3. Potential zones for implementing different REDD+ activities – some examples

Results-based REDD+ actions comprising the final phase of REDD+ will be linked to payments, and must contribute to climate change mitigation through forest-related activities. These could include *reduced deforestation* and *forest degradation, sustainable management of forests* and *conservation of forest carbon stocks,* which can help to lessen carbon dioxide emissions; and *enhancement of forest carbon stocks,* which can remove carbon dioxide from the atmosphere. While emissions reductions and carbon sequestration are the main goal, actions also need to contribute to a desirable development pathway for the country. As elaborated upon in Section I of this report, the purpose of REDD+ safeguards is to avoid REDD+ actions causing harm, and promote social and environmental benefits.

The National REDD+ Strategy for Tanzania identifies a number of strategic actions for addressing drivers of deforestation and forest degradation and thereby maintaining or enhancing forest carbon, while also respecting safeguards. Some examples are shown in Box 1.

- **Promote forest conservation**
- **Scale-up the Participatory Forest Management regime**
- **Support participatory land-use planning**
- **Invest in sustainable forest based enterprises for both timber and NTFP's**
- **Support the land-use planning commission to develop and implement national land use plans**
- **Establish and manage forest plantations/wood lots, agro-forestry for commercial use**
- **Promote establishment and management of woodlots at household level**
- **Promote planting and awareness raising of timber species**
- **Promote environmentally friendly wood utilization technologies**
- **Promote the use of lesser known and lesser utilized timber species**

Box 1: Examples of strategic actions identified by the Government of Tanzania to address drivers of deforestation and forest degradation through REDD+.

This section aims to demonstrate how mapping processes can be used to identify potential zones for implementation of Tanzania's strategic actions, through four example maps. These maps cover four categories for action:

1. Possible zones for maintaining existing forest and avoiding timber extraction
2. Possible zones for employing sustainable forest management techniques in production forest reserves
3. Possible zones for extending areas of community based forest management (CBFM)
4. Possible zones for REDD+ actions to rehabilitate forests

The maps can serve as an initial assessment of potential zones where certain REDD+ actions could be implemented. However site-scale spatial information is likely to be needed later in the planning process for detailed decisions on locations for REDD+ interventions. The maps could be improved with the addition of more refining parameters, and other maps could be developed for more strategic actions than the ones covered here, for example zones where plantations, woodlots or agro-forestry could be established.

Map 20

Identifying potential zones for REDD+ actions to maintain existing forest and avoid timber extraction (for example by enhancing forest conservation)

Relevant REDD+ activity/ies: *reduced deforestation* and *forest degradation; conservation of forest carbon stocks*

Examples of relevant strategic actions from the REDD+ Action Plan: Promote forest conservation

ABOUT THE MAP

This map can be used to identify where actions to maintain forest could provide the highest carbon benefits (forest areas with high current carbon stock will give higher benefits). In addition to carbon stocks, the following parameters could be taken into account in order to identify potential zones for maintaining existing forest and avoiding timber extraction: **importance for biodiversity and ecosystem services** (high existing values of biodiversity and ecosystem services would yield greater benefits if the forest was maintained, **see maps 6-10**); **current and expected future pressures on carbon stocks, biodiversity and ecosystem services** (higher pressure on the above values means that the risk of deforestation or forest degradation is higher, and therefore that the benefit of actions to maintain the forest will be higher. On the other hand, higher pressure will often mean that REDD+ implementation costs are greater. **See maps 16-19**). These maps will allow for an initial assessment of the potential for multiple benefits, and where specific actions are needed if the forest is to be maintained. It is important that the REDD+ activity that is selected to mitigate pressures is carried out in accordance with the REDD+ safeguards, e.g. without harm to local livelihoods, or displacing the pressure to other areas. Furthermore, areas of high cultural heritage value could be prioritized, including sacred forests. Sacred forests are generally respected locally, but may need to be protected from external pressures. The NAFORMA inventory recorded 19 plots as having cultural heritage potential, but for planning purposes a more targeted survey of important cultural sites is likely to be necessary.

PROCESS

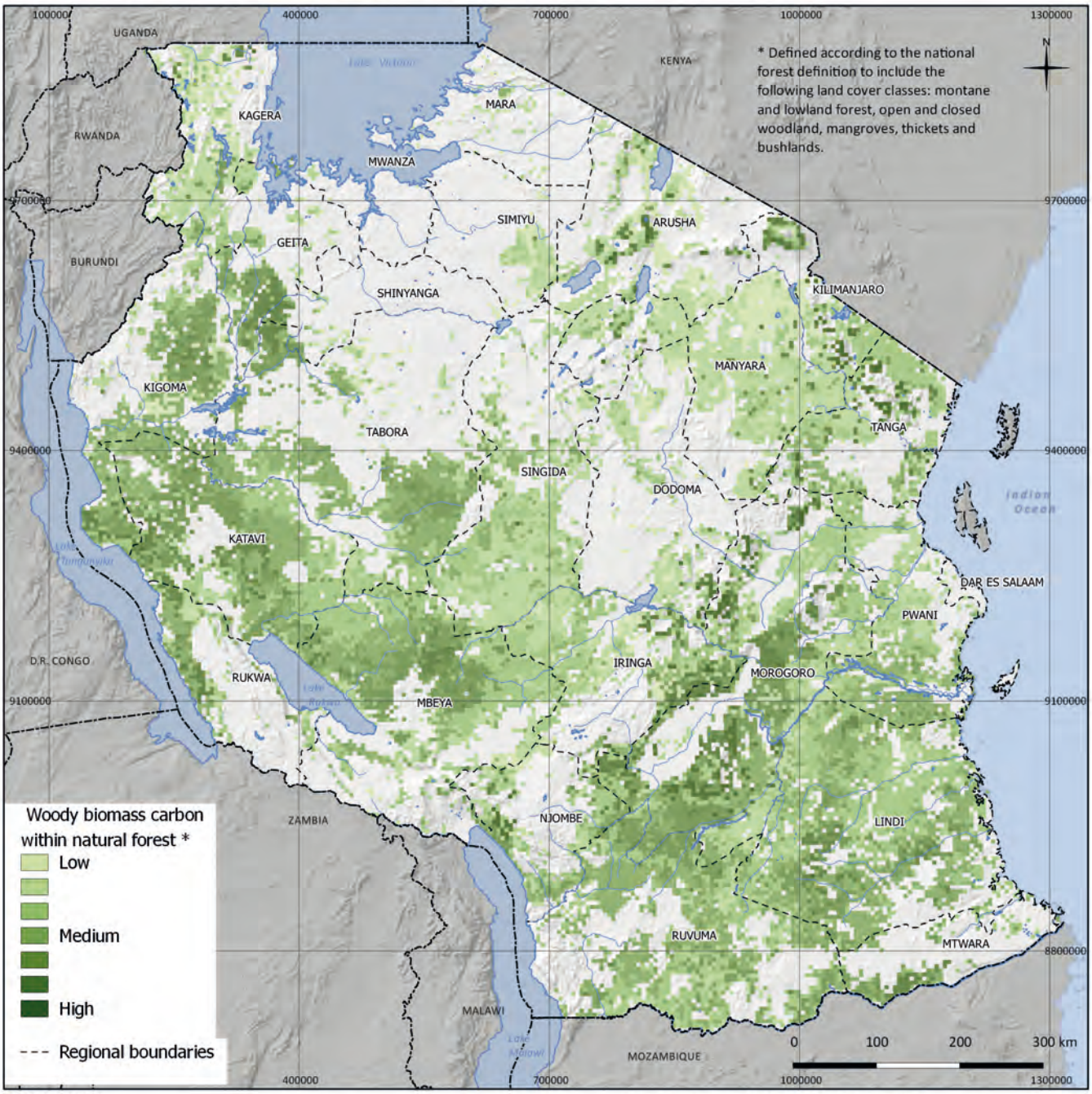
Map 20 was constructed as follows:

1. Natural forest (including thickets and bushlands) was selected from the NAFORMA land-use land-cover map. All other areas were blanked out.

2. Carbon values were assigned to the natural forest from the NAFORMA woody biomass carbon map.

Map 20: Potential zones for REDD+ actions to maintain existing forest and avoid forest degradation

This map shows natural forest with trees of a greater height than 2 m. A diverse set of REDD+ actions can be applied to maintain existing forest, and appropriate approaches will depend on local circumstances. High levels of carbon stocks will yield the greatest carbon benefits, which is the basic consideration of REDD+. However, actions to maintain existing forest can also yield numerous multiple benefits, such as protection of biodiversity and ecosystem services. This map can be complemented with spatial data relevant to the additional benefits desired from REDD+, to identify areas where the greatest multiple benefits can be achieved.



Data sources:
Natural forest: NAFORMA. 2013. NAFORMA land-use / land-cover Map 2010.
Woody biomass carbon: NAFORMA. 2013. NAFORMA Woody biomass only. 5km preliminary dataset based on field data.
Regional boundaries: Ministry of Lands, Housing and Human Settlements Development. 2011. Administration Map of Tanzania. Surveys and Mapping Division, Dar es Salaam Tanzania.

Map projection: WGS84 / UTM Zone 36S
Map prepared by Tanzanian Forest Service (TFS), UNEP-WCMC, FAO, Sokoine University of Agriculture (SUA) and Forestry Training Institute (FTI). Date: May 2013

Map 21

Identifying potential zones for REDD+ actions to extend areas of Community Based Forest Management (CBFM) for enhancing sustainable management of forests

Relevant REDD+ activity/ies: *sustainable management of forests*

Examples of relevant strategic actions from the REDD+ Action Plan: Scale-up Participatory Forest Management regime; promote establishment and management of woodlots at household level;

ABOUT THE MAP

Tanzania has implemented Participatory Forest Management (PFM) Programmes over many years (Ministry of Natural Resources & Tourism 2006), with the intention of integrating communities into forest management and addressing some of the critical forest governance issues concerning deforestation and forest degradation (Tanzania Vice President's Office 2013b). PFM is therefore considered a central approach for ensuring sustainable management and conservation of Tanzania's forests, and the scaling up of PFM, including through Community Based Forest management (CBFM), is a strategic action in Tanzania's REDD+ Strategy.

Where CBFM is currently implemented, forests are owned and managed (using a management plan) by a village government through a Village Natural Resources Committee. By 2008, the area reported under CBFM was 2 345 000 ha, which represents 11.6 per cent of unreserved forests (wards where CBFM has been implemented are indicated on map 21). The REDD+ Strategy notes that the current pace under which CBFM projects are established is very low, and that access to REDD+ finance through fund-based financing arrangements could facilitate and speed up this process and possibly reduce the high levels of deforestation and forest degradation (Tanzania Vice President's Office 2013a). Improvement of governance at the local level that can facilitate sustainable CBFM is needed, as the village institutions need capacity development in planning, mobilization, finance management, good governance, and lobbying (Tanzania Vice President's Office 2013a).

Map 21 shows forests on village land, where CBFM could be possible. Wards where CBFM is already being implemented are indicated through point locations, but more detailed spatial information of what forest land is currently under CBFM would be helpful for planning purposes. Information about **carbon stocks** can inform what kinds of actions could be included in land management plans from a climate change mitigation perspective (whether forest restoration or regeneration is needed, or carbon stocks are still high). E**cosystem services, including potential for forest based livelihoods** will need to be taken into account in land management plans (high existing values of non-timber forest products would yield greater benefits if the forest was maintained). The Tanzania REDD+ Action Plan defines a strategic action for investment in sustainable forest-based enterprises for both timber and NTFPs. For example, sustainable forest based enterprises could potentially include ecotourism in some areas. It could also be important to consider where there are other land uses planned, including concessions for large-scale commercial purposes. Naturally, development of CBFM plans need to be based on local data. The purpose of Map 21 is to illustrate the potential for CBFM in Tanzania, by mapping the amount of forest on village land and the relative woody biomass carbon values of this forest.

Implementation of CBFM should ensure transparent and democratic systems of information, knowledge sharing and governance, with conscious efforts to reach community members beyond the forest management committees (particularly the poor and marginalised). This may require more human and financial resources than those allocated if only work with forest committees is envisioned (Vyamana 2009; Blomley et al. 2011). In the context of a seriously degraded forest resource, where it may take years for the resource to be rehabilitated, direct employment of village guards, providing income and employment to poorer members of the community, could be considered until such time as the forest is able to generate revenues (for village development funds).

Additionally, it is important to consider how benefits are shared within communities to avoid the risk of poorer or more marginalized members of a given community losing out from the direct benefits, forest product harvesting rights and revenues of CBFM.

PROCESS

Map 21 was constructed as follows:

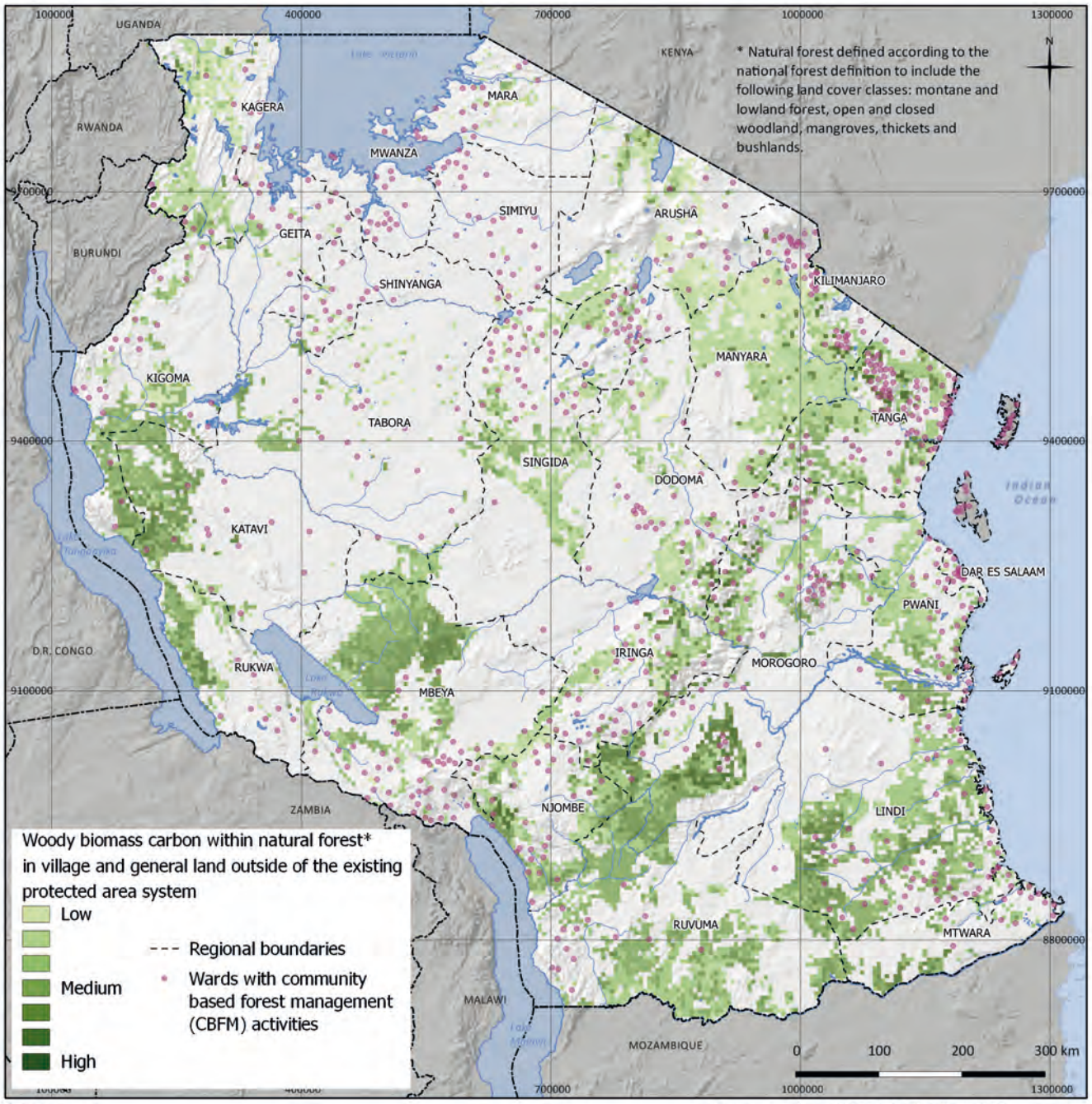
1. Natural forest (including thickets and bushlands) was selected from the NAFORMA land-use land-cover map. All other areas were blanked out.

2. Village and general land were displayed by blanking out reserved forest land (forest reserves and other protected areas), as this is land that is owned and managed by either central or local government. Remaining land should be largely village and general land (a definitive map of land designations was not available for constructing this map).

3. Carbon stocks were assigned to the village and general land, from the NAFORMA woody biomass carbon map.

Map 21: Potential zones for REDD+ actions to extend areas of Community Based Forest Management (CBFM) to enhance sustainable management of forests

This map shows areas of natural forest on village or general land. Points indicate wards that have existing (as of 2008) Community Based Forest Management (CBFM) activities. Scaling up the Participatory Forest Management Regime is part of Tanzania's REDD+ Action Plan. Participatory Forest Management is considered by the government to be a central approach for ensuring sustainable management and conservation of Tanzania's forests.



Data sources:
Natural forest: NAFORMA. 2013. NAFORMA land-use / land-cover Map 2010.
Woody biomass carbon: NAFORMA. 2013. NAFORMA Woody biomass only. 5km preliminary dataset based on field data.
Regional boundaries: Ministry of Lands, Housing and Human Settlements Development. 2011. Administration Map of Tanzania. Surveys and Mapping Division, Dar es Salaam Tanzania.
Forest reserves: Tanzanian Forest Service. 2013. Forest Reserves of Tanzania.
Protected areas: IUCN and UNEP-WCMC. 2013. The World Database on Protected Areas (WDPA) Cambridge, UK. Available at: www.protectedplanet.net.
Regional boundaries: Ministry of Lands, Housing and Human Settlements Development. 2011. Administration Map of Tanzania. Surveys and Mapping Division, Dar es Salaam Tanzania.

Map projection: WGS84 / UTM Zone 36S
Map prepared by Tanzanian Forest Service (TFS), UNEP-WCMC, FAO, Sokoine University of Agriculture (SUA) and Forestry Training Institute (FTI).
Date: May 2013

Map 22

Identifying potential zones for REDD+ action to enhance sustainable management of forest in production forest reserves

Relevant REDD+ activity/ies: *sustainable management of forests*

Examples of relevant strategic actions from the REDD+ Action Plan: Establish and manage of forest plantations/ wood lots, agro-forestry for commercial use; promote planting and awareness raising of timber species; promote the use of lesser known and lesser utilized timber species

Actions to promote sustainable management of forests under REDD+ can only bring carbon benefits if they are implemented in forests that would otherwise be used in an unsustainable way. Some production forest reserves in Tanzania are suffering from deforestation or forest degradation from different drivers, and improved management could ensure that loss of natural forest is avoided. Selection of production forest reserves where efforts could be made to improve management could start from Map 22 and take into consideration **carbon stocks** as shown on the map, **level of current degradation, and biodiversity and ecosystem services values** (maps 6-10). Adding information about **pressures on forest resources** (**see maps 16-19** for some examples) could provide some indication as to which production forest reserves are more likely to suffer from deforestation and forest degradation in the future if management efforts do not prevent these drivers.

Map 22 can thus provide a starting point for understanding where efforts could be targeted to introduce or enhance techniques for sustainable forest management in production forest reserves. The Tanzania REDD+ Action Plan defines several actions that can be considered in a framework for managing forests sustainably, including: investment in sustainable forest-based enterprises for both timber and NTFPs, promotion of environmentally friendly wood utilization technologies, and promotion of the use of lesser known and lesser utilized timber species. If this map is brought together with data layers that indicate **biodiversity and ecosystem services values** (**maps 6-10** provide some examples of relevant data), the potential for multiple benefits can be assessed.

PROCESS

Map 22 was constructed as follows:

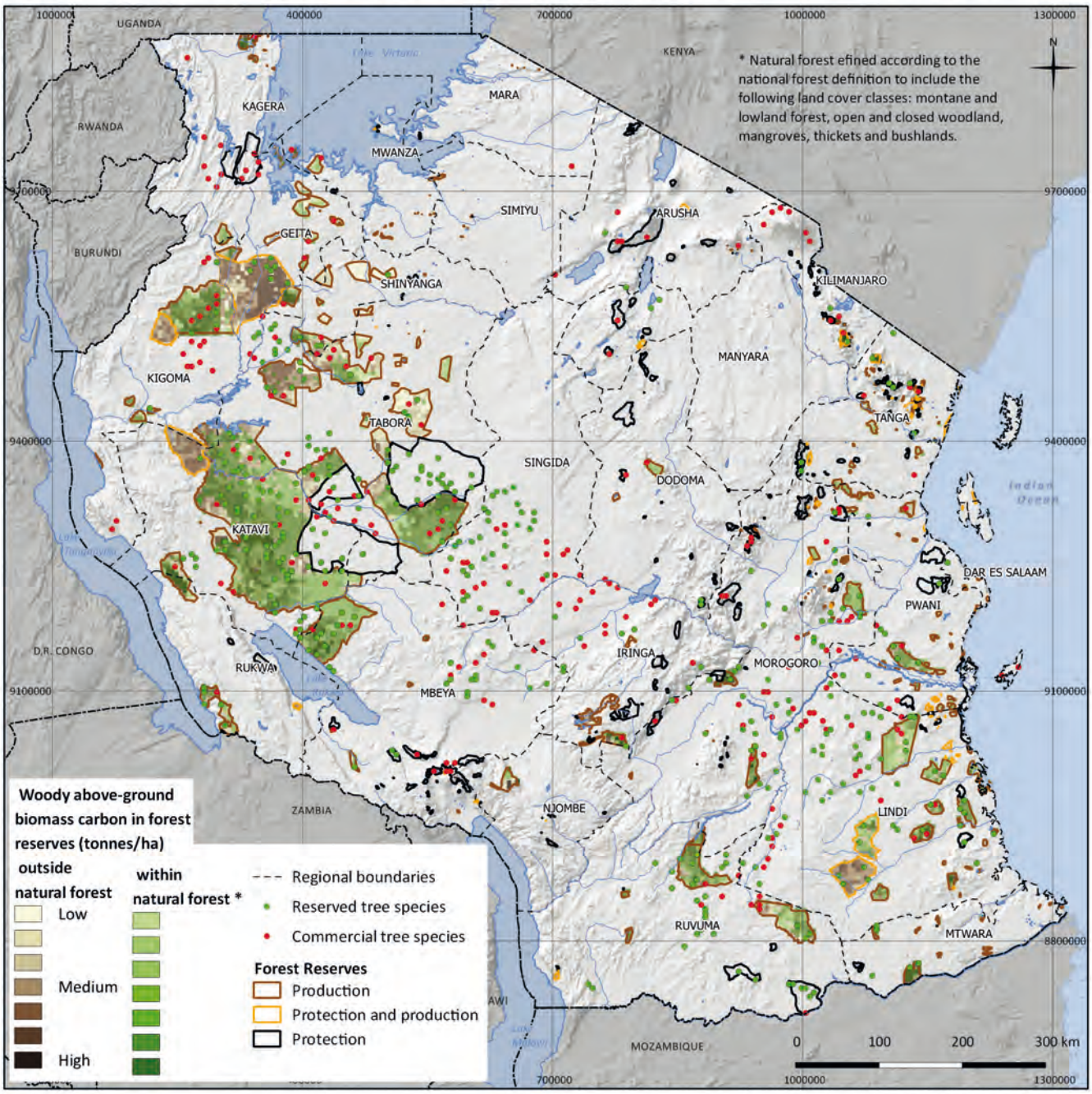
1. Forest areas (including thickets and bushlands) were selected from the NAFORMA land-use land-cover map. All other areas were blanked out.

2. Protected areas (forest reserves with protection status and other protected areas) were blanked out, as logging and other extractive activities are not permitted in such areas. Remaining areas are (a) within production forest reserves, defined by the Forest Act of 2002 as “an area of land covered by forest reserved or used principally for purposes of sustainable production of timber and other forest produce”, and (b) forests on village or general land. Forests on village or general land were subsequently blanked out.

3. From the NAFORMA woody biomass carbon map, carbon stocks were assigned to the forest land on this map.

Map 22: Potential zones for REDD+ action to enhance sustainable management of forest in production forest reserves

This map shows woody biomass carbon stocks inside production forest reserves. Numerous production forest reserves are suffering from forest degradation, and would benefit from improved forest management. The Tanzania REDD+ Action Plan defines allocation of sufficient funds for management of forest reserves at all levels as a strategic action. Sustainable management of forests as a REDD+ activity is often assumed to refer to refers to management strategies that allow timber extraction on a sustainable level that does not lead to forest degradation. Carbon benefits are likely to be greatest where carbon stocks are high, but the importance of the forest for livelihoods and biodiversity or ecosystem services can also be factors that influence the decision. The red and green dots on the map indicate where the NAFORMA inventory observed trees of particularly valuable timber species. Logging or trading reserved species requires a special permit from the government.



Data sources:
Natural forest: NAFORMA. 2013. NAFORMA land-use / land-cover Map 2010.
Woody biomass carbon: NAFORMA. 2013. NAFORMA Woody biomass only. 5km preliminary dataset based on field data.
Forest reserves: Tanzanian Forest Service. 2013. Forest Reserves of Tanzania.
Protected areas: IUCN and UNEP-WCMC. 2013. The World Database on Protected Areas (WDPA) Cambridge, UK. Available at: www.protectedplanet.net.
Reserved and commercial tree species: NAFORMA. 2013. NAFORMA biophysical survey 2013.
Regional boundaries: Ministry of Lands, Housing and Human Settlements Development. 2011. Administration Map of Tanzania. Surveys and Mapping Division, Dar es Salaam Tanzania.

Map projection: WGS84 / UTM Zone 36S
Map prepared by Tanzanian Forest Service (TFS), UNEP-WCMC, FAO, Sokoine University of Agriculture (SUA) and Forestry Training Institute (FTI). Date: May 2013.

Map 23

Identifying potential zones for REDD+ action to rehabilitate forests

Relevant REDD+ activity/ies: *Enhancement of carbon stocks*

Examples of relevant strategic actions from the REDD+ Action Plan: To mobilize funding for forest resources management

Forest rehabilitation can be defined in different ways. Here, the concept is used in the sense of re-establishment of forest cover on degraded forest land, with the aim to restore biomass and to some degree the biodiversity and ecological functions that were originally present. From a carbon stock perspective, forest rehabilitation has the highest potential benefit where carbon stocks are low. However, efforts to rehabilitate forests may be in vain if the forests that are restored are soon degraded or deforested again. Therefore, such actions may be most feasible in areas that are also under some level of protection or effective forest management. On Map 23, protected areas are highlighted, and carbon stocks indicated inside and outside forest land. Data on past deforestation and forest degradation would be relevant to add to this map, when it becomes available. Approaches to forest rehabilitation should be selected based on (i) feasibility, e.g. the local conditions of soil and vegetation, including the status of the soil, and (ii) the effects of the selected approach on biodiversity and ecosystem services (see Miles et al. 2010) Competing land uses may also need to be taken into account.

Forest rehabilitation could yield multiple benefits in the form of enhanced habitat for biodiversity, increased provisioning of ecosystem services such as water regulation, and livelihood opportunities. For example, catchment forests are particularly **important for water regulation**, and have strong protection status in Tanzania, but still suffer from forest degradation, including from **fires** (see **Maps 12** (contribution of forests to soil erosion prevention) **and 19** (land exposed to fires)). Such forest areas may be particularly suitable for forest rehabilitation. Areas with high **biodiversity**, or areas of importance for **movements of different species**, may yield high benefits for biodiversity if restored (see **Maps 6-10**, where Map 10 shows the location of wildlife corridors).

In Map 23, carbon stocks on land outside of current forest land are highlighted in brown. Some areas within these zones may be suitable for forest rehabilitation, while other areas have other preferred land uses, such as agriculture.

The REDD+ Strategy discusses the potential for landscape restoration in Tanzania, and concludes, based on studies, that *"natural regeneration through active involvement of local communities, promoted under PFM and supported by the new forestry legislation and programme, is by far the most promising option for restoration of the large areas of degraded land in Tanzania".* The Strategy further notes that successful forest landscape restoration needs to have active involvement of communities; with their interests, local knowledge and practices taken into account (Tanzania Vice President's Office 2013a). Existing policies and legislation for most sectors take this into consideration, putting in place the necessary enabling environment for restoration of degraded lands.

PROCESS

Map 23 was constructed as follows:

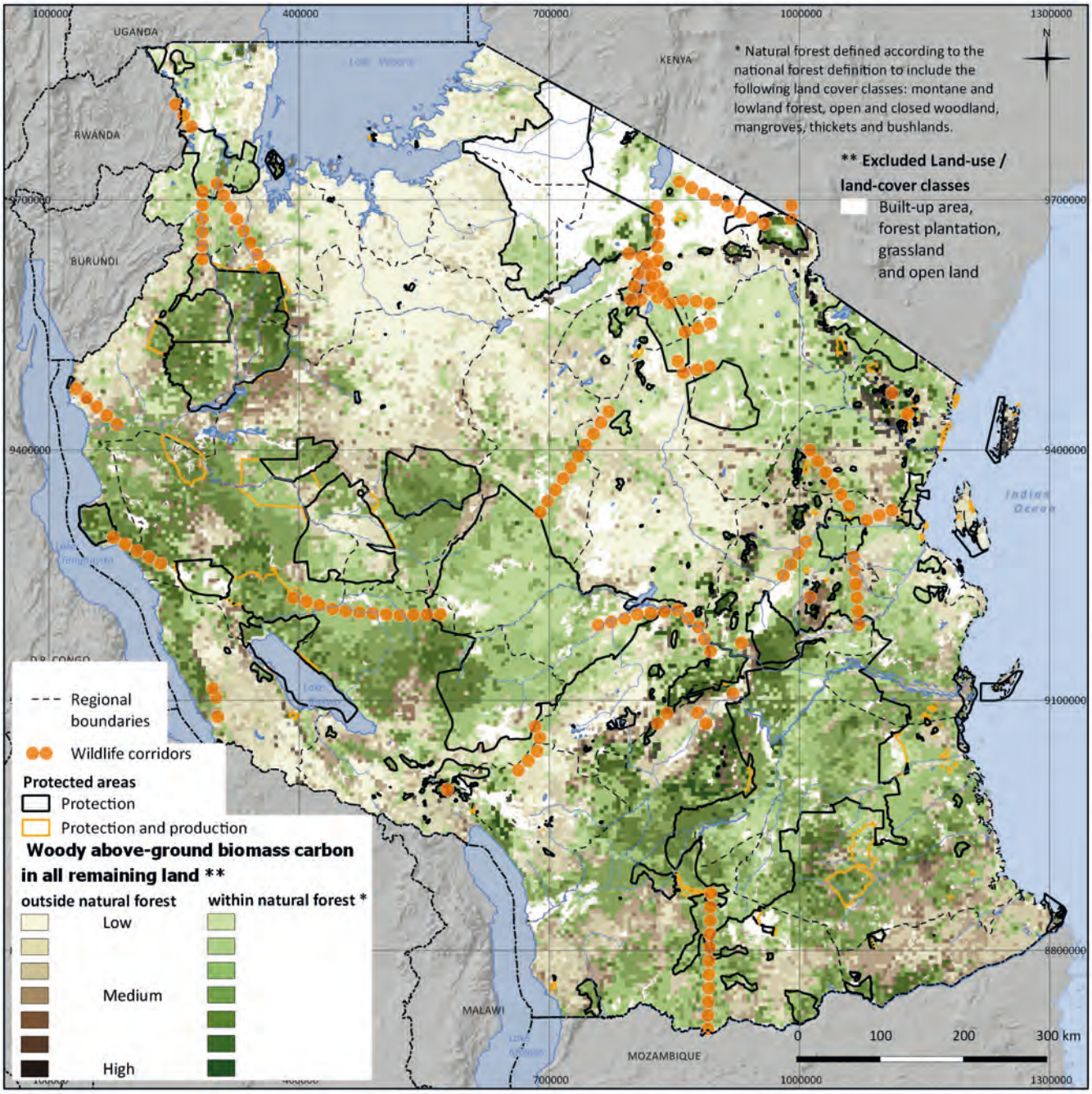
1. Built up areas, forest plantations, open land and grasslands were blanked out from the NAFORMA land-use land-cover map, as these were assumed to be unavailable for forest rehabilitation activities.

2. From the NAFORMA woody biomass carbon map, carbon stocks were assigned to all remaining land, with carbon stocks on natural forest land (including thickets and bushlands) indicated in green, and carbon stocks on other land indicated in brown.

3. Protected areas (including forest reserves with protection status, defined in the Forest Act of 2002 as "land covered by forest reserved or used principally for the purposes of protection of water sheds, soil conservation and the protection of wild plants") were highlighted.

Map 23: Potential zones for REDD+ action to rehabilitate forests

This map excludes built up areas, forest plantations, grasslands and open land, assuming that these are generally not available for forest restoration activities. Forest restoration activities can be worthwhile where the forest has been degraded or removed, but where previous values and functions of the forest can be restored, including enhancement of carbon stocks. For example, wildlife corridors that have degraded through expansion of human activities may be of priority for restoration. Areas that have been degraded through unsustainable wood extraction but where the forest remains important for livelihoods and/or ecosystem services such as water regulation may also be of priority. It may make more sense to rehabilitate forests in areas where there is a strong management regime, to avoid that they will be quickly degraded again.



Data sources:
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Protected areas: IUCN and UNEP-WCMC. 2013. The World Database on Protected Areas (WDPA) Cambridge, UK. Available at: www.protectedplanet.net.
Wildlife corridors: based on information provided at tzwildlifecorridors.org. Accessed May 2013.

Map projection: WGS84 / UTM Zone 36S
Map prepared by Tanzanian Forest Service (TFS), UNEP-WCMC, FAO, Sokoine University of Agriculture (SUA) and Forestry Training Institute (FTI).
Date: May 2013