Participatory mapping in Ntcheu district, Malawi

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Water, Land and Ecosystems

Background

The Acting together now for pro-poor strategies against soil and land degradation (AGORA) project aims to improve the lives of the rural poor by mitigating or reversing the land degradation that threatens their livelihoods and the underlying natural resource base and to sustain long-term productivity of their landscapes. Working in Malawi and Tanzania to identify the factors that drive land management decisions, especially those that influence the adoption of sustainable land management (SLM) practices, AGORA seeks to facilitate a process by which farmers are empowered to work together with other stakeholders to design and implement equitable solutions to land degradation and associated development problems.

The Ntcheu district of central Malawi (Figure 1), has received considerable attention in research and in development programs. In Ntcheu district there are significant constraints to production due to limited land availability, small farm size, scattered plots, poor access to inputs and expansion of agriculture into forested and riparian zones. Ntcheu district covers an area of 3,424 km^2. The population density of Ntcheu is about 108 persons per km^2 and the average landholding size is 0.91 ha. The district has two distinct terrain patterns: the upland area bordering Mozambique in the west and the Shire River Valley with alluvial soils to the east. Temperatures are warm and temperate, with mean annual temperatures of 15–20°C. The mean annual rainfall ranges from 600 mm to 1,200 mm.

In Malawi, to counter the effects of degradation, the government in collaboration with donor agencies and nongovernmental organizations, is designing and implementing various sustainable land management (SLM) reforestation and fertilizer subsidy programs. However, much remains to be done to ensure that these plans are adapted to local biophysical and socioeconomic contexts, rather than scaled-out in a uniform manner. The four focus villages in Ntcheu district for the AGORA project are: Mpulula, Malaswa, Kapalula and Gwauya.

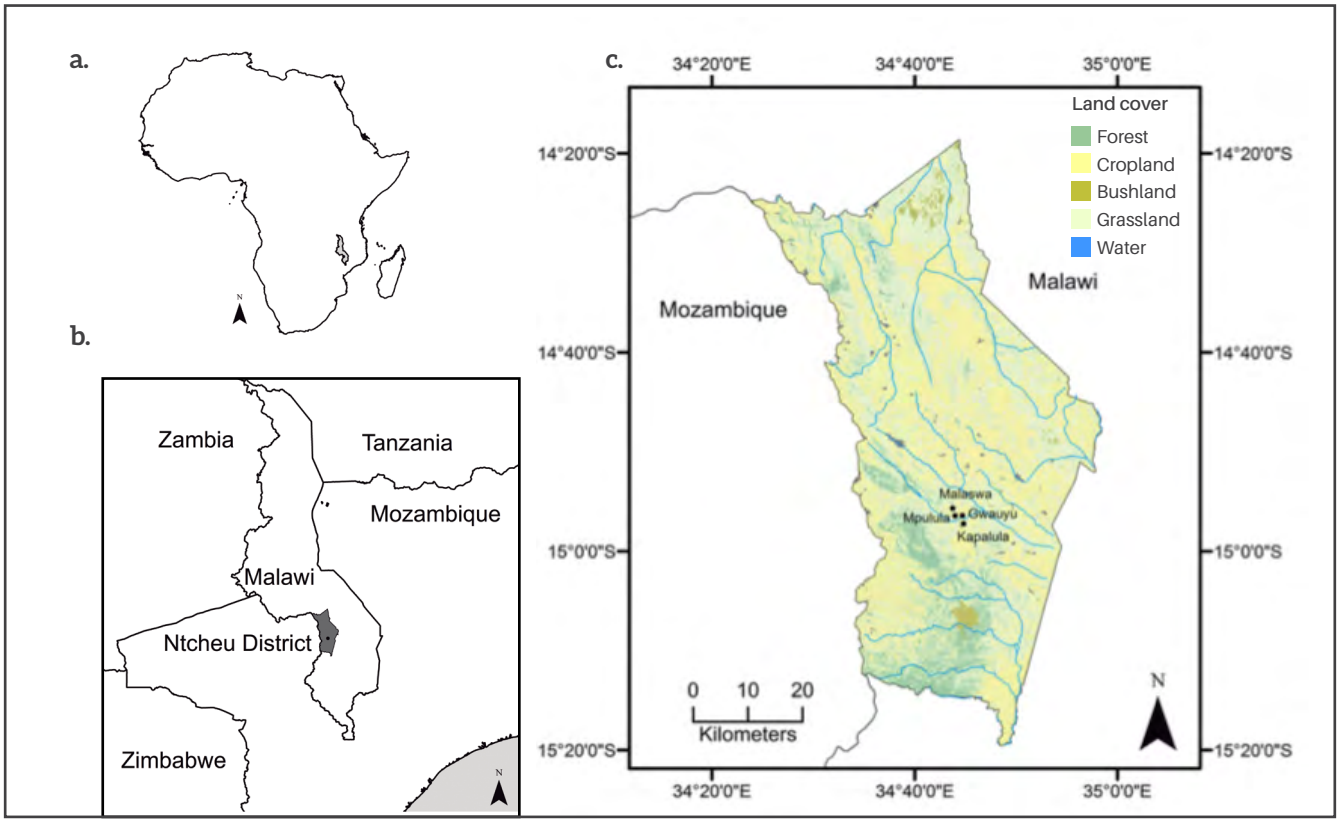

Figure 1. Location of the case study site in Africa (a), and in Malawi (b), with Ntcheu district shaded in gray. The four focus villages where the mapping was conducted are shown within Ntcheu district (c). Land cover for 2010 was obtained from GLC30.

Approach

Focus group discussions (FGDs) and interviews were conducted in October 2014 and informed the participatory mapping of ecosystem services exercise in the four focus villages in Ntcheu district in January 2015. In each community, the mapping was carried out with three separate groups – men, women and youth.

Aims

A participatory mapping of ecosystem services approach was used in this research to get a broad view of the local agricultural, social and biophysical context of this area in order to understand how communities and groups within those communities (men, women and youth) used and accessed resources across the landscape and the implications this has for the implementation of SLM measures.

How the mapping was adapted for this case

- Maps showing the extent of the area within 3 km of each community were used.
- Maps and legends were laid on tarpaulins or mats on the ground and groups of 8–10 community members sat around the map and legend.
- During this exercise we used the entire list of questions (Appendix 3 of the participatory mapping guide) and a detailed legend with different stickers/ labels for each good/resource. The mapping exercise focused on: water, livestock grazing areas and areas used to collect fodder (to feed livestock), uncultivated areas (such as forests) and cultivated areas (including plantation forestry).
- At the end of the mapping exercise, each group elected a representative to explain the highlights of their maps in 5 minutes in front of the entire community and then an open discussion was facilitated around the differences, similarities and main lessons learned from the mapping activity.

Process
How the step should be implemented

Results

Participants sit around the maps whilst facilitators use the entire long list of detailed questions and legends to lead the mapping exercise.

Challenges

- The standard questions that were asked for each resource were printed and available for the facilitator and translators in English, but it would have made the process easier if the questions were translated into the local language.
- Many of the participants were unable to read and/or felt uncomfortable writing, so they were unwilling to label or write on the maps. This made full participation by every person challenging, but with skilled facilitation it was still possible to make everyone feel included and their perspectives validated and respected. The facilitator ensured that all participants understood what each symbol represented verbally before they were placed on the maps.
- Using the full list of resource questions required 3 hours to complete the mapping activity and by the last hour, many of the participants were tired from sitting and the discussion.
- Participants in Malaswa village, where there is hilly terrain, struggled to identify the initial landmarks and orient themselves with the map.

- Low soil fertility was listed as a major problem in all the communities, but was difficult to map as it was so chronic and widespread that highlighting it would have covered the entire map. Instead this information was captured in the notes.
- All three groups in any given village may locate specific resources in slightly different places, which can make consolidating the maps during the digitization process challenging. Ground truthing would be required to confirm the location and the condition if the maps are to be used for specific planning or investment purposes.

What worked well

- In one group, a facilitator helped prepare the appropriate stickers (based on the resource being discussed) and handed them to the participants to place on the map after the entire group had agreed upon the appropriate location.

Participants first draw major landmarks on flip chart paper to help orient them to the map.

- Participants were happy to erase their mistakes with nail polish remover on the transparencies, especially when there was discussion and disagreement about locations or names of landmarks or resources.

Tip

In cases where the area has steep terrain or where participants have difficulty in identifying features, participants should first be asked to draw major roads and rivers on to a piece of flip chart paper. Once they are confident with this, they can transfer these details to the map, which will make it easier for them to locate where they are.

Note

If you do not use transparencies and write directly on the maps, this erasing technique will not work. Additionally, if there are many erasures, it can take quite a bit of time to complete.

- We discussed the community options to address the main challenges identified in each group, which led to rich discussion and exploration of opportunities and constraints for adopting the suggested practices. For example, tree planting and nurseries as well as enforced community by-laws were suggested by nearly all of the communities.

Key learning points

Differing perspectives of women, men and youth on resource use and access

- The youth groups reported changes in the quantity and quality of water for taps and boreholes but the men's and women's groups did not report any changes.

- The women preferred to grow maize; men focused on sweet potatoes.
- Men controlled livestock.
- Women said that they sold their labor to buy food, but men did it to get paid in alcohol… "In the past, men did not drink so much but these days when there is so little food, they turn to alcohol".
- While the men and women said there were no new areas that had recently been cultivated, the youth mentioned that there were some new plots along the river and in a wetland.
- The youth groups attributed changes in water quantity to climate change and a lack of trees.
- Women considered boreholes to be the most important source of water because they consistently had water.

Water

- Rivers were used for watering livestock and for irrigating crops.
- All groups confirmed that the quantity of water in rivers had declined and they often ran dry during the dry season (October and November).
- Participants suggested that planting trees and vetiver grass might mitigate the impacts of the floods but that no one had taken any action to do this.
- Conflicts had also arisen over wells and if people had not paid to use the taps.
- Water quality in the rivers has declined since 1992.

Uncultivated areas and goods

- In Malaswa village, villagers recognized the importance of trees for addressing land degradation. Yet in 1999, when 1,000 seedlings were planted as part of a project to set up a community nursery, all but two dried up or were eaten by termites. The community said that it had not been made clear at the start of the project who was supposed to take care of the trees and who would benefit from them.
- The community earned cash income from sand mining, bricks and labor.
- These communities use the following resources from uncultivated areas: fuelwood, timber, poles for construction, bushmeat, mushrooms (some also grew in fields), fruits, honey, grass (for weaving) and charcoal, but access to forest resources varied across villages.
- Resources were declining from uncultivated areas due to deforestation and the women said that it was taking longer to access forest resources.

Livestock

- Villagers kept chickens, ducks, doves, rabbits, pigs, goats and cattle, but numbers varied across villages.
- Livestock numbers have declined in the last 10 years because of diseases, a lack of veterinary services in the villages and because most of the grazing land has been lost to cultivation and deforestation. Now many people have to buy milk.
- The livestock population is increasing in one area (Mpulula village) because the community practices livestock loans there.
- All of the land was privately owned by the people and as grazing is limited, conflicts have arisen when cattle graze on other people's land, especially when there were crops in the fields.
- Low cattle numbers means there is not much cattle manure available. Households who own livestock used animal manure and it was usually applied on fields close to their homesteads.

Cultivated areas

- Crops grown included: maize, soybean, beans, groundnuts, millet, sorghum, tobacco, cowpea, pigeon pea, sweet potato, beans and cassava.
- Land was often rented out, but if a renter had a good crop, the owners often took their land back and grew tobacco on it, which reduced the incentives for renters to use practices that maintained productivity.
- Termites were a big problem in all the cultivated fields in the villages.
- Increasing land scarcity was leading to increasing pressure on the wetland areas for cropland.
- Fields near homesteads were more productive as people applied ash, household waste and manure to them.

Soil

- Low soil fertility and erosion were identified as a major problem in all the communities.
- In general, all cultivated fields were low in soil fertility. Low fertility was said to lead to low productivity.
- Newly cultivated areas near the river that used to be wetlands were considered to be very productive.
- Uplands have lost fertility, whilst the lower lands (near the river) were more fertile.

Overall learning points

- Participants showed that resources, from water to grazing land to trees, were declining, identifying population pressure as a major cause.
- Cropland renting patterns differed widely from village to village.
- Unavailability of jobs drove villagers to make charcoal so they could generate cash for their daily needs.
- Landscape issues: plots appear to be spread out across the landscape, though the extent of fragmentation was hard to estimate using this exercise. Accessing trees, grazing areas and land rentals required people to travel some distance, and access resources outside of their village boundaries. Different landscape niches provide different resources and livelihood benefits such as sand, clay, trees, grass and forest products, etc. These are to some extent gendered.

Who was involved?

CIAT in collaboration with Total Land Care (TLC) and Lilongwe University of Agriculture and Natural Resources (LUANAR).

How was it funded?

AGORA is funded by the German Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) and the CGIAR Research Program on Water, Land and Ecosystems (WLE).

Outputs

A detailed report including comprehensive notes and insights from all the maps was produced. This participatory mapping exercise was designed to facilitate discussions and understand how people use the landscape, rather than as a comprehensive ecosystem service assessment. Here we present examples of how information from the mapping activity can be interpreted and used to show how people are using landscapes.

How is the landscape used?

Maps such as Figure 2 can be used as a simple way of assessing how different communities access the landscape around them. This map shows where different communities are accessing timber and non-timber forest products (NTFPs), which often lie beyond the boundaries of one individual community. You can see that potential changes in resource availability or quality in one area would affect individuals living in multiple surrounding communities.

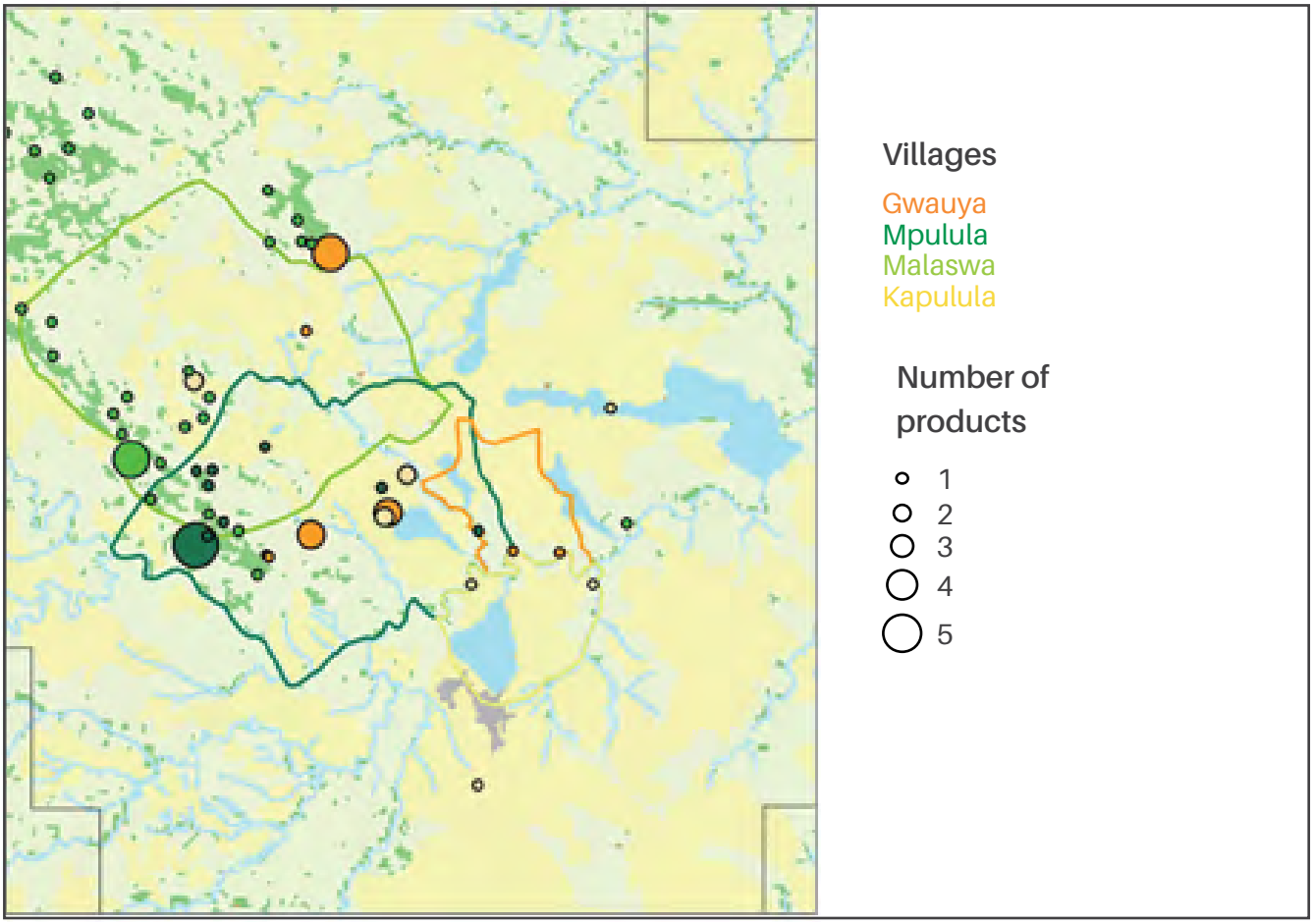

Figure 2. This map shows how communities from all four villages use timber and NTFPs, which are spread across the landscape. Black borders represent areas that fell outside of the maps used by the community during the participatory mapping exercise.

Using maps to explore general patterns of land use and access

Digitizing the maps generated during the participatory mapping exercise can generate maps, which will allow us to understand the differences among villages and across the landscape. For example, the four village boundaries are outlined in the maps shown in Figures 2 and 3, although villages did not adhere to them when accessing resources; they clearly show that some villages have access to more resources than others. For example, Malaswa and Mpulula villages have much larger boundaries that encompass forest; individuals own this forested land and they can choose to farm on it if access to land within the cultivated areas becomes scarce.

The map in Figure 3 shows land-use patterns, termite hot spots, and soil degradation hot spots among communities and renting patterns. The more marginal lands, e.g. those with soil erosion, termite infestation and waterlogging, are more likely to be rented out.

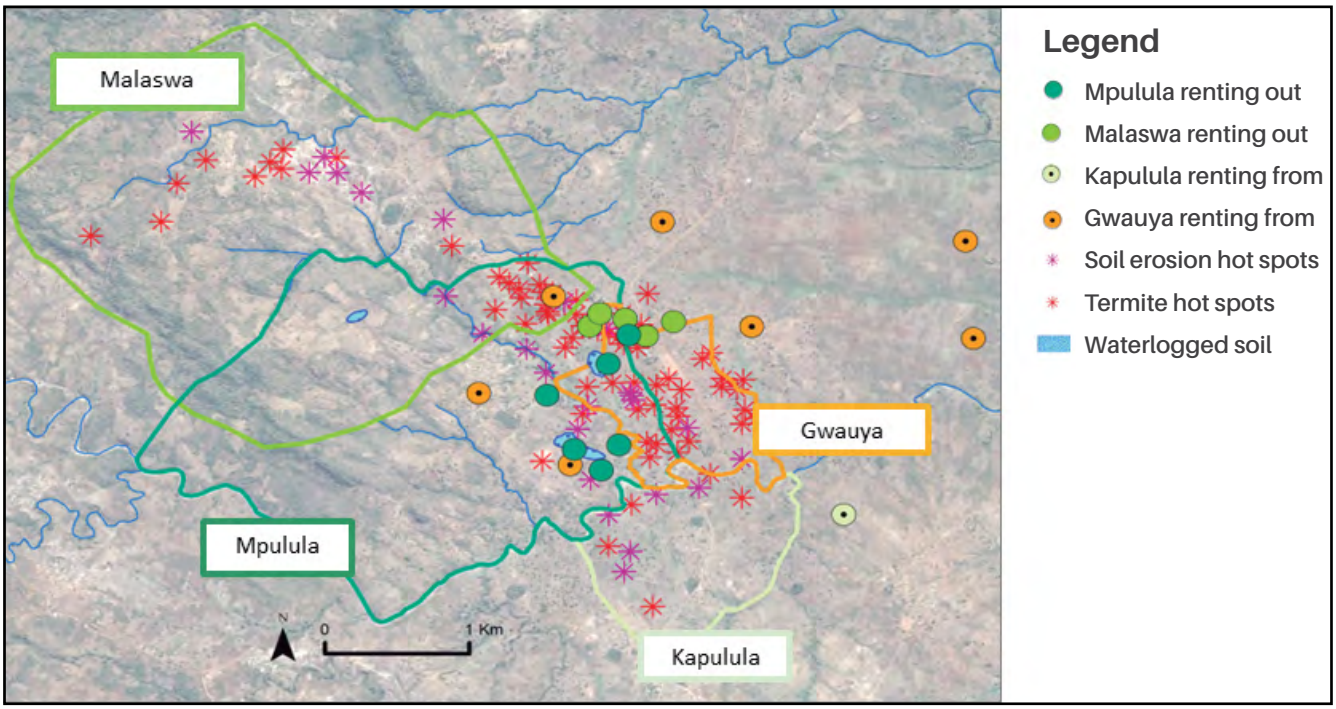

Figure 3. This map shows the areas where each of the four communities in Ntcheu district, Malawi (Malaswa, Mpulula, Gwauyu, Kapalula) either rent land to others (solid circles) or rent land from others (solid circles with center dots) as indicated by each community during the mapping exercise. It also shows areas that are waterlogged, have soil erosion or have termites.

We can interpret this map (Figure 4) to better understand the implications and patterns. For example, Gwauyu does not have enough land so farmers have to rent from surrounding villages (red arrows). Land leased out by villagers in Malaswa and Mpulula villages is often waterlogged, eroded or infested with termites (highlighted by red circles). Malaswa and Mpulula villages have new land available for cultivation in the forest (red rectangle).

This kind of map helps us to see that even within a 4 km^2 landscape communities have different challenges to investing in soil management. Farmers in Gwauyu do not have enough land so farmers have to rent from surrounding villages, which means that their fields are further away and more difficult to farm. It is also likely that this rented land is of poorer quality, leading to lower yields. In this renting scenario, farmers are less likely to invest in SLM because landowners often take back their land to grow tobacco if productivity is high. Additionally, the extra cost of renting land means they have less money available to invest in sustainable land management.

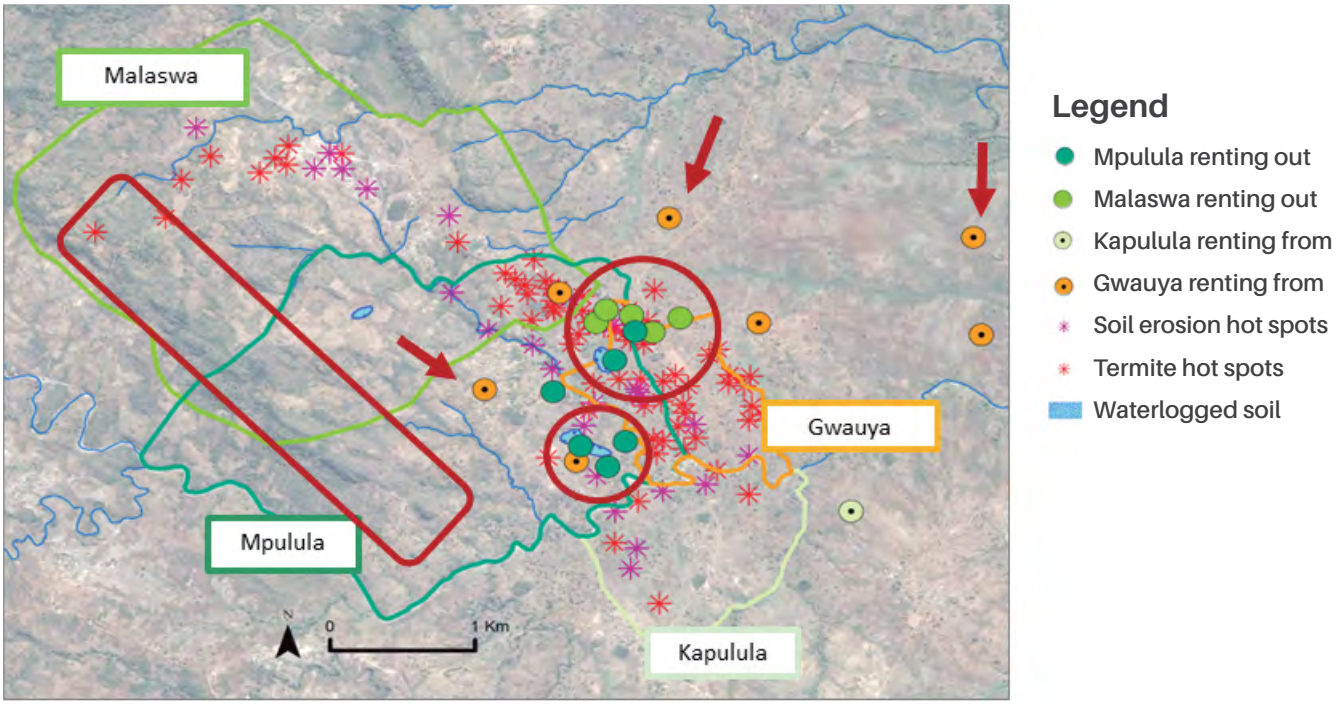

Figure 4. This map highlights areas where we interpret some of the patterns that emerge from digitizing the resources mapped by the participants.

If we keep the previous map (Figure 4) in mind and then overlay the identified newly cultivated areas, grazing areas, and forested areas as in the map below, we can see that the grazing and forested areas are at risk of over-use for cultivation, grazing and forest goods (Figure 5). This use should be managed to ensure that communities continue to benefit from uncultivated areas.from uncultivated areas.

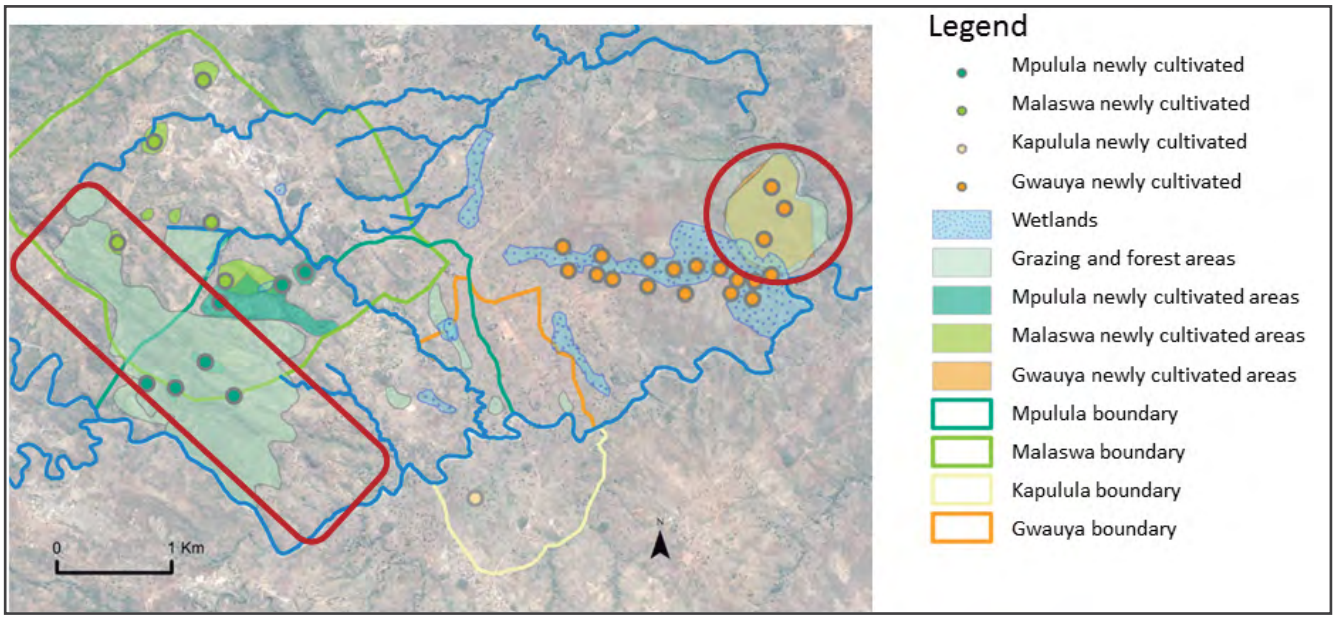

Figure 5. This map shows new cultivated areas (circles) identified by each village and the corresponding colors show newly cultivated areas. These overlap with grazing and forest areas (red circle and rectangle).

Mapping ecosystem service hot spots

We can also map ecosystem service provision hot spots by combining all the data from the four communities (Figure 6). The map shows where most ecosystem services are provided across the landscape. These maps can only be used to reveal general trends as interpreting data that was collected as points can be problematic. However, this can be used a tool to aid discussions around planning for better land use. Comparing this map with the map above (Figure 5) shows that many of these areas are potentially threatened by conversion to agriculture.

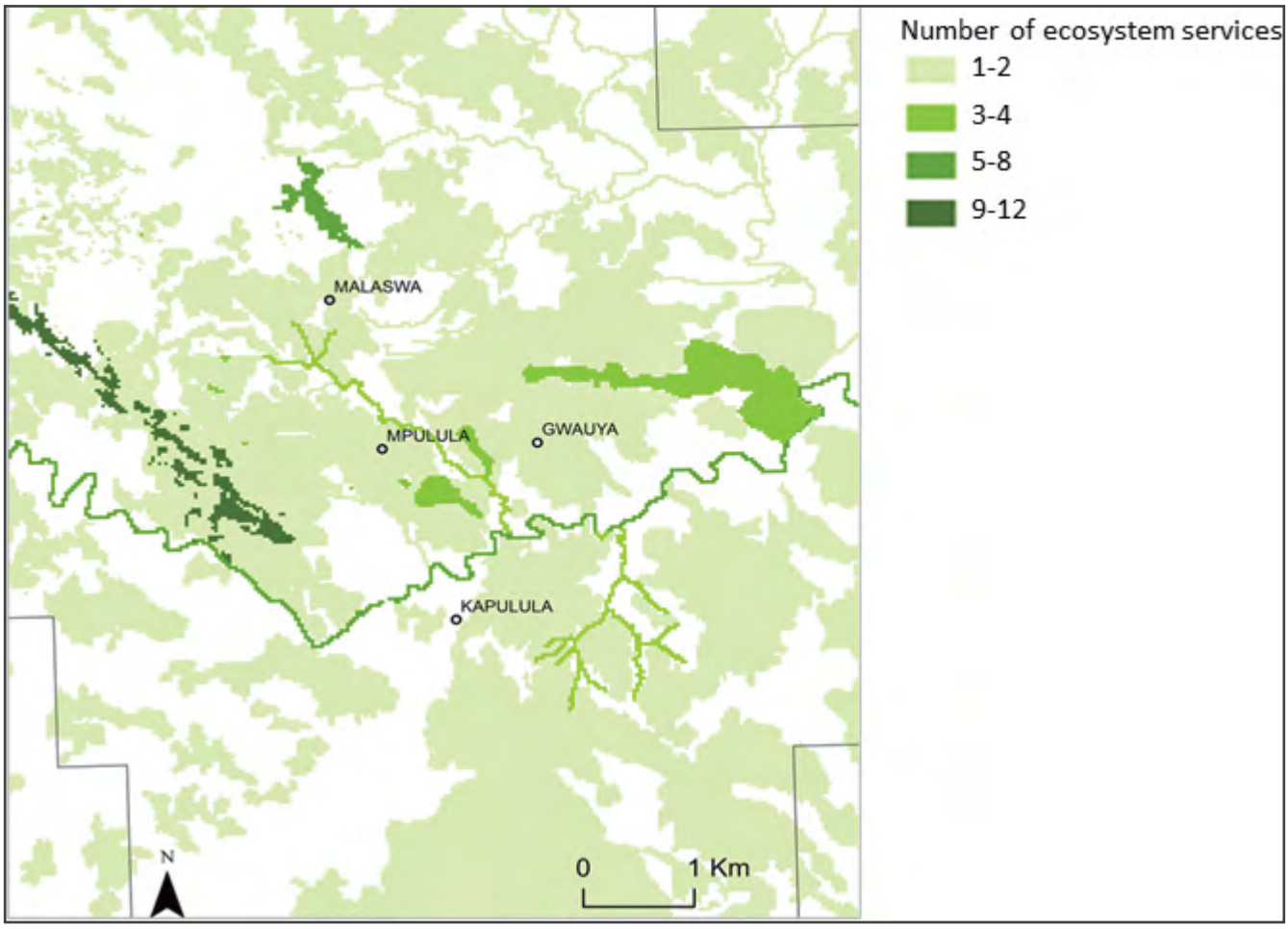

Figure 6. This map shows the number of ecosystem services associated with different areas. Ecosystem services include water, livestock grazing area, crop production, flood control, climate regulation, timber, fuelwood, NTFPs and areas of spiritual importance. The darker the green color the more communities are using the area. Black borders represent areas that fell outside of the maps used by the community during the participatory mapping exercise.

How can this information be used?

The mapping exercise led to more in-depth discussions and community members identified actions they hoped could address some of their problems. Follow-up engagement in the communities will focus on identifying incentives for community-created land management projects with a specific focus on some of the priority areas identified in the maps above.

Whilst the mapping exercise provided the research team with insight into the land and the community, participants also learned from each other. For example, younger community members learned about cultural and spiritual places used in the past. Additionally, patterns and connections that the mapping exercise revealed will help to find locally appropriate solutions. We have also used these maps to develop scenarios of plausible futures based on past changes and communities' perceptions of how conditions may change in the future.

How this participatory mapping has been used in the implementation of SLM projects in Malawi

This participatory mapping approach is being piloted by CIAT's development partner, Total LandCare, who implement large development programs across Malawi, Mozambique, Tanzania and Zambia. They are using this approach to strengthen the landscape and social focus of their development programs and help target SLM interventions

See more at: http://ciatblogs.cgiar.org/soils/land-management-matters-malawian-communities-create-maps-to-find-answers/

Citation

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