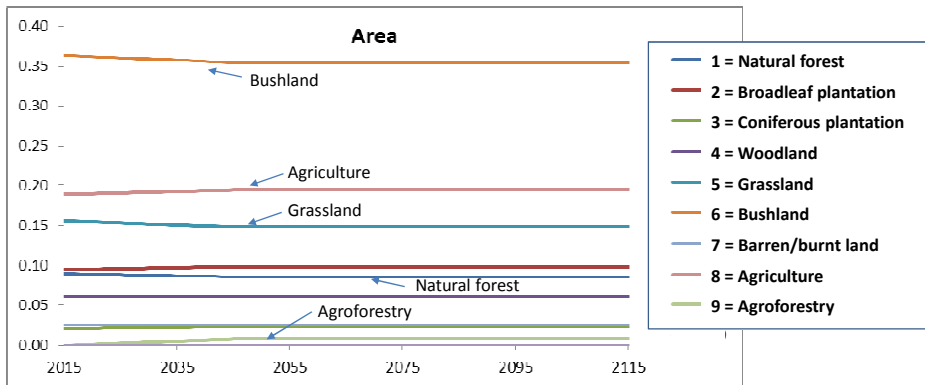
Scenario 3

Fig 20. Carbon implications in Kilolo district of Tanzania under a distinct scenario named Community First/People First (Jamii Kwanza)
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Presentation by: Prof. Markku Kanninen, Viikki Tropical Resources Institute – VITRI, University of Helsinki
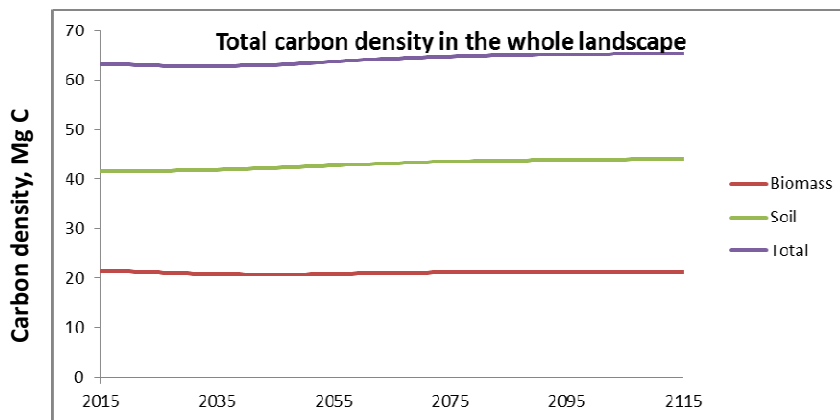
Scenario 4
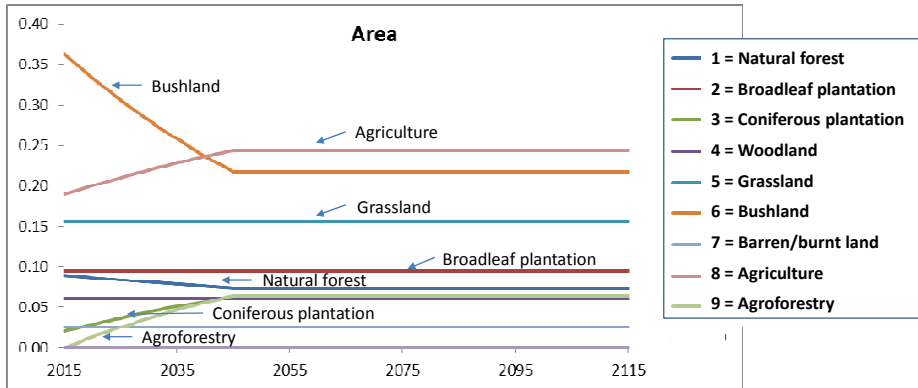
Scenario 4

Fig 21. Carbon implications in Kilolo district of Tanzania under a distinct scenario named Catastrophy /Dissasters (Majanga)
(CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Presentation by: Prof. Markku Kanninen, Viikki Tropical Resources Institute – VITRI, University of Helsinki

Total carbon – comparison of 4 scenarios
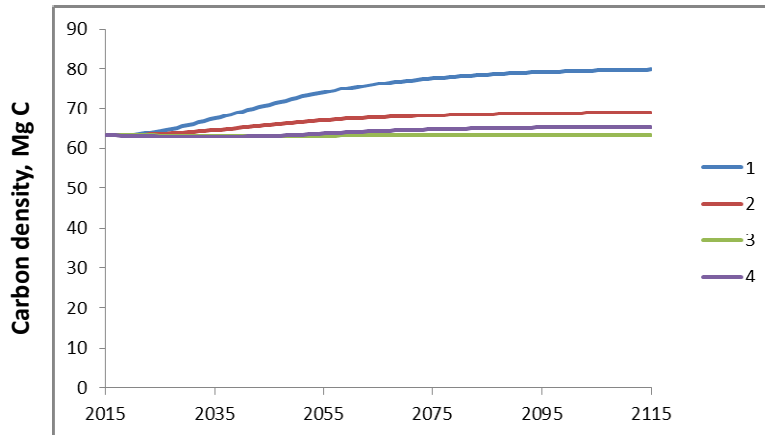
Fig 21. Comparison of carbon implications in Kilolo district of Tanzania under of the four distinct scenarios (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Presentation by: Prof. Markku Kanninen, Viikki Tropical Resources Institute – VITRI, University of Helsinki

The overall comparison indicator little albeit noticeable differences in carbon emission implications of alternative land use scenarios identified for Kilolo district of Tanzania. This is because irrespective of the land use scenario chosen areas of high carbon density (e.g. high forests) will be little affected because they are now already protected by laws as 'protected areas', although some level of encroachment will take place.

Two scenarios that would lead to higher carbon storage (i.e. economic growth and investment scenarios) would achieve this increase primarily due to forestry-based development and investments, particularly through extensive afforestation programs including agro-forestry systems, community woodlots, individual woodlots and large forest plantations.

7.2 Identifying Strategies to reach a desireable future (*Shughuli na hatua kuelekea hali za baadae tunazohitaji zaidi*)

Approximate time: 1 – 1.5 hours (individual and breakout groups)

Objective
The goal of this activity was to identify key activities and steps to reach a desirable future scenario.

Activities
After a period of individual reflection, participants were divided into random groups because many had agreed on the same single scenario in order to answer the following questions. To reach the desirable future scenario (described the previous day, but not strictly constrained by its parameters), (1) what needs to be done? what strategies, steps and activities must be undertaken? (2) how would these things be accomplished?, (3) who would be in charge of taking these steps?, (4) what are the barriers to taking these steps? and (5) how could these

barriers be overcome?

1. Individual work (15 min)

Facilitators explained that while the previous day was about describing future scenarios, the second day was about governance and what should be made to improve processes aimed at moving towards desirable scenarios. Participants were asked to reflect on what would need to be done to reach a desirable future. Who would have to do what? How would these things be done? What key strategies would need to be adopted? Participants wrote down some ideas – activities, steps, and strategies – on a piece of paper.

2. Group work (1 hour)

Because a significant numbers of participants selected different scenarios without reaching consensus on a single most desirable scenario, different groups were allowed to work with different scenarios, where individuals who voted for any given scenario were allowed to form a group and work on the scenario they voted for. The only scenario that received too few votes to form a group was Scenario 4. Voters for the latter scenario were allowed to join any of the other groups. Facilitators explained that the specific constraints of the scenarios were no longer strict for second day's activities. Rather, they formed a basis for what the "desirable future" was, but other desirable aspects of a preferred future could also be incorporated in second day's group work. Each group had a facilitator who asked each group member to share their reflections. The facilitator or groups note taker noted the strategies, activities, and steps that participants shared in a table such as the one below (either on a poster paper sheet, or on colored paper to stick to poster paper later):
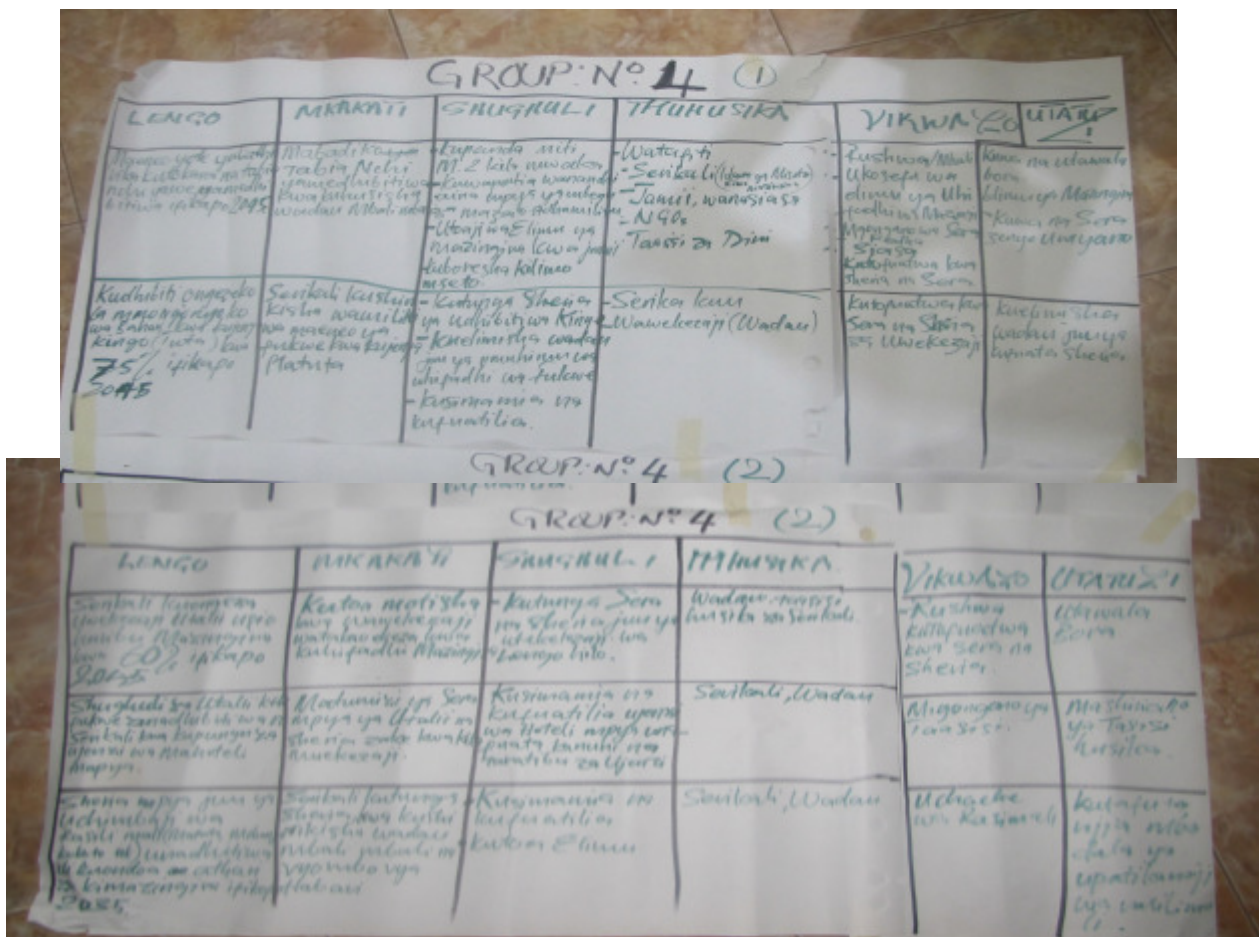

Fig 22. Example of group work describing what would need to be done to reach a desirable future (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)

3. Presentation of Group Work (45 min)

Circulating around the room, each group presented its outputs to the other participants. After the last presentation, facilitators asked participants to identify and discuss similarities and differences between the groups' outputs. This discussion topic was intended to promote broader thinking in the next activity.

Fig 23. Presenting group work describing what would need to be done to reach a desirable future (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)

Table 3: Strategies, actors, and barriers to reach desirable future scenario

What needs to be done (strategy or activity)	How will this strategy be carried out?	Who will have to do these things?	Barriers	How to overcome barriers

Increasing the economic growth and reducing environmental degradation by: • Preparing a Sustainable Land Use Plan • Improving policies by removing inter-sectoral conflicts	• Participation of all stakeholders and communities at all levels • Surveying and mapping according to prepared plans • Good governance of implementation of plans, policies and laws • Conducting Environmental Impact Assessments • Preparing a proper system for implementation responsibilities and accountability	• All responsible ministries and sectors • Policy makers • All other stakeholders e.g. regional, districts, public corporations, NGOs, private sector, communities, etc	• Scarce human, financial and infrastructure resources • Political interferences in the implementation • Bureaucracy, lack of transparency and accountability	• Increasing qualified human resources in relevant sectors • Increasing the budget in relevant sectors • Improving infrastructure • Demanding politicians to respect exiting rules and regulations • Reducing bureaucracy • Enforcing transparency and accountability measures
Combating coastline erosion by building physical barriers to stop erosion by rising sea-water	• Creating new law on coastline protection • Stakeholder education on coastline protection • enforcement and monitoring	• Central government • Investors • Other stakeholders	• Lack of enforcement & adherence to laws and policies to protect coastlines	Enforcement & Education
To improve and increase community social services for population growth control via: • Conducting family planning education • Building and improving health centers • Recruiting and allocating enough health	• Meetings, seminars, and workshops • Advertisements: radio, TV, posters • Introduce family planning curriculum in primary schools and above • Sensitize all stakeholders • Construction and improvement of Health Centers and Educational infrastructure • Government allocate sufficient budget	• Communities • Governments • Private sector • Development partners and • NGOs	• Insufficient budget • Improper priority setting • Insufficient qualified personnel • Insufficient equipment • Change of policy	• Increase revenue collection • Discipline in expenditure • Recruit more personnel in health and education • Policy to prioritize health sector

professionals, infrastructure, and medicine • To construct and improve educational infrastructures				
Management of landscape to improve community livelihoods by: • Involving stakeholders and development partners in preparation of land use plans from district to village level	• Through participatory land use planning team • Involve Village Land Use Management Committees, Village Councils, and Village Assemblies	• District and • Village stakeholders	• Boundary disputes	• Participatory planning meetings

Capability building in
• Skills
• Marketing
• Entrepreneurship
• Capital
	• Training the community in production skills like:
	  • Beekeeping
	  • Fish farming
	  • agroforestry
		• District Council
		• NGOs
		• SACCOs communities
		• other stakeholders
			• Low community adoption
			• Financial constraints
			• Market forces
				• Education
				• Involvement of financial partners

Climate change mitigation and adaptation	• To introduce tolerant species • To introduce conservation agricultural practices	• District councils • NGOs • CBOs • Communities • Other stakeholders	• Low community adoption • Technological constraints • Financial constraints	• Education • Research • Involvement of development partners

7.3 Governance: Conceptual Discussion

Approximate time: 45 minutes, individual, plenary, and group work

Objective
The purpose of this activity was to make sure that everyone understood the definition of the term "governance." Although the term had been mentioned many times at this point in the workshop, different people might have had different ideas about what it meant. The facilitation team provided a definition after hearing from the participants about their ideas on what the term meant to them ensuring that the participants have had a shared understanding.

After leading a participatory brainstorm on the definition of "governance," the lead facilitator presented an expert definition.

1. Individual reflection on governance (10 min)
The facilitator asked each participant to write down what they believe the term "governance" means, by prompting thus: "by now, we have all heard the term 'governance' before. But what does it mean? How do you understand the concept? Write down a brief definition of how you understand governance."

2. Brainstorm in plenary (10 min)

Participants were asked to share their reflections. A member of the facilitation team typed up participants' responses in real time. It was emphasized that only definitions that differ from what has already been shared should be mentioned. As responses were noted in the PowerPoint slide that was projected, key words that appeared in multiple definitions were highlighted.

3. Presentation on governance from facilitation team (10 min)

The lead facilitator presented a definition of governance that would be used in the workshop, recognizing commonalities and differences from participants' suggestions. One option used was to cite Larson and Petrova (2011), as provided in the facilitator guide defining governance as "who makes decisions and how decisions are made." This was complemented by contributions from all the facilitators. It was also explained that the concept of "good governance" is more normative, and there are a variety of opinions on what constitutes good governance. Some literature, and some actors in the development community, advance concepts like transparency and participatory decision making as pillars of good governance. This is not universally the case, however. The facilitation team presented a slide suggesting some possible "pillars" of good governance like transparency, representation, participation and accountability— and compared these with some key words from participants' definitions of good governance. It was evident that some definitions of these concepts were touched in participants understanding of good governance, which indicated some shared value on governance. At the same time, it was emphasized that different concepts of good governance exist, and indeed that many participants in the room may have different ideas about what constitutes good governance. The facilitators invited these suggestions, in addition to any pillars of good governance that were suggested. Participants shared what they considered to be other pillars of good governance including: the rule of law (utawala wa sheria); representation (uwakilishwaji); accountability (uwajibikaji); transparency (uwazi); legitimacy (uhalali), and integrity (uadilifu).

Finally, the lead facilitator explained the concept of multilevel governance – a framework for studying governance that explicitly emphasizes the importance of actors operating at different levels and representing distinct sectors. Horizontal and vertical linkages are critical determinants of land use decisions from a multilevel governance framework, and this is why actors from multiple levels and sectors were explicitly invited to this workshop. Several participants pointed out that being in the presence of actors from different levels of governance and sectors enabled them to hear others point of view, and helped them to get their own points of view across to other actors. The workshop also served as a forum for communication and knowledge sharing and transfer across different sectors and levels of governance/government. Participants, therefore, expressed their desire to have similar forum on a more regular basis.

Fig 25. Plenary. (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)
Photo by Ashwin Ravikumar

7.4 Monitoring and Indicators of Multilevel Governance/ Ufuatiliaji wa viashiria vya utawala wa ngazi mbalimbali

Approximate time: 1.5 hours, plenary and breakout groups

Objective

The purpose of this activity was to identify indicators of governance that can be measured objectively. These indicators should be conducive to further steps with interested participants to develop a governance monitoring tool.

The following steps were involved in this activity:

1. Presentation by facilitation team on the concepts of "indicators" (*viashiria*) and "monitoring" (*ufuatiliaji*) (10 min)

The lead facilitator explained the concepts of "indicators"/*viashiria* and "monitoring"/*ufuatiliaji* in the context of governance (*utawala*). An indicator can be described as something that is measurable and verifiable that tells us about something more fundamental or harder to measure. An individual indicator is usually an incomplete measure of the underlying concept that it is designed to assess, but multiple indicators can jointly measure a concept more completely. For example, if we are interested in "participation of actors from multiple levels and sectors" as an underlying governance concept, then the number of municipal governments that attend each meeting in a particular land use decision-making forum might be one indicator. Another indicator might be the number of proposals from local governments that are taken up by a higher level of government. The degree of satisfaction of civil society actors with decision - making processes, as measured by surveys, or their satisfaction with their own level of participation may be indicators of their level of participation.

Once such indicators have been defined, questions remain of *who* will monitor these indicators, *how*, and *when*. An NGO or government agency itself may monitor and measure these indicators, or some other body may be responsible for it. These are all part of the "monitoring" process, which requires clarity in these areas. The lead facilitator explained all of this to the group in plenary, while allowing comments from other facilitators and participants.

2. Development of governance indicators in groups (45 min)

In the same groups that worked on developing strategies, activities, and steps in the previous breakout groups, facilitators worked with groups to answer the following questions. Each group was instructed to describe these for one or two of the activities/strategies elaborated in the previous exercise:

-- What should be monitored? That is, what indicators can be measured to inform us whether we are engaged in good processes that lead towards realizing the strategy or activity that ultimately leads to the desired future scenario? What are the indicators for governance associated with the strategy or activity from the previous exercise?

-- Who should monitor each indicator? Each indicator may be of a different type, and require a different monitoring strategy. Some may require simply documenting aspects of participation in meetings, others may require using secondary data such as court documents to report on frequency of sanctioning, for example, and still others may require resources to administer surveys or conduct original research. Who is best equipped, and most appropriately suited, to actually do the monitoring?

-- When should these indicators be monitored? Is this a short-term, medium-term, or long-term monitoring need? How frequently does it need to be monitored? At the end of this group work session, each breakout group presented their outputs to the broader group.

Each group was advised to identify however many indicators they feel are necessary, but that it was best to contain it to two activities identified in the previous exercise. Possible topics suggested to encourage participants to think about indicators include participation and transparency in key forums, information flow among actors, evidence of capacity building, coordination between levels and sectors, lack of participation of certain levels of government or certain divisions, or relationships between civil society and sub national governments. (Note: the section suffered from lack of adequate time to complete the exercise properly, as it was close to the end of the workshop. Groups had been excessively engaged in prior activities and spent more time on them. This observation should serve as a methodological and time keeping caution).

Fig 27. Examples of Groups' identified monitoring indicators of governance. (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015)

Table 4: Monitoring indicators of multi-level governance

Strategy	What to monitor (indicator)	Who should monitor it	When should it be monitored
To improve and increase community social services	• Number of people educated/sensitized on family planning • Number of families practicing family planning • Child spacing	• Government • Development Partners • Village Health Committees	• Quarterly • Annually
	• Number of Health Centers and schools built	• Government	• Annually

	• Number of :
	  ○ Health personnel recruited
	  ○ Quality and quantity of medicines
		• Government
		• Village health committees
			• Quarterly and Annually

	• supplied • Reduced mortality rate • Increased life expectancy		
Management of landscape for improved community livelihoods	• Land conflicts decrease • Number of community members utilizing planned areas (land use)	• Participatory Land Use Monitoring team • Village land use Monitoring committee	• Every six months and • Every one year
Capacity building in skills, marketing, entrepreneurship (capital)	• Behavior change • Change in production pattern	• Extension officers	• Every six months and • Every one year
Climate change mitigation and adaptation	• Number of community member using mitigation and adaptation measures /interventions	• Extension officers	• One every year
Growing the economy and reducing environmental degradation	• Increase in high quality housing • Increase and Improvement in social services • Increase in number investments in social services • Decrease in conflicts	• Relevant Ministries and Agencies • National environmental management council (NEMC) • District Councils	• Every five years

3. Presentation and discussion of monitoring option (5 min.)
This was a good opportunity to discuss next steps. Developing indicators is a first step in a larger process of actually implementing and socializing governance monitoring. There are several options for next steps that were mentioned to participants. The most basic option is simply to share the outputs of the workshop including the indicators with the group, so that actors present can take the next steps themselves and use the workshop outputs as inputs into a governance monitoring tool or other governance monitoring activities that they wish to coordinate. This report presented here, which will be shared by willing participants, serves that purpose. A more intensive option is to solicit feedback on which participants are interested in monitoring and believe that their organization is either itself equipped to monitor governance, or may involve another organization. Presently such option has been left open. The most intensive option, if interest and resources are sufficient, is to hold another workshop focused explicitly on developing a governance monitoring tool with actors from relevant organizations. This

option too, has been left open presently as it will depend on future interests and resources from both the organizers and participants.

7.5 Open Discussion on Multi-Level Governance

Approximate time: 30 minutes to an hour, plenary

The original objective was for the facilitators who had conducted research prior to the workshop with results to share, to use this opportunity to do so, lending some context to the work done in the workshop and sharing relevant findings. However, by this time it had become obvious to the facilitators that some participants had also shown a great interest to share their experiences. Thus, the facilitators made this an open discussion session where both facilitators and participants shared their experiences on multi-level governance of land use decisions.

Fig 28. Open discussion on multi-level governance experiences. (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015). Photo by Ashwin Ravikumar

Some of the key themes that emerged during the open discussion on multi-level governance include:

- Prevalence of land use conflicts require a comprehensive strategy to limit and mitigate land use conflicts. Preventive measures more important than reactive measures;

- The need for institutional cooperation between different levels of governments in land use decision making . This should involve different sectors and to harmonize policies, programs and procedures;

- Regular exchange of information between actors from different sectors and different levels of government in order to harmonize activities and resolve conflicting interests and priorities;

- Transparency, accountability and integrity in land use decisions e.g. in allocating permits to investors allowing them to develop forest plantations of large farming;

- Corruption and political patronage are some of the major barriers to enforcing current land use laws e.g. currently they allow encroachment of protected areas by residents;

- Respect for the rule of law is necessary to ensure environmental sustainability, and to address land grabs, encroachment and land conflicts;

- Enforcement of existing land laws – currently laxity of enforcement, corruption, bureaucracy and political patronage hinder effective enforcement;

- Stronger involvement of citizens and other stakeholders in land use decisions and rule making and enforcement;

- Citizens need to develop a culture of abiding to the laws and regulations regarding land use decisions – to address the problem of encroachment into protected areas

7.6 End of Workshop Survey

Approximate time: 30 minutes

Objective

To collect feedback on the workshop in general and the dynamics within it in particular. This was intended to be used to improve the methodology and ensure that participants have a chance to share their thoughts and reactions with the facilitation team. The following survey represents Iringa workshop participants' responses. The findings are presented by the frequency of responses out of 20 participants who completed the survey, followed by the percent of respondents that checked the answer (in brackets):

Please mark the degree to which you agree or disagree with the following statements about this workshop. On a scale of 1-5 (1= strongly disagree, 5 strongly agree), how do you feel about the following statements?

	1.(strongly disagree)	2.(disagree)	3.(neither agree nor disagree)	4.(agree)	5.(strongly agree)
a. This workshop involved all actors that should have been involved	1 (5%)	3 (15%)	2 (10%)	9 (45%)	6 (30%)
b. I had enough information to contribute to discussions	1 (5%)	2 (10%)	2 (10%)	10 (50%)	5 (25%)
c. I felt comfortable expressing my opinion				8 (40%)	12 (60%)
d. The discussions were always dominated by the same people	6 (30%)	10 (50%)	1 (5%)	2 (10%)	
e. I felt that my opinion was respected by the other participants				5 (25%)	15 (75%)
f. I felt more comfortable in the thematic groups (the first day) than in the mixed groups (the second day)	1 (5%)	4 (20%)	3 (15%)	5 (25%)	7 (35%)

From the responses above, a significant number of participants believe/agree that this workshop involved all actors that should have been involved (but there is a fair number of participants who don't believe so). But very strong majority believe/agree that they had enough information to contribute to discussions – with very few who do not believe so; all respondent said they felt comfortable expressing their opinion; They felt that their opinion was respected by the other participants; and they felt more comfortable in the thematic groups during the first day than in the mixed groups during the second day (though a fair number disagree on this latter aspect). Also a significant majority disagree that the discussions were always dominated by the same people. One can conclude that the workshop provided a friendly environment for all participants to contribute and be respected. An open question (below) was also asked to the participants. Some of the insightful responses are provided below:

Would you like to share any other thoughts or feedback with us?

Some insightful responses from respondents include:

- Participants and stakeholders should be informed of workshop findings/report
- The workshop has been eye opening on land issues – hope we will receive the report
- Would like to continue to be engaged in similar initiatives
- I would prefer that more participants were interactive/conversational
- The workshop taught us how to calculate carbon emissions, but did not teach us how we can benefit from reducing our carbon emissions
- Workshops of this kind should be offered more regularly
- The workshop touched me greatly, particularly during the land use change mapping exercise
- Carbon modeling presentation should include more details on how to measure carbon; also a field visit to elaborate various issues should have been more informative
- I have learned a lot from other participants
- I have greatly enjoyed the participatory nature of the workshop
- Land is a very critical issue in our country – workshops should also be organize to educate on land rights
- Great workshop that has brought different stakeholders with a shared interest. The similar approach could be used at community/ grassroots level as a means to raise awareness on land use and management issues
- I have enjoyed the workshop; and I expect that the people of Kilolo district whose landscape was used for the workshop will benefit from receiving the workshop report

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9 ANNEXES

9.A. Participants

Workshop participants. (CIFOR-VITRI Workshop, Iringa, Tanzania, March 3-4, 2015).

KUJIANDIKISHA KUSHIRIKI WARSHA SIKU YA 1/ WORKSHOP REGISTRATION DAY 1

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Building Future Scenarios: Governance, Land Use, and Carbon Management at the Landscape Sca...

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