REPUBLIC OF MALAWI

The Ministry of Natural Resources, Energy and Mining

NATIONAL FOREST LANDSCAPE RESTORATION STRATEGY

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FOREWORD

With current unpredictable shifts in climate, Malawi faces many challenges due to landscape degradation, and solutions to these challenges require immediate attention. Agricultural, economic, and ecological productivity have decreased in the past 20 years. Forest landscape restoration is a powerful vehicle for Malawi to achieve several national environment and development goals, including those codified in the National Forest Policy (2016), National Climate Change Management Policy (2016), National Climate Change Policy (2015), and National Agriculture Policy (2016), among others.

The will for change is reflected in Malawi's Vision 2020, the Malawi Growth and Development Strategy, and other government strategies and policies that guide development in the country. The National Forest Landscape Restoration Strategy, developed within this guidance, forms the inception point for action to address land degradation and deforestation while outlining near-term, medium-term, and long-term strategies to translate the potential of restoration into better, more prosperous lives for the citizens of Malawi. These strategies include policy recommendations; spatial and cost-benefit assessments that identify where restoration interventions will have the highest positive impacts to reduce degradation and support increased food security, resilience, and biodiversity; scalable techniques and intervention types that can be employed at large scale to support landscape restoration; and the development of economic incentives and funding mechanisms that perpetuate large-scale restoration. The strategy builds on the results of the National Forest Landscape Restoration Assessment (NFLRA) and is aligned to Malawi's national goals in the context of stakeholder cooperation and support for shared objectives.

An important goal of forest landscape restoration is to create conditions, at scale, that incentivize and reward the sustainable use of natural resources. Malawi should restore landscapes to improve food security, increase resilience from disasters and diseases made worse by climate change, and support the biodiversity and ecological functions that underpin agricultural productivity, economic growth, and social well-being. Therefore, broad engagement of the public sector, private sector, traditional authorities, and other local community organizations will be required to successfully restore Malawi.

The will of the Malawian people and cooperation among all stakeholders for the restoration of degraded lands and forests will put Malawi on a path to a climate-smart future. Together, we can achieve the growing demand for productive landscapes in a sustainable manner.

Professor Arthur Peter Mutharika
President of the Republic of Malawi

PREFACE

Successfully restoring Malawi's degraded and deforested lands requires a unified approach. The National Forest Landscape Restoration Strategy presents us with an opportunity to tackle key obstacles to our national development, all of which are compounded by the impacts of climate change: food insecurity and poverty, insufficient energy supply, and water shortages. In the last 10 years, Malawi has experienced an increased frequency and intensity of disasters induced by climate change that has outpaced the government's and population's capacity to cope. Land degradation has decreased food security, reduced availability of water for consumption and for irrigation, decreased our hydroelectricity production, and increased vulnerability of affected areas and their populations to climate change across the country.

The results of the National Forest Landscape Restoration Assessment (NFLRA) have enabled Malawi to formulate a national strategy to address the social, economic, and biophysical realities of land degradation and deforestation, and in a way that is gender responsive. By implementing restoration activities at scale, Malawi will mitigate the underlying conditions of soil erosion and nutrient depletion and enhance the opportunity for obtaining greater output from degraded lands and forests. Through forest landscape restoration (FLR), local government and rural areas will benefit from increased autonomy in restoration interventions that are tailored for their local objectives and interest.

This strategy is not about planting trees. It involves tailoring interventions to the context of a particular area in order to improve the productivity of landscapes that are degraded and deforested while enhancing human well-being. The strategy will guide Malawi in the promotion of sustainable use of natural resources and enhance the resilience of ecosystems including agriculture that sustain the lives of Malawian communities. To address these land use challenges, five priority FLR interventions (agricultural technologies; soil and water conservation; forest management; river- and stream-bank restoration; community forests and woodlots) were identified through stakeholder consultations as having been successfully implemented on a small scale in all or most districts, and thus were proposed for scaling up across Malawi. The areas available for each of these interventions were then calculated in a GIS using a series of biophysical criteria to determine the hectares available for each intervention within Malawi. Specific suggestions have been outlined on restoration activities and partnerships to drive positive landscape and social changes and the strategies that can be employed to ensure that economic and social benefits of restoration are equitably realized and reinvested in Malawi's economy.

With nearly 7.7 million hectares of degraded and deforested lands across the country that can potentially be restored through a wide range of FLR interventions, our legacy should not be measured by how much we did in the past but by how much we leave for the future.

Bright Msaka SC
Minister of Natural Resources, Energy and Mining

INTRODUCTION

Large-scale landscape restoration will create significant social, economic, and environmental benefits in Malawi that will include increased food, water, and livelihood security for many Malawians. Restoration of degraded and deforested land has an unparalleled potential to use nature-based solutions[1] to address Malawi's Vision 2020, Growth and Development Strategy III, and many additional components of current agricultural, land use, economic, social, and conservation policies. With a population growth rate of 3.1 percent per year and an average annual deforestation rate of 0.5 percent from 2000 to 2015, food security, resilience, and biodiversity will be increasingly important for Malawi as reflected in many national policies.
Impacts from land degradation include the following:

- Lower agricultural productivity. An estimated 29 metric tons of soil per hectare are lost each year, reducing productivity of croplands (GOM 2001).
- Limited energy sources. Soil erosion and siltation from deforestation and poor agricultural practices are hindering efforts to expand hydroelectric power generation, decreasing an already limited supply of electricity and increasing costs to consumers. This problem is compounding Malawi's dependence on wood to meet energy needs, causing deforestation to further exacerbate soil erosion and limit hydroelectric opportunity.
- Declining water quality and availability. Longer dry seasons and dried-up water supplies are impacting the Water Boards, which are responsible for supplying drinking water to urban residents, causing reductions in supply and increased costs to treat drinking water. The damages to the water sector have been estimated at US$11.8 million (World Bank 2016).
- Increased vulnerability to disasters. Conventional farming practices leave croplands highly vulnerable to climatic shocks. In 2016, the El Niño–induced dryness throughout the south and central regions of the country, and seasonal flooding in the north, resulted in a decline in crop yields (maize, rice, and wheat) by over 34 percent from the previous five-year average (FAO 2016).
- Lost revenue. Each year between 2001 and 2009, land degradation cost Malawi an estimated $244 million (6.8 percent of GDP) (Kirui 2015). Poor farming practices that degrade croplands for maize, rice, and wheat resulted in a loss of $5.7 million per year (Kirui 2015).

Forest landscape restoration (FLR):
The ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes. More than just planting trees, FLR restores entire landscapes "forward" to meet present and future needs and to offer multiple benefits and land uses over time.

Degraded landscapes:
Lands that have lost their productivity or capacity to provide services to people and wildlife.

Restoration interventions:
Activities and actions used to support sustainable increases in ecological, economic, and agricultural productivity.

1. Nature-based solutions (NbS) are defined as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (https://www.iucn.org/commissions/commission-ecosystem-management/our-work/nature-based-solutions).

Figure 1 | Effects of Degradation on Malawians

The NFLRA capitalized on the collective expertise of stakeholders to generate a comprehensive analysis of how forest landscape restoration (FLR) can be leveraged to achieve the sustainable development goals of Malawi's Vision 2020 and other national development strategies. Stakeholders identified a number of national goals that FLR can contribute toward achieving (Table 1).

FLR will ultimately be implemented on millions of hectares of land within Malawi and presents a significant opportunity to achieve many of Malawi's sustainable economic development goals, as outlined in Vision 2020 and the Malawi Growth and Development Strategies (MGDS II, MGDS III). Within Malawi's Vision 2020, FLR most directly contributes to aspirations for the country's Natural Resource and Environmental Management component. However, FLR has a positive impact on nearly every aspect of Malawi's many development strategies and programs. With an emphasis on restoration of degraded lands and support for policy shifts and incentive structures to halt deforestation, Malawi is poised to achieve sustainable landscape management at scale. The implementation of Malawi's Vision 2020 will catalyze sustainable economic development growth toward a technology-driven, middle-income country with an export economy based on Malawi's natural and human capital. Key actions in Vision 2020 include developing human resources and capacities, developing products that can be made from locally available natural resources, increasing the attractiveness of investments in mining, using a multidimensional strategy to increase the productivity of

agriculture, developing the financial sector, and continuing to develop tourism in Malawi. Increasing the supply of goods and services, developing rural markets, and creating financial investment feedbacks from these strategies will allow Malawi to close its trade deficit gap, will improve human livelihoods, and will make financial investment in Malawi more attractive.

FLR can yield myriad benefits for agricultural productivity—many of which are outlined in the restoration opportunities assessment (MNREM, 2017)—and increase the supply and decrease the time burden of collecting fuelwood, poles and household construction timber, fodder, edible fruits, and other nontimber forest products. FLR can lead to an increased number of seasonal streams and more opportunities for dry-season irrigation.

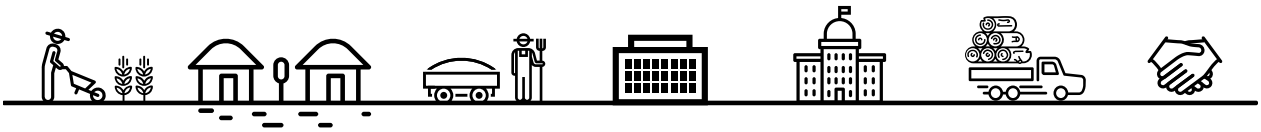
With a strong commitment to implement FLR through the strategic actions outlined in this document in the coming years, Malawi can develop into a healthy, vibrant export economy that uses nature-based solutions and sustainable development strategies to ensure a secure and prosperous future.

Table 1 | National Development Goals targeted by Forest Landscape Restoration Strategy

NATIONAL GOAL	FLR CONTRIBUTIONS TO NATIONAL GOALS
Improve food security	■ Reduce soil and nutrient loss, restore soil organic matter content, increase and diversify crop yields and cultivars, enable more efficient use of inorganic inputs ■ Increase rural access to and availability of food by increasing the production of timber, fuelwood, fodder, honey, mushrooms, and other nontimber forest products that directly or indirectly contribute to the food security of rural communities
Increase energy resources	■ Increase supplies of locally managed and sustainable sources of fuel wood ■ Decrease sedimentation in catchments of hydropower infrastructure to boost energy outputs
Increase climate resilience	■ Restore soil fertility to boost yields, diversify farming systems and facilitate adaptation of farmers to erratic weather patterns ■ Reduce landslide risks, reduce consequences of flooding/extreme weather events ■ Support ecosystem-based adaptation ■ Reduce GHG emissions from agriculture ■ Increase carbon sequestration
Improve water quality and supply	■ Control erosion mitigation and reduce sedimentation ■ Protect source water from sedimentation
Conserve and restore biodiversity	■ Contribute to more effective protection, accelerated regeneration and ecological restoration of native ecosystems and threatened species across landscapes ■ Help to restore the health of ecosystems and increase the flow of ecosystem services
Ensure gender equity and equality	■ Promote women's access to, ownership and control of productive resources including land, water, and farm inputs ■ Promote agricultural education and technical training for women ■ Facilitate access to finance for women in agriculture
Alleviate poverty	■ Enhance sustainable management of forest resources and their contribution to the national economy ■ Strengthen linkages between agriculture, forestry, and other sectors to ensure resilient socioeconomic growth

Figure 2 | Overview of strategy

WHO



Farmers | Rural communities | Traditional authorities | NGOs | Government | Private sector | Partners

WHAT

AGRICULTURAL TECHNOLOGIES

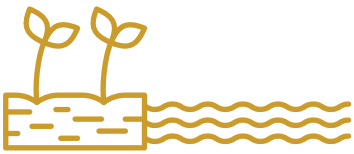
Achieve at least 10% tree cover on 50% of cropland in Malawi by 2020 and 80% of cropland by 2030

COMMUNITY FORESTS AND WOODLOTS

Increase area of community forests and woodlots to 200,000 ha by 2020 and 600,000 ha by 2030

FOREST MANAGEMENT

Improve protection and management of 2 million ha of natural forest, restore 500,000 ha of degraded forest, and establish 100,000 ha of commercial plantations by 2030



SOIL AND WATER CONSERVATION

Apply soil and water conservation measures on 250,000 ha and 500,000 ha by 2030

RIVER- AND STREAM-BANK RESTORATION

Regenerate or plant 20 million trees along river- and stream banks by 2020 and 50 million trees by 2030

HOW

GOVERNANCE

Reinforce landscape governance by strengthening local bylaws for the use and management of trees and other natural resources

MOVEMENT BUILDING

Expand communication and outreach to share information broadly about restoration techniques and benefits, and to mobilize a restoration movement

EQUITABLE BENEFIT DISTRIBUTION

Ensure increased socioeconomic benefits accrue to communities and individual households investing in implementing restoration

POLICY COORDINATION

Mainstream integrated landscape management approaches and increased support for implementing restoration in development programs at all levels

RESTORATION OPPORTUNITIES AND PRIORITY INTERVENTIONS

The National Forest Landscape Restoration Assessment (NFLRA) provides the best science and knowledge on restoration at the national scale in Malawi. The information contained in the report will assist stakeholders in making informed and optimal decisions regarding interacting, and sometimes competing, landscape priorities. Through extensive consultations with stakeholders, field visits, and a series of workshops organized at the district level, the NFLRA identified five priority restoration interventions that directly contribute to achieving Malawi's national goals and help to resolve the major land use and development challenges associated with deforestation and land degradation.

A geospatial analysis was performed to map suitable areas for each of the five restoration interventions and to estimate the national scale of restoration opportunity for each type of intervention. In total, nearly 7.7 million hectares, which is 80 percent of the total land area of Malawi, has an opportunity for restoration. The restoration interventions, their specific objectives and targeted contributions to national sustainable development goals, and estimated opportunity area are presented in Table 2 and described in detail on the following pages.

Figure 3 | Illustrations of farmer-managed natural regeneration (FMNR)

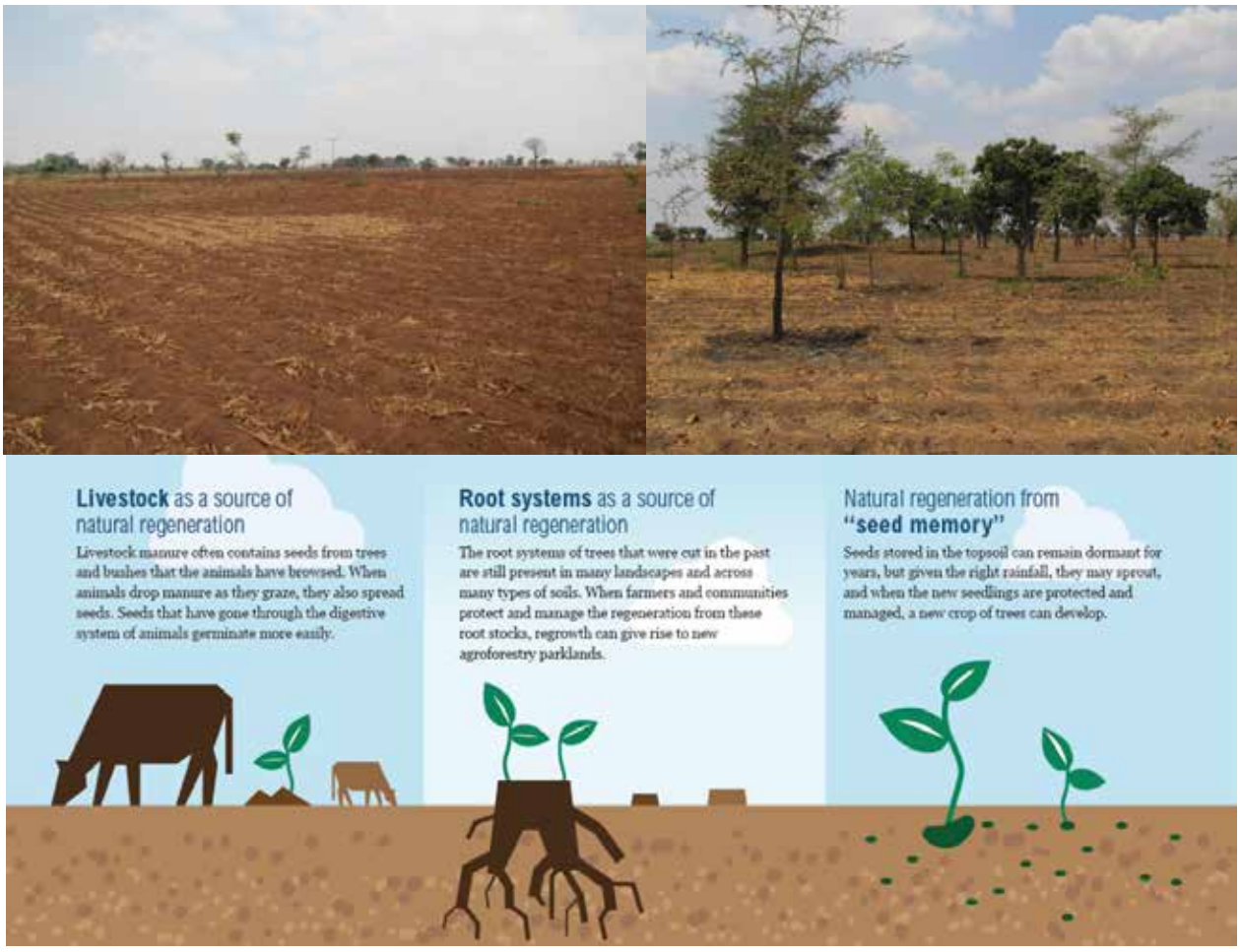


Figure 4 | Estimated area of opportunity as compared to total restoration opportunity area in Malawi

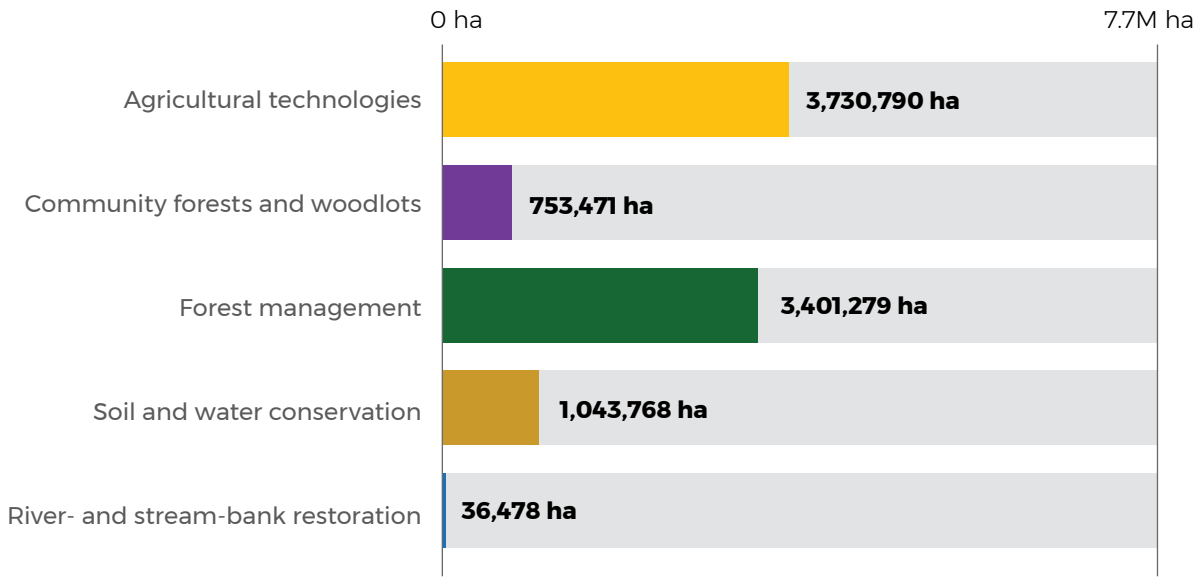


Table 2 | Summary of restoration interventions and opportunity in Malawi

SPECIFIC RESTORATION OBJECTIVES	BENEFITS	PRIMARY CONTRIBUTION TO NATIONAL GOALS	ESTIMATED AREA OF OPPORTUNITY (HA)	PERCENT OF COUNTRY
Agricultural technologies (conservation agriculture, farmer-managed natural regeneration, and agroforestry)				
Increase tree cover on degraded, low-yielding cropland and pastures in agricultural landscapes through farmer-managed and assisted natural regeneration, direct seeding, and planting of agroforestry trees and shrubs; implement climate-smart agriculture techniques, including FMNR, continuous cover crops, crop rotation, other agroforestry technologies	Increased crop yields with reduced dependence on inorganic inputs, reduced soil/nutrient loss, increased resilience to drought and other climate shocks	■ Food security ■ Climate resilience ■ Poverty alleviation ■ Gender equity and equality	3,730,790	39%
Community forests and woodlots				
Restore forest cover on degraded customary land and nonarable land in agricultural landscapes by expanding area and improving management of village forest areas and woodlots through demarcation, strengthened community bylaws, and agreements for protection against uncontrolled cutting, grazing, and fire	Locally managed, more sustainable sources of fuelwood; increased access to forest products for subsistence and sale; reduced burden on women in collecting fuelwood	■ Food security ■ Climate resilience ■ Sustainable energy ■ Poverty alleviation ■ Gender equity and equality ■ Biodiversity conservation	753,471	8%
Forest management				
Restore forest cover and improve management in deforested and degraded forests, including forest reserves, natural forests outside reserves, and plantations	Decreased sedimentation in catchments of hydropower infrastructure, protection of source water, increased access to forest products for subsistence and sale, conservation of biodiversity	■ Climate resilience ■ Sustainable energy ■ Water quality and supply ■ Poverty alleviation ■ Biodiversity conservation ■ Gender equity and equality	3,401,279	36%
Soil and water conservation				
Stabilize soils and increase infiltration in areas with high rates of rainfall runoff, erosion and source areas for downstream sedimentation by constructing check dams, gully plugs, infiltration ditches, and other rainwater harvesting and soil and water conservation techniques	Protection of croplands and water sources from rainfall runoff and erosion; reduced landslide risk during high rainfall events	■ Food security ■ Climate resilience ■ Water quality and supply ■ Gender equity and equality	1,043,768	11%
River- and stream-bank restoration				
Increase tree cover in denuded buffer zones of rivers and streams through natural regeneration and tree planting	Protection of source water and decreased sedimen-tation in catchments of hydropower infrastructure, reduced impacts of flood events	■ Climate resilience ■ Sustainable energy ■ Water quality and supply ■ Gender equity and equality	36,478	0.4%

Agricultural technologies

Description of intervention

Agricultural technologies refer to any type of intercropping of trees with crops and include conservation agriculture (CA), farmer-managed natural regeneration (FMNR), and agroforestry (AF). Trees on croplands stabilize the soil and improve soil fertility, which helps to boost crop yields and increase food security, with the added benefit of providing fodder for grazing animals.

FMNR is a specific type of agricultural technology in which farmers do not plant trees but rather manage and cultivate the natural regrowth of trees on their farms instead of eliminating them. FMNR using leguminous—or nitrogen fixing—trees enhances the productivity of agricultural land, and research has shown that yields can increase by 50 to 250 percent (Saka et al. 1994). Natural regeneration can originate from multiple sources, including livestock waste, root systems, or seed. CA is a type of agricultural technology that minimizes tillage and soil disturbance, and involves permanent soil cover (such as with crop residue or live mulch) and crop rotation or intercropping. CA is often most successful when combined with agroforestry or FMNR (i.e., intercropping with trees).

Cost-benefit analysis

Analyzing the costs and benefits to smallholder farmers who adopt agricultural technologies shows that they would likely be better off in the long run than their peers who did not. All three activities generate additional benefits – compared to degraded conventional maize agriculture – of between 1.5 million MWK and 2.1 million MWK per hectare over a 20-year period. Despite requiring more labor than degraded conventional maize agriculture as well as additional material inputs, all three agricultural-based restoration activities generate new flows of benefits that more than compensate for the additional costs. FMNR is the most cost-effective and least labor-intensive agricultural technology in that it does not require acquiring and planting seeds or seedlings but rather allows trees to regrow naturally.

Figure 5 | Illustrations of conservation agriculture (CA) with trees

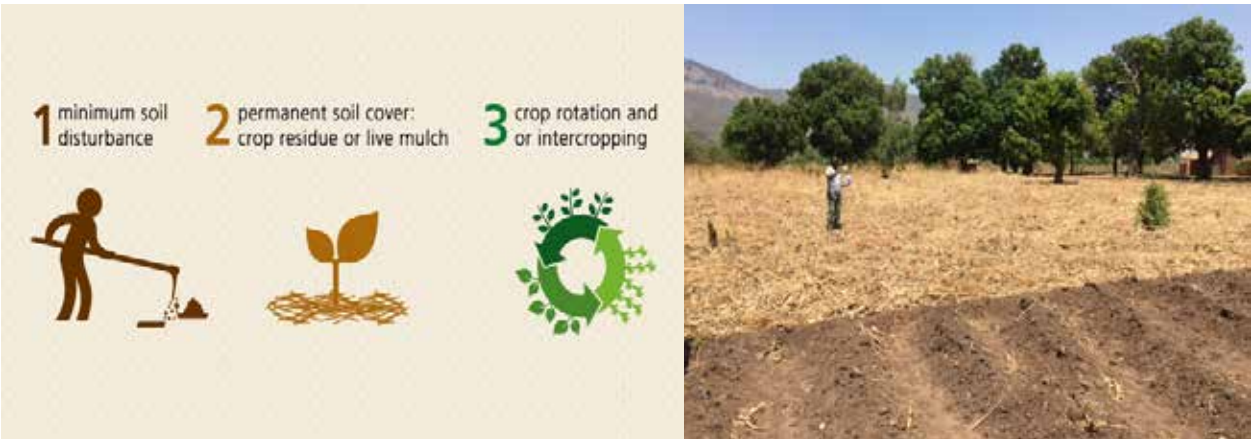
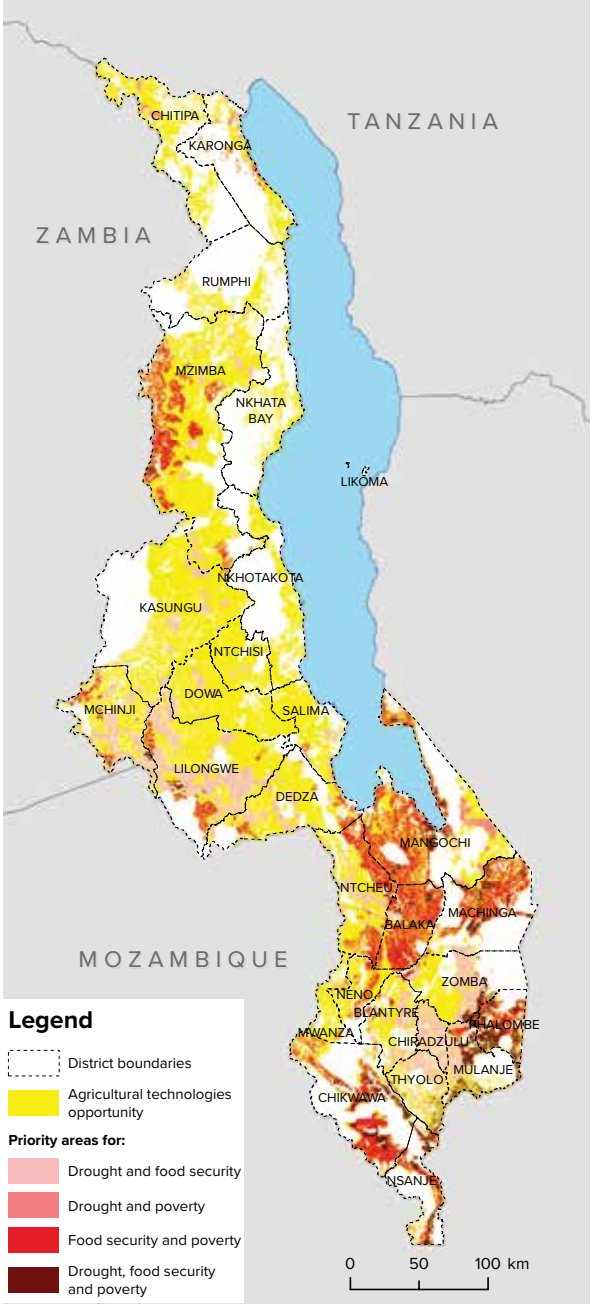
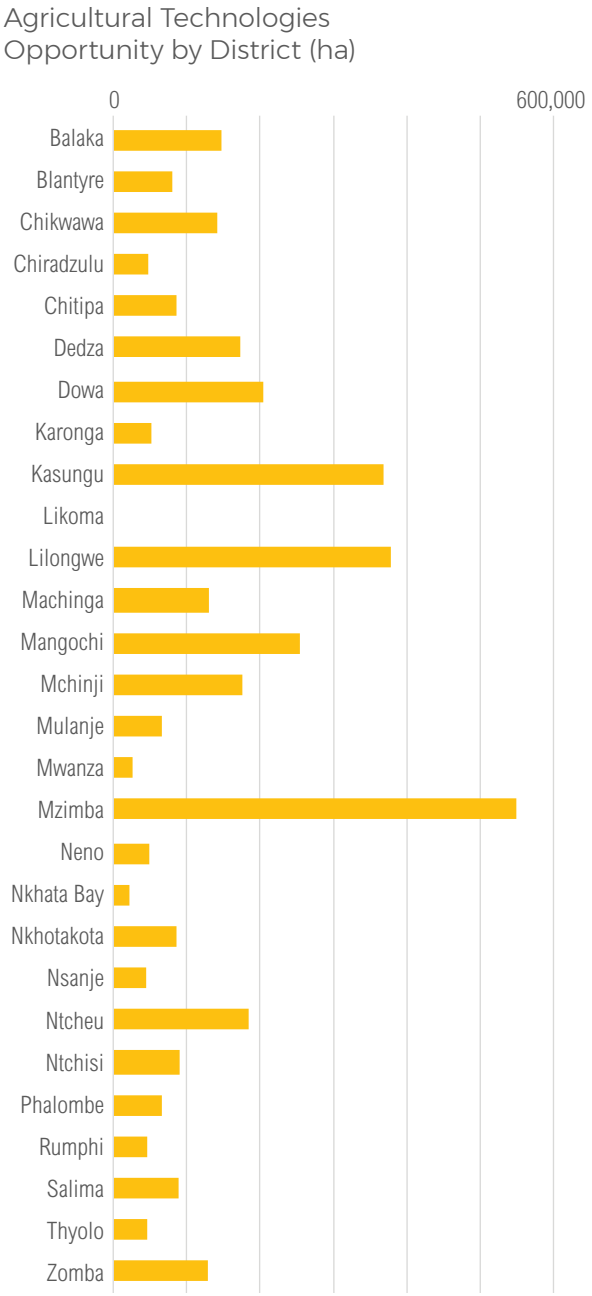


Figure 6 | Map of opportunity area for agricultural technologies





The map of opportunity area for agricultural technologies (including CA, FMNR, and AF) targets areas of annual cropland with very low or no existing tree cover. The map (left) shows where opportunity exists to implement agricultural technology interventions and highlights areas to prioritize for poverty alleviation, food security, and drought alleviation. The bar chart (right) shows the proportion of the district that is potential opportunity for implementing agricultural technology interventions.

Community forests and woodlots

Description of intervention

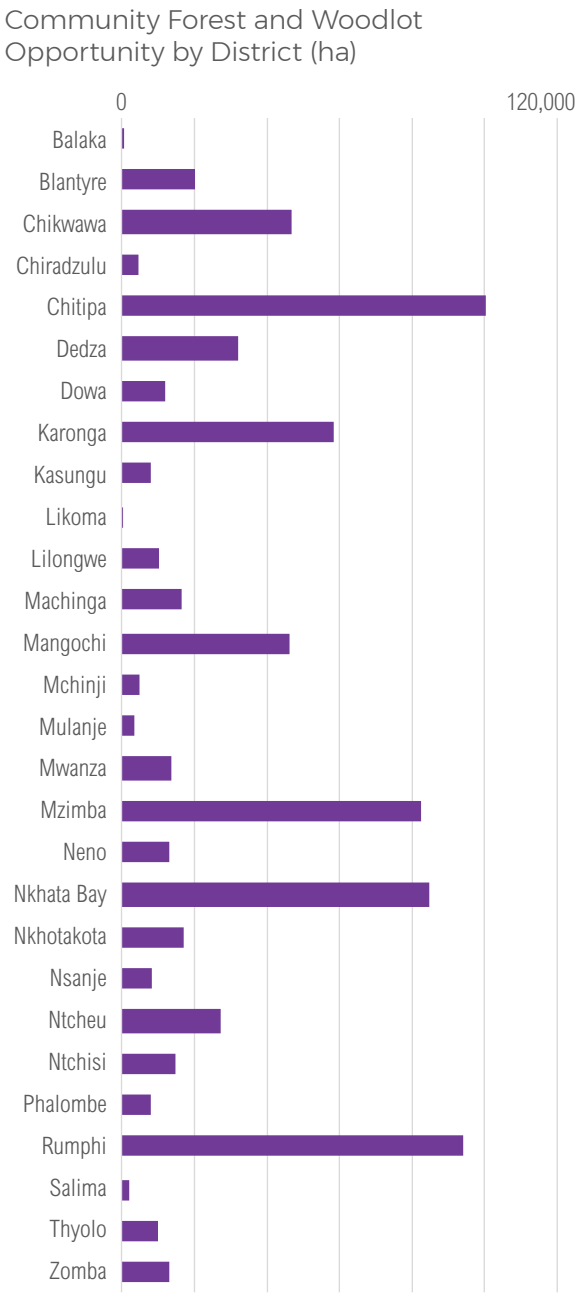
Community forests (such as village forest areas) and woodlots are areas of customary or private land set aside and managed for wood and non-wood products. They may be managed by a traditional authority, a community, a family or an individual. Community forests and woodlots, if planned and managed properly, can provide a regular, local supply of products (e.g., poles, timber, fuel wood, fruit, etc.) for household consumption or for sale. Both through provision of wood products and income, community forests can reduce pressure on forest reserves and other protected areas. They also can substantially decrease the time and distance traveled by women and children to collect wood for their homes.

Cost-benefit analysis

Cost-benefit analyses show that establishing community forests and woodlots generate additional benefits to smallholder farmers of 5.7 million MWK over a 20-year period compared to degraded forest and woodlands with light agriculture. The intervention requires substantially more financial and labor investment compared to the degraded land use, but it creates several sources of revenue that smallholder farmers can benefit from. Importantly, smallholders can generate short-term benefits from the intervention by harvesting and selling fuelwood five years after the forests or woodlots have been established. Without this benefit source, smallholders would not receive benefits until the end of the rotation interval, 20 years later. When the values of carbon sequestration and sediment retention are accounted for, the results show that the net present value of community forests and woodlots becomes larger by 2 percent.

Figure 7 | Woodlot in Machinga District, Malawi

Figure 8 | Map of opportunity for community forests and woodlots



The map of opportunity for community forests and woodlots targets areas that are unsuitable or less desirable for cultivation (e.g., shallow soils and steep slopes) near village centers. The map (left) shows where opportunity exists to establish community forests or woodlots, and highlights areas to prioritize for market access, poverty alleviation, and female-headed households, where at least two of these priorities could be achieved. The bar chart (right) shows the proportion of the district that is potential opportunity for implementing community forest and woodlot interventions.

Forest management

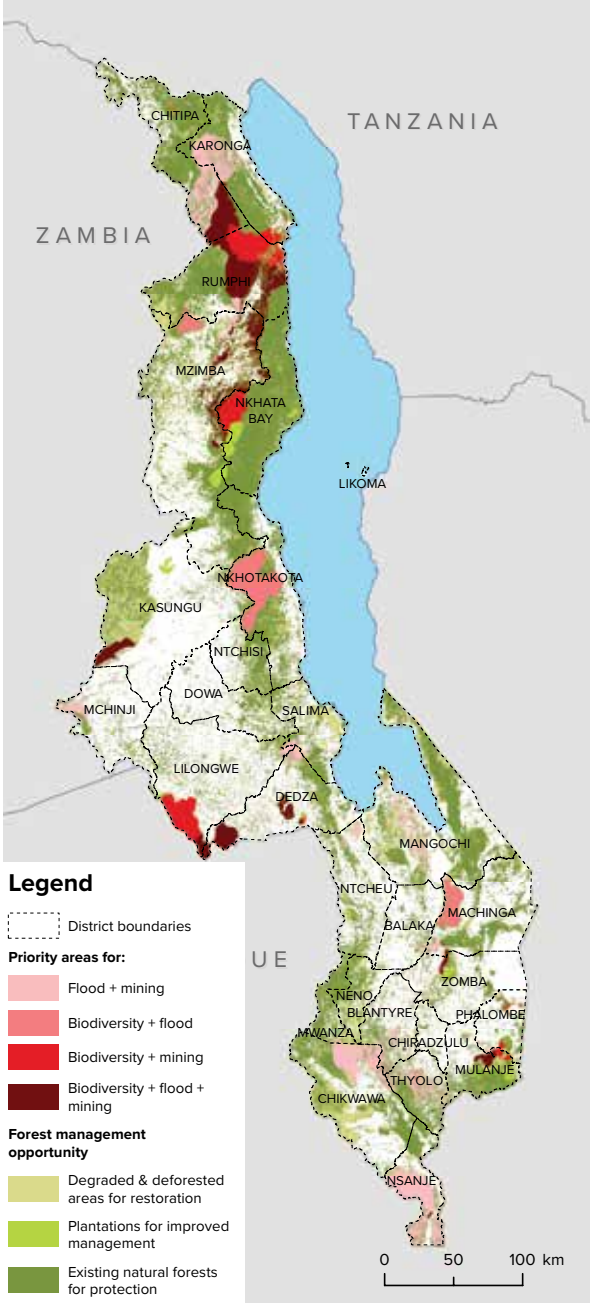
Description of intervention

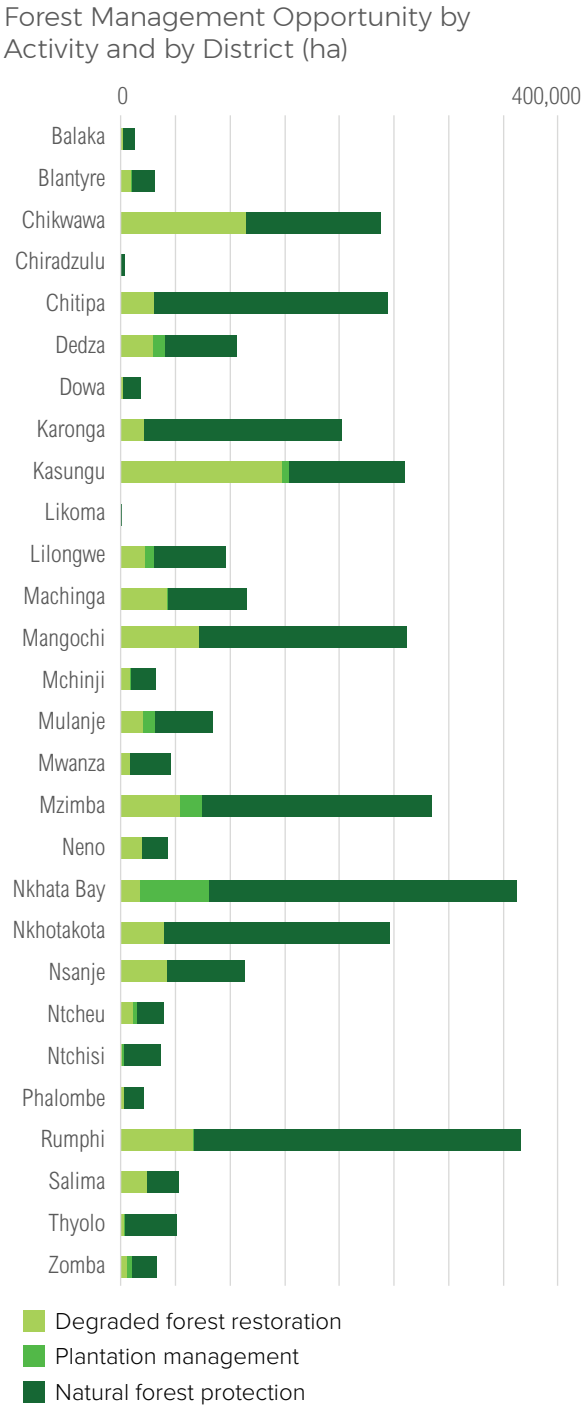
The forest management restoration intervention includes three types of activities: (1) protection of existing forest (e.g., implementing fire prevention and control, and enforcing restrictions on tree cutting); (2) natural forest management (e.g., natural regeneration and enrichment plantings to encourage regrowth of natural forest); and (3) improved forest plantation management for sustainability, profitability, and efficiency. The benefits of all forest management activities include soil stabilization and watershed protection, increased availability of forest products such as timber and fuelwood, improved biodiversity and habitat for wildlife, and increased resilience to climate change. The total estimated intervention opportunity area for forest management in Malawi is 3.4 million hectares, which includes 2.4 million hectares of natural forest protection, 820,000 hectares of degraded forest restoration, and 138,000 hectares of improved plantation management.

Cost-benefit analysis

Forest management interventions require substantially more financial and labor investment compared to the degraded land use, such that the net present value is -4.3 million MWK when only private benefits are accounted for. Natural forest management is most beneficial when it is done on landscapes with low agricultural and forestry opportunity costs or in areas where the public benefits of natural forest management are high (e.g., upstream from Water Board reservoirs and hydroelectric generating facilities). It is also most beneficial when it is used to restore forest reserves and other protected areas that have already been gazetted and therefore, by legal definition, have no opportunity cost. Similarly, forest management will be net beneficial in areas with steep slopes that are in close proximity to important water features, like the Shire River. In these areas, the returns to agriculture are likely to be low because the steep slopes make cultivation difficult and costly and, more important, reducing soil erosion and increasing water yields in this areas will create large benefits for downstream users, such as the Electricity Supply Corporation of Malawi and downstream agriculturalists (Wiyo et al. 2015). When the values of carbon sequestration and sediment retention are accounted for, the results show that they compose as little as 3 percent of the net present value.

Figure 9 | Map of opportunity for forest management





The map of opportunity for forest management targets existing plantations, existing natural forest areas either inside or outside forest reserves, and areas of recent deforestation from cutting or fire. The map (left) shows where opportunity exists to establish the three types of forest management interventions, and highlights areas to prioritize for flood mitigation, mining site rehabilitation, and biodiversity improvement, where at least two of these priorities could be achieved. The bar chart (right) shows the proportion of the district that is potential opportunity for implementing the three types of forest management interventions.

Soil and water conservation

Description of intervention

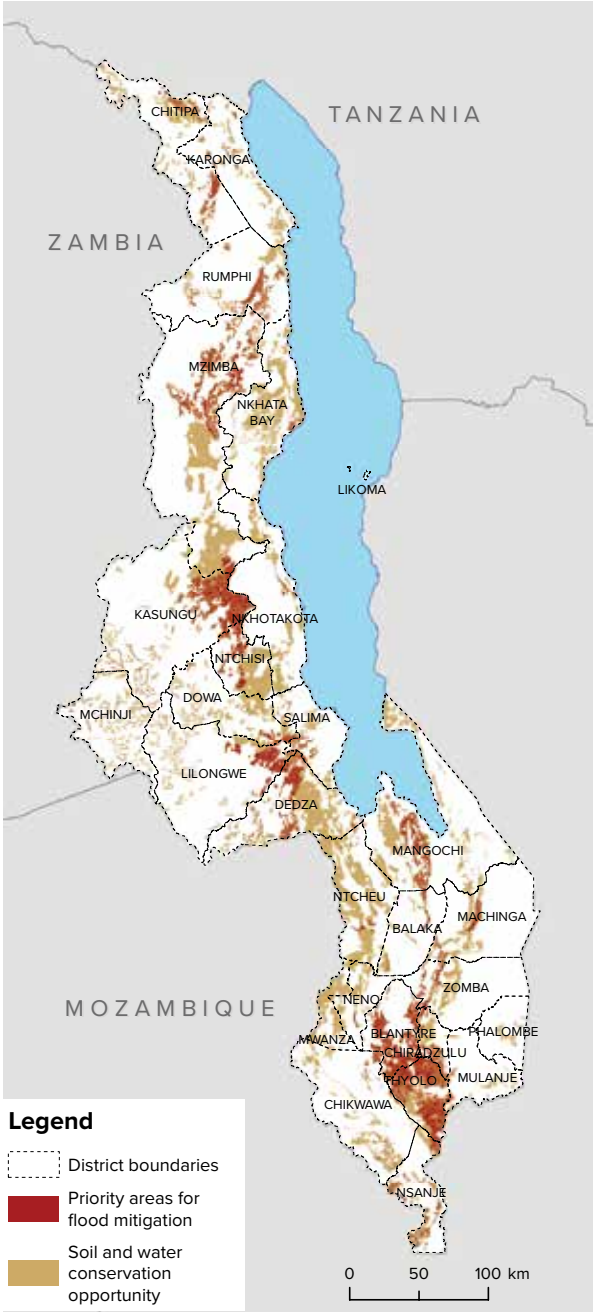
Soil and water conservation interventions involve establishing small-scale infrastructure such as check dams, terraces, infiltration trenches, and contour bunds along slopes and hillsides for the purposes of regulating water flow during heavy rains to prevent intense erosion and gully formation. These types of infrastructure are particularly important where croplands are located at the base of these hillsides and thus are more vulnerable to soil and nutrient loss and crop damage from heavy or rapid water flow. The check dams and terraces serve to reduce the force of water flow downslope while the infiltration ditches and contour bunds absorb and accumulate soil and water. Planting vetiver grass and other vegetation along the slopes also adds to the absorption and mitigation benefits. Soil and water conservation can improve food security by improving households' ability to access food during times of drought or low yields, and expand access to alternative energy sources and clean water. More than 1 million hectares in Malawi meet the opportunity criteria for soil and water conservation interventions, which is 11 percent of the total country area.

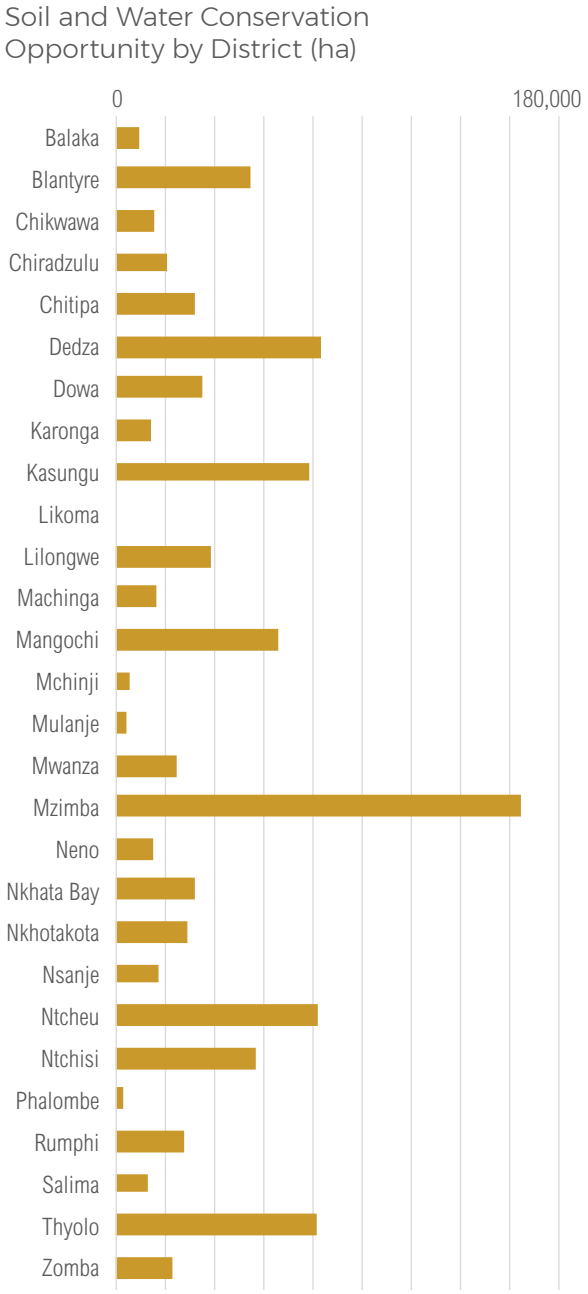
Cost-benefit analysis

Cost-benefit analyses show that soil and water conservation generates additional benefits of approximately 1.5 million MWK per hectare over a 20-year period compared to degraded conventional maize agriculture. Despite requiring more labor than degraded conventional maize agriculture as well as additional material inputs, soil and water conservation activities generate new flows of benefits that more than compensate for the additional costs. Smallholder farmers who adopted this activity would likely be better off in the long run than their peers who did not.

Figure 10 | Examples of soil and water conservation interventions in Machinga District: check dams (left) and infiltration ditch (right)

Figure 11 | Map of opportunity for soil and water conservation





The map of opportunity for soil and water conservation interventions targets areas of high erosion risk either on or near cultivated areas. The map (left) shows where opportunity exists to establish soil and water conservation interventions, and highlights areas to prioritize areas for flood mitigation. The bar chart (right) shows the proportion of the district that is potential opportunity for soil and water conservation interventions.

River- and stream-bank restoration

Description of intervention

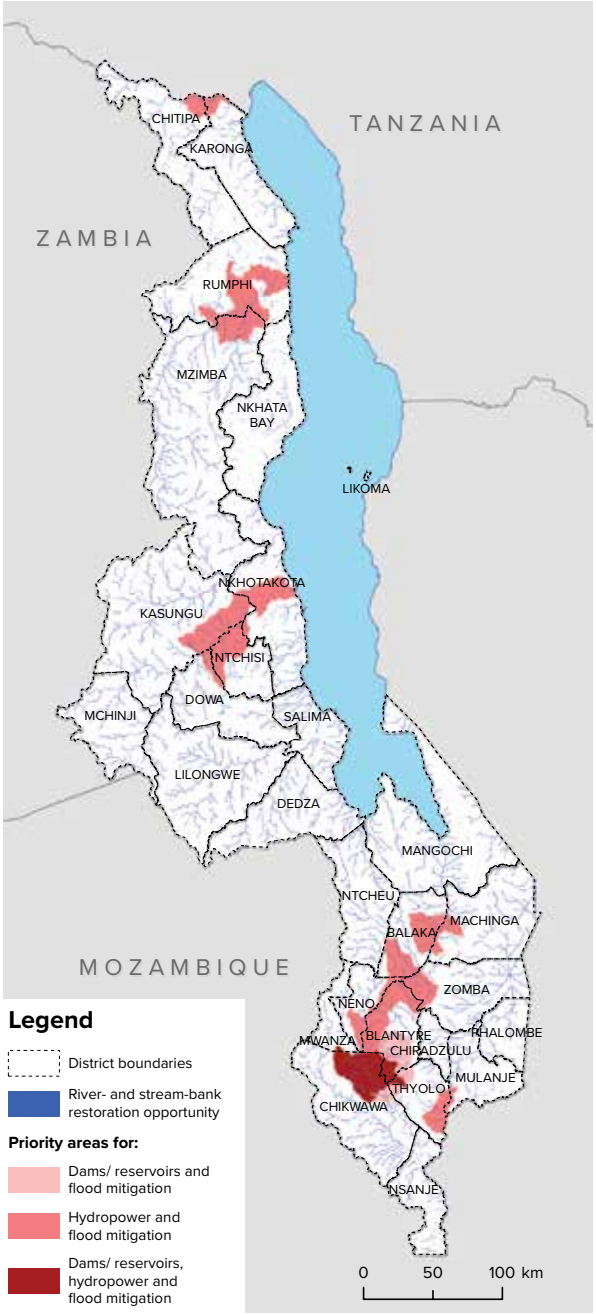
River- and stream-bank restoration focuses on establishing buffers of trees along streams and rivers courses to stabilize the soil, either through active planting or natural regeneration. The benefits of these protective buffers include decreased erosion and sedimentation into waterways, which improves water quality and quantity. This practice is particularly important in watersheds with downstream hydropower and reservoir infrastructure, where sedimentation is a major impediment to their efficiency and sustainability. More than 36,000 hectares in Malawi are suitable for river- and stream-bank restoration.

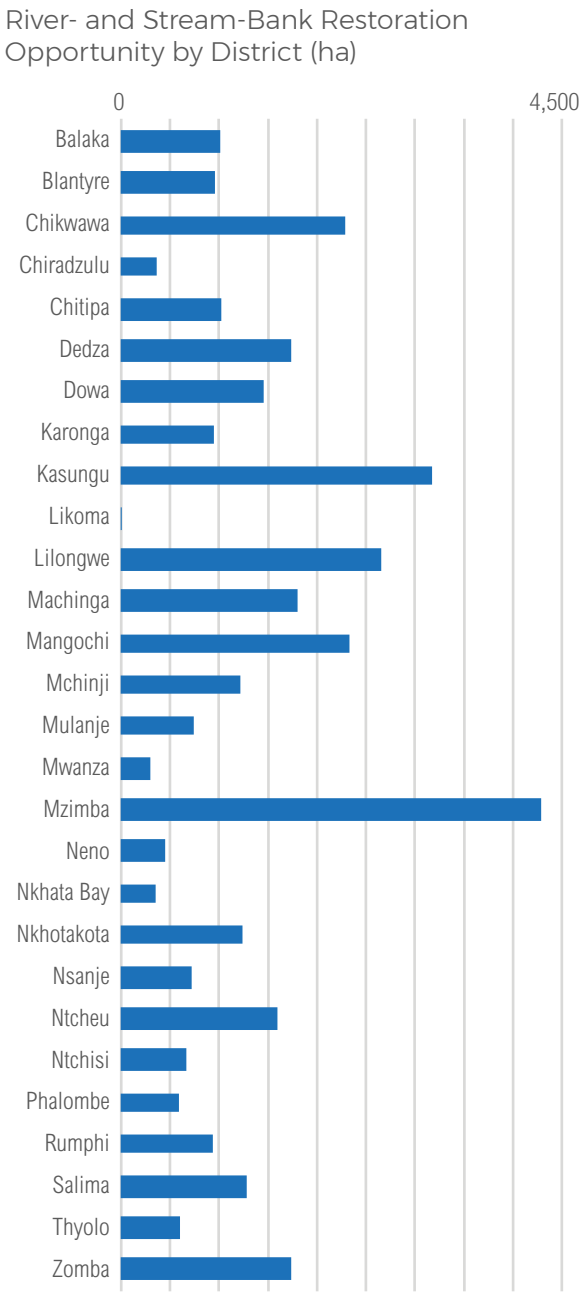
Cost-benefit analysis

River- and stream-bank restoration requires substantially more financial and labor investment compared to the degraded land use, and as such the net present value is -4.3 million MWK when only private benefits are accounted for. River- and stream-bank restoration is most beneficial when it is done on landscapes with low agricultural and forestry opportunity costs or in areas where the public benefits of reducing erosion and increasing water quality are high. Similarly, river- and stream- bank restoration will be net beneficial in areas with steep slopes that are near important water features, like the Shire River. In these areas, the returns to agriculture are likely to be low because the steep slopes make cultivation difficult and costly and, more important, reducing soil erosion and increasing water yields in these areas will create large benefits for downstream users, such as the Electricity Supply Corporation of Malawi and downstream agriculturalists (Wiyo et al. 2015). When the values of carbon sequestration and sediment retention are accounted for, the results show that they compose as little as 3 percent of the net present value.

Figure 12 | River- and stream-bank restoration in Machinga District

Figure 13 | Map of opportunity for river- and stream-bank restoration





The map of opportunity area for river- and stream-bank restoration targets 15-m buffers along rivers and streams that have low or no existing tree cover. The map (left) shows where opportunity exists to establish river- and stream-bank restoration interventions, and highlights areas to prioritize for dam/reservoir management, flood risk mitigation, and hydropower potential, where at least two of these priorities could be achieved. The bar chart (right) shows the proportion of the district that is potential opportunity for river- and stream-bank restoration.

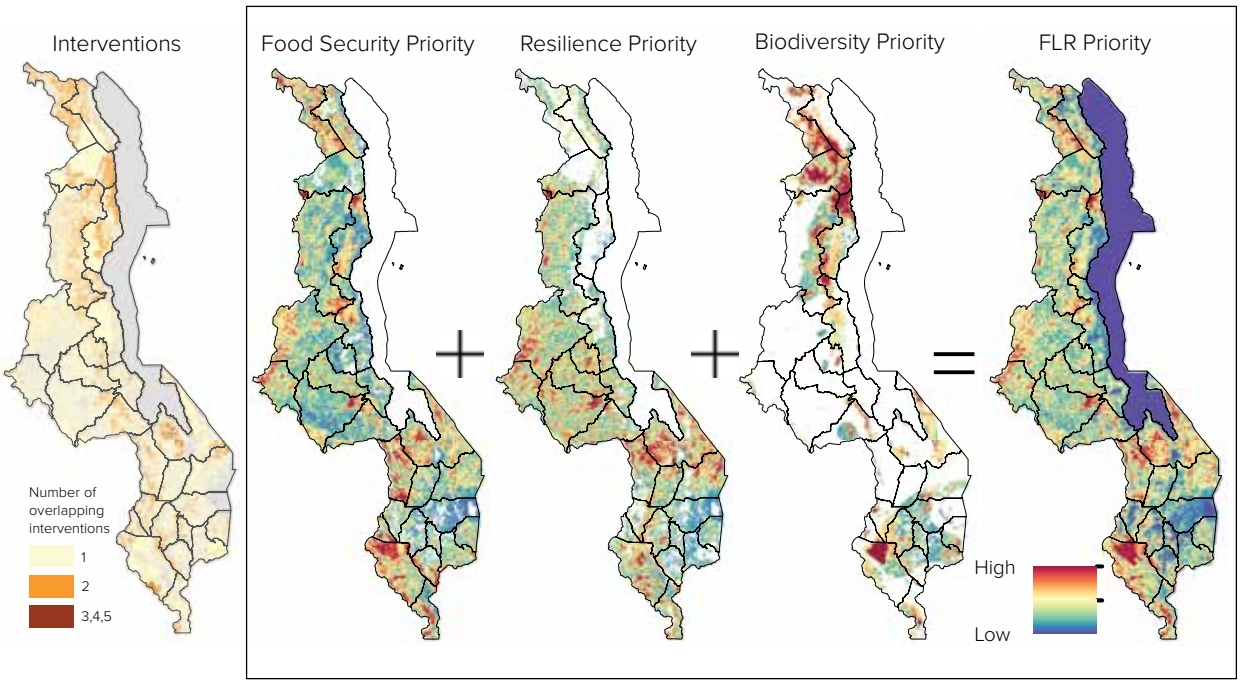
THEMATIC PRIORITIES USING MULTICRITERIA ANALYSIS

In order to refine the priority of FLR implementation within each of the identified FLR intervention types, a multicriteria analysis (MCA) was applied to identify areas of functional landscape degradation where FLR interventions could be targeted to support increased food security, resilience, and biodiversity. Using the MCA to help prioritize spatial investments in FLR, the five priority interventions types can now be implemented with specific attention to the severity and type of degradation in these areas, and the contributions landscape restoration can make to food security, resilience, and biodiversity (see figure 14). Furthermore, the underlying criteria that form the emergent priority levels indicated in the MCA can also be extracted from the analysis to provide specific recommendations on the design of restoration interventions into technical packages such that they address the underlying drivers of degradation.

Priority actions to implement interventions identified in this strategy include the following:

- Rehabilitate degraded natural forests and protect existing natural forest stands near water sources to capitalize on flood and erosion mitigation benefits and biodiversity value.

Figure 14 | Malawi landscape restoration multicritera analysis



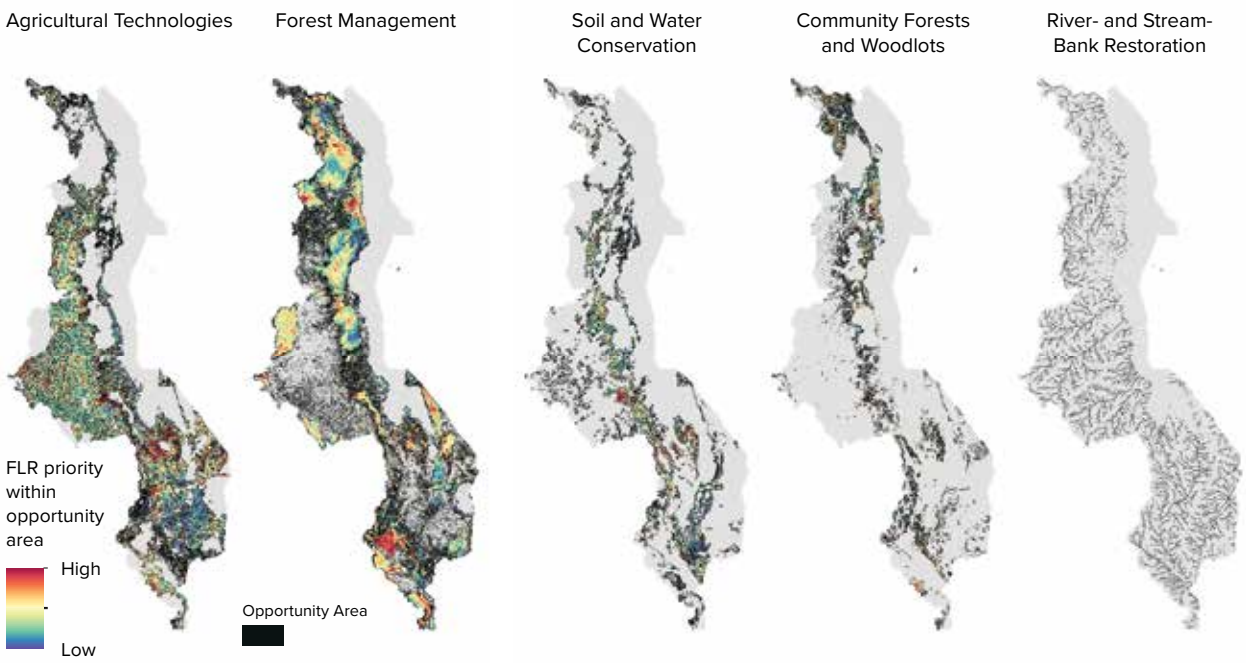
This figure shows the sum of the three priority landscape restoration scenarios (food security/degradation, resilience/degradation, and biodiversity/degradation) in the MCA (right) and the composite intervention map (left). The food security, resilience, and biodiversity priority maps demonstrate the highest priority areas for addressing each of the themes in dark red. The FLR priority map on the right can provide a useful guide for decision makers looking to prioritize restoration in Malawi irrespective of any one theme.

- Prioritize forest management in areas with a high risk of flooding, expansive degradation from mining sites, or high biodiversity value.
- Assist local communities in the formal demarcation of community forests and in the development of forest management plans to govern the sustainable use and decentralized management of such forests.
- As a strategy for restoration, the spatial locations of different restoration activities should complement each other such that practitioners prioritize diversity in approaches to restoration. The temptation to streamline restoration approaches to increase efficiency through a handful of approaches at a large scale will conflict with the necessary complexity of restorative activities. Care will be taken to recognize and plan for the flow of ecosystem services across a landscape and to provide a diversity of restoration approaches that support the diversity of people and species in a landscape.

As such, strategic investments in FLR interventions should account for the proximity among related outcomes. For example, areas targeted for community forest and/or woodlot interventions should be strategically placed in areas where the expected benefits of this intervention will have social, economic, and ecological benefits. Additionally, river- and stream-bank restoration in key watersheds could be prioritized in areas important for increasing hydropower efficiency as well as mitigating the risk of floods.

Through diversified FLR interventions and the locations of thematic priorities for FLR demonstrated through the MCA, restoration activities can be optimized in areas where their benefits will address the drivers of degradation and the social and economic benefits expected from FLR. This will require synchronization among interested stakeholders to come to consensus on the functional attributes desired from a landscape in both the short term and the long term, as well as a landscape restoration strategy that satisfies the immediate needs of people and their long-term resilience.

Figure 15 | Estimated FLR priority



This figure shows the estimated FLR priority (a composite index of each of the three input scenarios) calculated by the multicriteria analysis within the area for each of the five identified restoration interventions. This can be thought of in terms of "general priority" as it relates to the interrelatedness of priority areas for food security, resilience, biodiversity, and functional degradation. Within each intervention type, these data can help guide implementation strategies toward areas that would better support FLR interventions to achieve increases in food security, resilience, and/or biodiversity.

Table 3 | Combinations of criteria, or the occurrence of a single criteria, for totals larger than 100,000 ha for the food security multicriteria analysis scenario

CRITERIA, AND COMBINATIONS THEREOF, TO BE CONSIDERED IN THE DEVELOPMENT OF FLR TECHNICAL PACKAGES TO ADDRESS FOOD SECURITY (ABOVE 100,000 HA, AT NATIONAL LEVEL)	HECTARES
Rainfed cropland	2,244,700
High poverty, poor market access	446,000
High poverty, limited nontimber forest products, few livestock	416,000
Low soil fertility	292,400
Low evapotranspiration, rainfed cropland	202,000
Sediment export, female gender balance, poor market access	151,400
Canopy cover loss, sediment export, poor market access	120,000
Low soil fertility, high poverty, rainfed cropland, low crop yield, few livestock, food insecurity	115,400
Female gender balance, few livestock	111,500
High slope, high/moderate erosion, low soil fertility, canopy cover loss, few livestock	104,700
Canopy cover loss, high population density, sediment export, rainfed cropland, low crop yield	104,000
Total	**4,204,100**

Table 3 provides an example of this strategy for food security. While over 2 million hectares of rainfed cropland would benefit from FLR interventions designed to address the challenges associated with this land use, 416,000 additional hectares would benefit from technical restoration packages that include interventions to address poverty, a lack of access to nontimber forest products, and a lack of livestock. A strategic technical package developed that produces tangible livelihood benefits, increases access to nontimber forest products, and provides better access to livestock would conceivably restore these 416,000 hectares using a combination of interventions that specifically address these criteria. The strategy is then to develop forest landscape restoration enterprise opportunities that build and support rural economies, production, and markets, and satisfy the aspirations of landscape restoration and sustainable development.

Similar approaches have been developed to address resilience and biodiversity in Malawi. Restoration in areas adjacent to degraded key biodiversity areas can both support critical habitat for species of concern and alleviate threats and pressures on such habitats and species through increases in agricultural and ecological productivity. Diversified restoration interventions, placed into this landscape context, unite the intersectoral nature of restoration and expand the potential for social trust and economic investment in restoration.

ENABLING CONDITIONS FOR THE IMPLEMENTATION OF FLR INTERVENTIONS

Policy and institutions

An important goal of FLR is to create landscape conditions that incentivize the sustainable use of natural resources. Policies, administrative frameworks, and institutional strategies create the conditions within which social and economic activities either exploit or sustainably use natural resources. The following strategic priorities show how policies and institutions in Malawi can facilitate sustainable development in support of forest landscape restoration and the national aspirations that the restoration process seeks to meet:

- Include FLR as a national priority consistently across newly drafted or revised policies and laws.
- Engage the public sector and private citizens in a national conversation on restoration via radio, television, advertisements, and high-profile events.
- Build on supportive cultural aspects that have a bearing on forest use (e.g., *Gulewamkulu* and similar cultural expressions) to spur greater community mobilization and address cultural barriers to restoration.
- Develop economic activities and regional partnerships based on the provision of genetically diverse and locally sourced seeds and seedlings for use in landscape restoration.
- Engage, capacitate, and formalize responsibility of Traditional Authorities in land use and restoration planning and implementation.
- Integrate FLR into the educational curriculum on climate change being implemented by schools in Malawi through the Department of Forestry engagement with school administrators.
- Strengthen establishment and management of woodlots and tree nurseries on school grounds; assess and improve school and institutional use of fuel wood for cooking.
- Support multiagency and cross-sectoral program design and implementation of landscape restoration approaches.
- Align parallel initiatives within ministries and among stakeholders on restoration, biodiversity conservation, climate change, fisheries, humanitarian aid, human health, and economic and social development.

Table 4 | List of Malawi government sectors and their relevance to implementing and/or benefiting from FLR

MINISTRY	RELEVANCE TO NATIONAL FOREST LANDSCAPE RESTORATION STRATEGY
National Defense	Areas for military activity often have high ecosystem value due to their restricted use. Increased ecosystem services that flow from these areas reduce the potential for national and international conflict over resources.
Disaster and Relief Management	Restoration reduces the probability of some natural disasters (floods, landslides, etc.) and can mitigate the intensity of other disasters (drought, climate change).
Finance, Economic Planning, and Development	The costs of degraded land compound with increasing population and reductions in crop yields. Restoration can facilitate the creation of rural markets and new opportunities for the production of goods from sustainably managed landscapes, moving Malawi toward a technologically driven export economy.
Foreign Affairs and International Cooperation	Restored landscapes in Malawi contribute to many international commitments, and successful restoration will make Malawi an example of the transformational potential of nature-based solutions to environmental and development challenges.
Labour, Youth, Sports, and Manpower Development	FLR interventions can be organized to engage large numbers of young people and labor organizations and help to reduce unemployment and generate a lasting national commitment to a sustainable and prosperous nation.
Health	Healthy landscapes that provide clean water and air reduce the prevalence of disease. Through increases in agricultural and ecological productivity, the negative health effects of low socioeconomic status are mitigated.
Gender, Children, Disability, and Social Welfare	FLR on millions of hectares of land in Malawi constitutes an unparalleled opportunity to ensure that solutions to landscape challenges support approaches that ensure an equitable and fair distribution of benefits and costs among men and women.
Education, Science, and Technology	Malawi has the opportunity to mainstream FLR into the school systems by developing educational commitments to restoration and employing recent technological and scientific solutions for nature-based approach to restoration.
Justice and Constitutional Affairs	An increase in effective governance at the national and local level reduces the burden on the judicial system of legal conflicts from land and resource disputes.
Information, Communications Technology	Through a nationally led communications campaign, and through the interaction with several other ministries, the data and potential of landscape restoration can be communicated. Advances in mobile technology and landscape monitoring also ensure that the communications infrastructure of Malawi helps contribute to monitoring and reporting on progress toward a more sustainable and prosperous nation.
Civic Education, Culture, and Community Development	The engagement of civil society, communities, and cultural organizations in defining the importance and legacy of national and local actions to build sustainable landscapes and economies can be led here. The development of local restoration economies and markets through community development will be key.
Natural Resources, Energy, and Mining	This sector covers very important departments (Forestry, Environmental Affairs, Mining, Climate Change Management and Energy) that are very crucial for the attainment of Malawi's restoration goals. The mandates of these departments have a direct bearing on how Malawi makes progress.
Agriculture, Irrigation, and Water Development	Some of the main benefits of FLR are increases in agricultural productivity and crop diversity, along with improved water quality and access that has a bearing on irrigation farming as well.
Industry, Trade, and Tourism	Through the restoration of degraded land and forests, Malawi can support an increase in tourism opportunities at its natural heritage treasures. Broad landscape restoration also provides the long-term natural capital to support increases in economic production and industry, leading to increases in technological and agricultural exports.
Lands, Housing, and Urban Development	The increased land use and tenure rights inherent in a comprehensive landscape restoration strategy clarify formerly ambiguous land tenure and resource-use arrangements.
Transport and Public Works	The transport and public works sector will be instrumental in helping to define the economic, infrastructure, and transport networks for goods produced as a result of increased agricultural and economic productivity, at the same time ensuring that the development of transport and public works presents minimal damage to forests and land.
Gender	The ministry will ensure that interests of both genders are considered in implementation of landscape restoration interventions.
Local Government and Rural Development	The focus of restoration on local implementation of national restoration goals leaves a lot of room for local interpretation of activities. Through FLR local government and rural areas will benefit from increased autonomy in restoration interventions that are tailored to their local objectives and interests.

Key policy and institutional strategies and ministerial cooperation

Finance, Economic Planning, and Development; Agriculture, Irrigation, and Water Development

- Shift domestic government budget allocations from subsidies for mineral fertilizers to support for increased extension services, training, and outreach programs to promote improved agricultural technologies; soil and water conservation; and other FLR interventions that promote improved catchment management.
- Increasingly redirect cash-for-work programs toward restoration actions (natural and build restoration infrastructure).

Agriculture, Irrigation, and Water Development; Local Government and Rural Development

- Secure tree tenure on cropland and support local governance arrangements, including community bylaws, to effectively ban uncontrolled cutting of trees on farms and customary land.

Natural Resources, Energy, and Mining; Local Government and Rural Development

- Improve incentives for adhering to existing forest regulations that support controlled and sustainable production of charcoal.
- Establish appropriate incentives and compliance mechanisms to strengthen laws and policies on forest clearing restrictions and for community forest management.
- Improve the transparency and accountability of participatory forest management and forest comanagement structures, such as block management committees and other bodies responsible for forest protection, regeneration, management, and harvesting.
- Develop forest management plans for sustainable commercial firewood extraction and charcoal production schemes, especially in areas targeted for forest management interventions (forest reserves and other protected areas in particular).

Industry, Trade, and Tourism; Natural Resources, Energy and Mining; Gender, Children, Disability, and Social Welfare; Finance, Economic Planning, and Development

- Establish and/or support equitable benefit-sharing agreements that include provisions to avoid elite capture and to ensure appropriately compensated community-level participation and governance.

Local Government and Rural Development; Industry, Trade, and Tourism; Natural Resources, Energy, and Mining

- Enable and empower Traditional Authorities to work with the Department of Forestry and locally established forest management committees and associated user groups.
- Increase support for community organization and engagement in forest comanagement, participatory monitoring, and expansion of sustainable forest production and management systems.

In the long term, the cultural shift required to build sustainable economies at different scales in Malawi will require political and economic investment and the creation of social feedbacks that reinforce investments in sustainable development. In this vision, the full faith and confidence of Malawi and its citizens can be built and supported in perpetuity with a dedication to the long-term vision for sustainability and national prosperity and independence.

ECONOMICS AND FINANCE

Restoration is a time- and labor-intensive process. Restoring degraded lands, especially those currently under agricultural production or intensive use incurs opportunity costs. The gaps between the realization of economic benefits from restoration and the realities of people's lives have often been cast as at odds with one another.

However, restoring degraded land can include short-term economic returns and the immediate effects of restoration on agricultural yields and water quality can be substantial. Time scales for restoration are being reduced as approaches become more diversified. Many restoration strategies and technical packages exist (and appropriate ones will be developed for Malawi) that both meet the short-term economic needs of landowners and build in diversified income-generating products based on ecological succession in the mid-term, all the while contributing to long-term public and private economic and ecological sustainability. These diversified restoration strategies can be the drivers of sustainable businesses and markets that both restore degraded lands and create novel income-generating activities in rural economies.

The NFLRA economic analysis weighed the costs and benefits for the implementation of the five identified restoration intervention types and found the following:

- **Agricultural technology, when** adopted by smallholder farmers, makes them likely to be better off in the long run than their peers who did not adopt it. Farmer-managed natural regeneration was identified as the most cost-effective and least labor-intensive strategy.
- **Community forests and woodlots** generate additional benefits to smallholder farmers of 5.7 million MWK over a 20-year period compared to degraded forest and woodlands with light agriculture.
- **Natural forest management** is most beneficial when it is done on landscapes with low agricultural and forestry opportunity costs or in areas where the public benefits of natural forest management are high.
- **Soil and water conservation** generates additional benefits of approximately 1.5 million MWK per hectare over a 20-year period compared to degraded conventional maize agriculture.
- **River- and stream-bank restoration** is most beneficial when it is done on landscapes with low agricultural and forestry opportunity costs or in areas where the public benefits of reducing erosion and increasing water quality are high.

The economic strategy for forest landscape restoration in Malawi has been on the implementation of the five identified intervention types in locations where the costs will be reduced and the benefits increased. This will be based on the analysis of priorities that demonstrate where the economic benefits from these restoration actions will flow. It is especially important at this stage to ensure that economic benefits from restoration are provided in a fair and equitable manner—especially in support of women's leadership and participation in restoration activities and initiatives and their access to and control of land, capital, and credit.

Table 5 | Total financial costs of bringing restoration activities to scale in Malawi

LAND USE	FINANCIAL COSTS IN EXCESS OF BASELINE ACTIVITY (MWK/HA)	HECTARES	TOTAL FINANCIAL COST (MILLIONS MWK)
Conservation agriculture	50,400	200,000	10,080
Intensive agroforestry	200,500	200,000	40,100
Farmer-managed natural regeneration	6,400	1,800,000	11,520
Soil and water conservation	50,400	200,000	10,080
Community plantations and private woodlots	103,800	580,000	60,204
Natural forest management and watershed protection	96,500	1,520,000	146,680
Total		**4,500,000**	**278,664**

SCALING UP SUCCESSFUL RESTORATION IN MALAWI

Considering the ambitious commitment to restoration—nearly half of Malawi's land area—a coordinated strategy that is inclusive of Malawi's national economic, social, and development goals as well as its natural resource and management aspirations will be key. The following strategy outlines how the results of the NFLRA can be operationalized for policies and institutions, stocktaking and mapping, and economics and finance. To create an enabling environment that fosters widespread adoption of the five intervention types identified for scaling up through the NFLRA and the novel economic opportunities generated through restoration enterprises, different ministries and sectors should recognize that existing agriculture, forest, and climate policies for their sectors all contribute to the same goals. Landscape restoration provides a unique opportunity to harmonize this understanding, especially through the implementation of forest landscape restoration over the coming years. The scale of restoration in Malawi and the interdependency of all sectors necessitates a coordinated and inter-departmental approach to this landscape strategy that is supported by a genuine national restoration movement. Broadly, an increase in technical support and training through extension services on the components of this strategy will fundamentally determine the trajectory of Malawi's restoration commitment.

Expanded communication and outreach are fundamental to the successful enabling of restoration at scale and therefore a critical component of Malawi's national FLR strategy. Real and lasting change in land use practices that contribute to degradation will depend on reaching millions of resource users across the forest and agricultural landscapes of Malawi with key messages and information that prompts behavior change and mobilizes a new "restoration generation."

People will not adopt activities they do not know about, perceive as risky, and/or lack the skills to implement. Many more households would likely be willing to adopt restoration activities if they knew about them, but poor extension and outreach coverage limit this potential. According to the 2014 Welfare Monitoring Survey, only 17 percent of households in Malawi received advice on farm planning and practices, while only 7 percent received information on forest and woodlot management (NSO 2014). In addition, gender gaps in access to information and extension services can contribute to the lack of adoption.

There are several ways to reduce the information barrier to promote more widespread adoption of restoration activities. It is critically important to increase investment in extension, outreach, and knowledge-sharing programs separately designed for women and men to reduce knowledge and skill barriers and promote adoption. Outreach activities, like farm radio programs, can also reduce information barriers by discussing the practical steps of implementing different restoration activities and highlighting the benefits that smallholders could expect to receive. The following strategies can facilitate the scaling up of restoration in Malawi:

- Dedicate more resources to communication and outreach about the benefits of restoration through rural radio, expanded extension services, and support for NGOs to provide community support.
- Expand support for farmer-to-farmer visits and peer-to-peer training.
- Mobilize Traditional Authorities and high-level political support to organize competitions, award prizes, and recognize local champions who are leaders in adopting, adapting, and innovating with respect to restoration.

The systematic use of new cell phone technologies, social media, video documentaries, radio and TV programs, and other information-communication technologies can greatly accelerate the widespread knowledge of proven restoration interventions. However, there is no substitute for the influence of family, friends, and colleagues in driving societal change. While electronic communication mediums can increase the range of a message, depth of communication comes only through personal interaction. Behavior change is based on personal experience and relationships. Communication strategies should revolve around the inherent trust that people place in their friends and family to spread the word of restoration, and restoration interventions should earn this trust from the people.The following sections describe the strategies for scaling up each of the five restoration intervention types identified.

Agricultural technologies

To create an enabling environment that fosters widespread adoption of agricultural technologies, existing agriculture, forest, and climate policies need harmonization. These include the National Agriculture Policy (2016), the National Forest Policy (2016), and the National Climate Change Policy (2015). The National Climate Change Investment Plan (2013) also highlights agriculture as a key sector through which to enhance climate change resilience, while Malawi's National Adaptation Programme of Action (2006) outlines agricultural interventions aimed at boosting women's resilience to climate change.

Strategies for scaling up the adoption of agricultural technologies include the following:

- Prioritize for intervention areas that are the most food insecure, highest in poverty, and prone to drought to maximize the benefits of agricultural technologies to increase crop yields, diversity incomes, and increase the climate resiliency of croplands.
- Dedicate more resources to communication and outreach about the benefits of agricultural technologies through rural radio, expanded extension services, and support for NGOs providing training for communities.

- Shift domestic government budget allocations from subsidies for mineral fertilizers to support for increased extension services, training and outreach programs to promote conservation agriculture, FMNR and agroforestry, and soil and water conservation.
- Improve coordination between the Department of Forestry and the Ministry of Agriculture, Irrigation, and Water Development to align and increase resource allocations for tree-based restoration interventions on farms.
- Increase support for the development of more coherent and well-coordinated extension materials and training programs for conservation agriculture, agroforestry, and FMNR.
- Expand support for farmer-to-farmer visits, peer-to-peer training, and other capacity building activities.
- Reinforce the security of tree tenure on cropland, and strengthen the authority of local leadership to enforce community bylaws against uncontrolled cutting of trees on farms and on customary land.

- Mobilize Traditional Authorities and high-level political support to organize competitions, award prizes, and recognize local champions who are leaders in adopting, adapting, and innovating with respect to agricultural technologies.

Community forests and woodlots

Enforcing the provisions in the National Forest Policy (2016) to conserve and develop forest resources for economic and environmental benefits through community-based forest management could significantly accelerate FLR in Malawi. The National Forest Policy also contains provisions to promote tree growth, including through the establishment of woodlots, as a means of achieving self-sufficiency in firewood and charcoal. Provisions in the Environmental Management Bill (2015) are poised to promote community-based natural resource management. The National Land Policy (2002) presents the legal framework governing land rights and has significant bearing on the implementation of these policies; it includes provisions that the Government of Malawi support community participation in land management and communities' right to a share of revenue derived from any public land established on land managed by Traditional Authorities, and that communities have authority to protect land areas reserved for communal use against encroachment and should manage community forests and woodlands.

Strategies for scaling up the establishment of community forests and woodlots include the following:

- Prioritize areas for community forest and woodlot interventions that are in close proximity to markets, have higher levels of poverty, and have a greater proportion of female-headed households to maximize the benefits of increased local access to forest products.
- Increase coordination between the Department of Forestry and school administrators to expand the establishment and strengthen management of woodlots and tree nurseries on school grounds, which are required as part of the Ministry of Education's National Curriculum.
- Improve enforcement of existing forest regulations against the uncontrolled and unsustainable production of charcoal.
- Build capacity within the Department of Forestry and district government and in targeted communities to assist in the formal demarcation of community forests and in the development of forest management plans to govern the sustainable use and decentralized management of these forests, with an accent on more effective protection and assistance of natural regeneration.
- Encourage community user groups, especially women and local entrepreneurs, to establish and manage woodlots as economically viable businesses organized to produce a steady supply of forest products.
- Mobilize increased technical support, such as through extension services, to assist with site and species selection, seed supply, site preparation and tree planting, and sustained yield management and regeneration.
- Complement local investments in establishing and managing community forests and woodlots with small grants and technical support to strengthen associated forest product value chains and reinforce the economic returns and incentives for communities and user groups to invest in these restoration interventions. This could include assistance with the development of beekeeping and honey production, and value-added processing and marketing of a range of timber and nontimber forest products from community forests and woodlots.
- Establish appropriate incentives and compliance mechanisms to strengthen enforcement of related laws and policies, in particular for forest-clearing restrictions and for community forest management.
- Create and support institutions to extend credit to smallholders with an interest in investing in plantation forestry, expansion of woodlots, and value-added processing and marketing of tree and forest products.

Forest management

If enforced effectively, several existing policies could accelerate FLR through forest management. For example, the National Land Policy (2002) includes provisions to prohibit tree-cutting on steep slopes, hilly areas, and watershed areas unless done under strict control and guided by selective pruning. The National Land Resources Management Policy (2000) promotes tree planting, natural regeneration, and conservation of forests; the Food Security Action Plan (2008) and Malawi's National Action Programme include a focus on tree planting (of species that can increase soil fertility) and on promoting regeneration of native tree species; and the National Forest Policy (2016) promotes both regeneration on degraded land and improved management of industrial plantations for sustainability, profitability, and efficiency.

Strategies for scaling up the adoption of forest management interventions include the following:

- Prioritize forest management interventions in areas with high risk of flooding, expansive degradation from mining sites, and high biodiversity value to maximize the benefits of increased forest cover.
- Improve the transparency and accountability of participatory forest management and forest comanagement structures, such as block management committees and other bodies responsible for forest protection, regeneration, management, and harvesting. This includes establishing and enforcing equitable benefit-sharing agreements, with provisions to avoid elite capture and to ensure that community-level participation is appropriately compensated, as well as provision for full participation and local-level accountability in decision making and governance.
- Enable and empower Traditional Authorities to work in concert with the Department of Forestry and locally established forest management committees and associated user groups.
- Build the capacity and institutional support to ensure that forest management objectives, management plans, and implementation procedures take account of local development needs and priorities as well as other ecological and socioeconomic factors.
- Implement regular monitoring of forest resource stocks and conditions with local support.
- Focus by Department of Forestry on controlling commercial firewood extraction and charcoal production in areas targeted for forest management interventions, particularly forest reserves and other protected areas.
- Increase support and incentives for private investment to establish and manage commercial plantations aimed at production of pine and other saw timber and high-value forest products with lower-valued fuelwood as a by-product.
- Reinforce specific policy directives and enabling conditions with the aim of reducing barriers to financing and increasing economic incentives and market access for sustainable and certified forest products from well-managed forests and plantations, including sawlogs and charcoal.

Soil and water conservation

Harmonization of cross-sector policies related to soil and water conservation would facilitate widespread adoption of these interventions. Soil and water conservation are recognized in the National Climate Change Policy (2015) as vital to food security, strengthened livelihoods, and natural resource resilience and to achieving adaptation outcomes. The National Climate Change Policy also underscores the importance of good catchment management to boost water retention and soil health. For its part, the National Land Policy (2002) encourages forest cover for river headwaters and water catchment areas, while the Malawi Growth and Development Strategy II (2011–2016) promotes water conservation techniques as a means of achieving economic growth and development, and the Food Security Action Plan (2008) aims to build farmers' capacity to carry out water conservation activities.

Strategies for scaling up the implementation of soil and water conservation interventions include the following:

- Prioritize interventions in areas where there is high risk for flooding to capitalize on the flood mitigation benefits of soil and water conservation infrastructure.
- Increase investments in training and assistance, such as through extension services, to establish soil and water conservation infrastructure that protects croplands from flooding and erosion.
- Focus the government public works program (cash-for-work) scheme on soil and water conservation activities in watersheds at high risk for flooding and erosion. These programs (especially the World Bank–funded Malawi Social Action Fund and its Public Works Programme) provide significant inputs that could be more strongly directed toward restoration actions at the village level.

River- and stream-bank restoration

Harmonization of existing forest and agricultural policies is important for enabling river- and stream-bank restoration interventions at scale. In particular, agricultural policies that promote irrigation and cultivation close to riverbanks should be reexamined with a view to better alignment with riverbank protection stipulated in forest policies. As things currently stand, lack of harmonization in these policies creates confusion about where and how to protect and manage protective vegetation adjacent to wetlands, lakes, rivers, streams, and other water bodies. The National Land Policy (2002) is the vehicle to harmonize these approaches, as it includes a provision to introduce buffer zones in areas where agriculture conflicts with forestry or grazing land. Stronger enforcement of riverbank protection measures, including to counter cultivation of marginal areas, is also needed to realize the vision of the National Forest Policy (2016).

In addition, river- and stream-bank restoration is overlooked in policies, such as the Energy Regulation Act (2004), where it has potential to achieve goals including sustainable power generation and biomass energy production.

Strategies for scaling up the implementation of river- and stream-bank restoration include the following:

- Prioritize river- and stream-bank restoration in watersheds that currently have or could-have reservoirs and hydropower facilities, as well as those with high flood risk.
- Dedicate more resources to communication and outreach about the benefits of river- and stream-bank restoration through rural radio, expanded extension services, and support for NGOs providing training for communities to aid with species selection and other training needs.
- Reinforce local environmental governance by supporting the adoption and enforcement of strong community bylaws to reduce the uncontrolled cutting of trees along river- and stream banks.
- Rehabilitate degraded natural forests and protect existing natural forest stands near water sources to capitalize on the flood and erosion mitigation benefits and biodiversity value.
- Provide seedlings and other material resources and associated training to encourage river- and stream-bank tree planting and regeneration to secure water resources and mitigate erosion and flood risks.

The extent to which the national mobilization of both the public sector and private citizens citizens to undertake and contemplate restorative actions can only be achieved through an increase in honest dialogue and communication among stakeholders.

FINANCING RESTORATION IN MALAWI

The results of the cost-benefit analyses of the priority restoration interventions have shown that the benefits of each intervention exceed the costs. Forest management and river- and stream-bank restoration are an exception due to the higher up-front investments of labor and capital as compared to the degraded land use. Currently Malawi expends significant resources on cash-for-work programs to support the poorest members of society. Increasingly these resources will be channeled into restoration activities to improve landscape function.

Agricultural technology restoration interventions produce more private benefits than public benefits and will be supported by investments made directly by smallholders, incentivised by grants or loans to smallholder associations. Models for these kinds of incentives are now emerging.[2] It is proposed that additional funding be mobilized through private financing businesses like microfinance institutions and other businesses that offer farm credit. An innovation in microfinance is the Climate-Smart Lending Platform (CSLP), which incentivizes climate-smart agriculture and agroforestry while greening and mitigating risk for loan portfolios.[3]

Some types of forestry-based restoration interventions, especially activities designed to improve sediment retention or flood control, generate significant public benefits but few private benefits. Accordingly, forest-based restoration interventions that promote the creation of public goods but lack conventional economic returns may require financing through public funds or novel investment schemes that generate financial returns on natural capital.

Some key strategies that will facilitate the movement of financial opportunities for restoration include the following:

- Support farming communities to use solidarity and community lending mechanisms to incentivize communities' own investment in restoration.
- Create and support local and national institutions to extend credit to smallholders (e.g., through the CSLP).
- Complement local investments in establishing and managing community forests and woodlots with small grants and technical support to strengthen associated non–forest product value chains and reinforce economic returns and incentives for communities and user groups to invest in restoration interventions. This should include assistance in the development of beekeeping and honey production, as well as value-added processing and marketing of a range of timber and nontimber forest products from community forests and woodlots.
- Increase support and incentives for private investment to establish and manage commercial plantations aimed at production of saw timber and high-value forest products with lower-valued fuelwood as a by-product.
- Increase economic incentives and market access for sustainable and certified forest products from well-managed forests and plantations, including sawlogs and sustainably sourced charcoal.

2. For example, the Community Environmental Conservation Fund (CECF) operated in Uganda and the Lower Shire Basin.

3. Climate-Smart Lending Platform (http://climatefinancelab.org/idea/climate-smart-finance-smallholders/).

Potential sources of revenue to fund activities necessary to bring restoration to scale in Malawi and capitalize a national restoration fund include the following:

- Reprogramming and realigning domestic public funding through three main options:
  1. Redirect food/cash-for-work programs toward restoration activities.
  2. Reduce or remove subsidies that create incentives for overproduction or overuse of inputs that are high cost, such as Malawi's fertilizer subsidy, to increase support for the integration of trees into farming systems and incentives to protect and manage forests and agro-forestry systems sustainably.
  3. Establish a national restoration fund, as exemplified in Costa Rica, Rwanda, and Guatemala, to transfer a portion of public tax revenues to a fund that finances sustainable land use and restoration activities and to attract private-sector financing.
- National and international private investments and public-private partnerships that provide a return on investment in enterprises linked to restoration interventions. Although restoration business models are still in the early stages of development, where uncertainty can be high and therefore risk-tolerant investors are necessary, examples of potentially viable restoration-based enterprises include sustainable commercial tree plantations and improved nursery management for production of high-value seedlings, and value-added processing and sale of timber, poles, fodder, fruits, and other products from restoration interventions.
- International funds and sources for restoration financing, such as development finance institutions (e.g., microfinance institutions, community development financial institutions, and revolving loan funds); the Global Environment Facility, which distributes grants to developing countries that support actions to address critical threats to the global environment; the Green Climate Fund and other climate-related funds, which finance climate mitigation and adaptation activities; and Official Development Assistance, a flexible source of funding channeled via multilateral organizations.

Potential sources of funds to capitalize a national restoration fund for Malawi included development finance institutions (DFIs), the Global Environmental Facility (GEF), and the Green Climate Fund (GCF) and other related funds established to support climate mitigation and adaptation activities. Malawi is well-positioned to mobilize GCF funding to implement its national restoration strategy and transform the agricultural and forestry sectors. Malawi received more than $900 million in official development assistance (ODA) in 2014 allocated across many development sectors. This assistance supports numerous programs that would benefit from the impacts of successful forest and landscape restoration interventions.

National and international private investment is a further source of restoration financing. Interest is steadily building in leveraging funds from impact investors for restoration, and there is considerable scope for these investors to improve their understanding of potentially successful business models and investment opportunities in small and medium-sized enterprises linked to restoration. Investor roundtables can be organized to facilitate information sharing about needs and opportunities and to catalyze engagement by interested impact investors. About 13 percent of enterprises in Malawi sell forest-based products and could benefit from more sustainable sourcing of these products through an association with restoration interventions and improved management of trees and forests.

MONITORING MALAWI'S PROGRESS ON RESTORATION

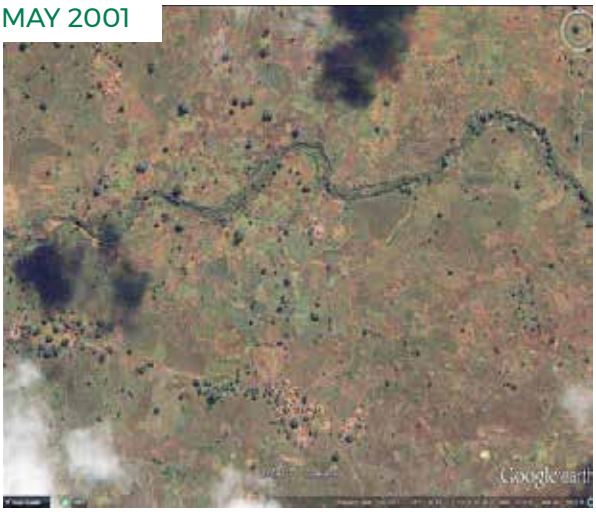
Malawi's national commitment to restoration and the recognized international contribution to AFR100 under the Bonn Challenge are intended to accelerate action on national goals for restoration, climate resilience, agricultural and economic security, and sustainable economic development. Monitoring the hectares under restoration is important to drive progress in achieving these goals, but the impact of Malawi's pledge on achieving the goals of restoration is paramount. This is less about counting hectares and more about using baseline criteria to measure and monitor changes that can be attributable to forest landscape restoration activity.

The establishment of a monitoring system is important for the categorization of successful forest landscape restoration in Malawi. A robust monitoring system would incorporate information on (1) processes, projects, and interventions being undertaken; (2) incremental progress toward agreed-upon targets; and (3) the medium- and longer-term socioeconomic and environmental impacts and benefits of restoration.

A key factor in monitoring restoration progress is the improved mapping of land use and land cover across Malawi. Malawi needs an accurate map of the current extent of croplands, forests, and other major types of land use/land cover, and an improved capacity to monitor changes in land use/land cover. More attention needs to be paid to tracking land degradation and understanding the drivers of degradation leading to changes in the productivity of land and other natural resources. Additional analysis is needed of the costs and benefits for specific restoration interventions in combination with business models and enterprises in order to more accurately inform the allocation of resources to support the implementation of restoration. Applied research needs to be supported to improve the understanding of the drivers of land degradation and the key success factors for the widespread adoption of effective restoration practices.

Figure 16 | Pairwise Google Earth images of cropland in Balaka district from May 2001 and July 2013 showing increased density of on-farm tree cover

MAY 2001



JULY 2013

It will be particularly important to track the adoption of restoration language in district development plans and other regional and local policy documents, in addition to this language in national and international policy documents and statements. Key indicators to assess the impacts restoration may include measurement on any of the criteria used in the multicriteria analysis, including changes in the density of trees across the landscape (within and outside of forests, including changes in tree cover on croplands), in the quality and fertility of soils, and in agricultural yields and productivity. Remotely sensed measurements of primary productivity in forest lands and survey-based representations of forest products in markets are other key indicators. These indicators may also include measurements of water quality and quantity, as well as changes in species diversity and habitat fragmentation, and in indexes of social vulnerability and climate adaptation and/or resilience. Knowledge that these criteria are used in other existing survey and monitoring regimes should confer priority for that indicator. Many development partners in Malawi are actively engaged in supporting restoration and are well-positioned to assist with participatory monitoring and other forms of data collection for a robust FLR monitoring system.

Next steps for establishing a baseline and monitoring progress on FLR include convening stakeholders to discuss and agree upon (1) a core set of indicators for monitoring progress toward these goals, especially using the criteria from the MCA; (2) uniform, coordinated methods of collecting data and measuring changes in these indicators; (3) developing an open repository of collected data; and (4) communicating progress toward the achievement of Malawi's restoration and development goals.

ACTION PLAN

Table 6 | Action plan to accelerate implementation of FLR at scale

Agricultural technologies (CA, FMNR, and AF)

Prioritize these interventions in 2018–2020

WHAT (ACTIONS)	WHO (ACTORS)	ROLES AND RESPONSIBILITIES
■ Achieve target of 10% tree cover on 50% of cropland by 2020 and on 80% of cropland by 2030. ■ Develop communications strategy to accelerate adoption of FLR agricultural technologies, such as rural radio outreach and FMNR awards program. ■ Mainstream CA, FMNR, and AF in agricultural, rural development, and in food security programs.	■ Farmers with support of rural associations, traditional authorities, extension agents, NGOs, and key government departments in Ministry of Agriculture, MNREM, and others. ■ Government technical departments and leadership responsible for policy coordination and harmonization.	■ Farmers and rural communities adapt and adopt targeted FLR practices at scale and participate in communications, outreach, and monitoring. ■ Extension services, NGOs, and other rural development project implementers facilitate exchange visits, peer-to-peer learning, radio, and awards programs. ■ Government leaders reprogram fertilizer subsidies, increase budget allocations, and secure rights of farmers and communities to manage trees in rural landscapes.

Community forests and woodlots

Plan and mobilize support in 2018 for implementation of first phase in 2018–2020

WHAT (ACTIONS)	WHO (ACTORS)	ROLES AND RESPONSIBILITIES
■ Increase area of community forests and woodlots to 200,000 ha by 2020 and to 600,000 ha by 2030. ■ Reinforce enabling conditions for expansion of community forests and woodlots by prioritizing transfer of management rights and securing benefits of community forests and woodlots for local communities, village associations, and forest user groups. ■ Engage traditional authorities, village associations, schools, and civil society organizations in championing and participating in the expansion of community forests and woodlots, and in strengthening local enforcement of bylaws for protection and management of community forests and woodlots. ■ Increase support from Department of Forestry and extension services in demarcation, capacity building, and devolution of authority for local management of community forests and woodlots.	■ Primary actors are local communities, village associations, and traditional authorities. ■ Increased support to be mobilized by extension services, the Department of Forestry, and other technical services in association with NGOs and rural development projects. ■ Policymakers in MNREM and other concerned agencies to collaborate in reinforcing the devolution of management rights and provision of technical support to local actors engaged in establishing and managing community forests and woodlots.	■ The Department of Forestry leads multiagency and cross-sectoral program with participation of key stakeholders responsible for land use, community development, and management of land, forest, and water resources. Together, these actors organize and coordinate design and implementation of special program to expand areas of community forests and woodlots as a main component of national program for integrated landscape management and accelerated implementation of FLR interventions.

Table 6 | Action plan to accelerate implementation of FLR at scale (continued)

Forest management

Plan and mobilize support in 2018 for implementation of first phase in 2018–2020

WHAT (ACTIONS)	WHO (ACTORS)	ROLES AND RESPONSIBILITIES
■ Improve protection and management of 1 million ha of natural forests and plantations by 2020 and 2 million ha by 2030; restore 500,000 ha of deforested and degraded forest land by 2030; rehabilitate or establish 100,000 ha of commercial forest plantations by 2030. ■ Target and prioritize participatory forest management interventions in strategically important forests where deforestation and degradation threats are highest and potential benefits from FLR are greatest. ■ Increase support for community organization and engagement in forest comanagement, participatory monitoring, and expansion of certified forest production and management systems.	■ Comanagement and participatory forest management institutions in targeted districts. ■ Department of Forestry in collaboration with district officials and traditional authorities. ■ Private-sector investors and entrepreneurs engaged in sustainable use and value-added processing and marketing of forest products.	■ Specific roles and responsibilities to be confirmed through local-level consultations and participation in the formulation of forest management plans, with a focus on formulation of management objectives, organization of interventions, agreements on benefit distribution, and provisions for transparency and accountability in implementing management plans.

Soil and water conservation

Plan and mobilize support in 2018 for implementation of first phase in 2018–2020

WHAT (ACTIONS)	WHO (ACTORS)	ROLES AND RESPONSIBILITIES
■ Implement soil and water conservation measures on 250,000 ha by 2020 and on 500,000 ha by 2030.	■ Smallholder farmers in collaboration with village associations supported by extension services, competent technical departments, NGOs, and rural development projects.	■ Land Resources Conservation Department in the Ministry of Agriculture leads multiagency and cross-sectoral program with participation of key stakeholders responsible for land use, community development, and management of land, forest, and water resources. Together, these actors organize and coordinate design and implementation of special program to scale up soil- and water- conservation interventions as part of the national program for integrated landscape management and accelerated implement of FLR interventions.

River- and stream-bank restoration

Plan and mobilize support in 2018 for implementation of first phase in 2018–2020

WHAT (ACTIONS)	WHO (ACTORS)	ROLES AND RESPONSIBILITIES
■ Regenerate or plant 20 million trees along river- and stream banks by 2020 and 50 million trees by 2030. ■ Support participatory land use planning at local level to demarcate priority zones for stream-bank protection and restoration. ■ Expand communications, outreach, and provision of technical support for river- and stream-bank restoration. ■ Integrate measures in village bylaws and reinforce supporting national regulations to demarcate, protect, regenerate, and manage trees along river- and stream banks.	■ Rural communities organized in community associations to take the lead in implementing stream-bank restoration. ■ Extension services, with assistance of NGOs, technical departments, and rural development projects, facilitate local land use planning and provide increased logistical and technical support for stream-bank restoration. ■ Traditional authorities and community leaders, with support of district and central government authorities, collaborate to reinforce bylaws and harmonize regulatory support for stream-bank restoration.	■ MNREM leads multiagency and cross-sectoral program with participation of key stakeholders responsible for land use, community development, and management of land, forest, and water resources to organize and coordinate design and implementation of special program on stream-bank restoration.

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MOVING MALAWI TOWARD A CLIMATE-SMART FUTURE THROUGH RESTORATION

This restoration strategy and the National Forest Landscape Restoration Assessment (NFLRA) provide a comprehensive framework for achieving Malawi's restoration commitment of 4.5 million hectares as well as the economic development, poverty reduction, increased food security, and resilience promised through successful landscape restoration. Malawi's restoration commitment contributes to the regional AFR100 initiative under the Bonn Challenge.

Findings from the NFLRA have informed this strategy and engaged a range of stakeholders in identifying options for forest landscape restoration (FLR) to achieve the sustainable development goals reflected in Malawi's Vision 2020 and other national development strategies. The Restoration Opportunities Assessment Methodology (IUCN and WRI 2014) provided a framework for stakeholder engagement and a consultative analytical process to assess the opportunity for FLR in Malawi.

Technical assistance for the NFLRA and to develop this strategy was provided by the USAID-funded Protecting Ecosystems and Restoring Forests in Malawi (PERFORM) project; by the International Union for Conservation of Nature (IUCN) as part of the KNOWFOR program, funded by UKaid from the UK government; and by the World Resources Institute with support from the German Federal Ministry for Economic Cooperation and Development (BMZ).

TIMELINE FOR PROCESS TO FORMULATE THE NATIONAL FOREST LANDSCAPE RESTORATION (FLR) STRATEGY

February 2016	Launch of the National Forest Landscape Restoration Assessment (NFLRA) by the Minister of Natural Resources, Energy, and Mining
April 2016	Briefing working on the National Forest Landscape Restoration Assessment and nomination of members of the Task Force and Technical Working Groups
June 2016	NFLRA Inception Workshop with an orientation workshop on gender issues in restoration organized in Blantyre
June–August 2016	Field visits and four zonal stocktaking and participatory mapping workshops organized with district officials, working groups, and key stakeholders in each zone to identify land use and land degradation issues, as well as degradation and restoration activities
July 2016	Participation of Malawi in High-Level Bonn Challenge Roundtable in Kigali, Rwanda
August–September 2016	Continued data collection for economic analysis, and review of findings from zonal workshops and preliminary results of restoration opportunities mapping
September 2016	Participation in World Conservation Congress in Hawaii and announcement of Malawi's national target for forest landscape restoration
October 2016	Participation of Malawi in first annual AFR100 partnership conference and presentation of status of NFLRA and national restoration target
November 2016	Organization of task force and working group meetings to review and validate findings of FLR opportunities mapping, diagnostic of enabling conditions for restoration, and economic and financial analysis and to discuss implications for scaling up strategies
January 2017	Participation in national workshop to scale up tree-based systems to increase agricultural productivity and resilience to climate change and to contribute to Malawi's restoration targets
February–April 2017	Finalization of NFLRA report
April–May 2017	Formulation of National FLR Strategy
June–July 2017	Adoption and launch of National FLR Strategy and NFLRA report at Southern Africa (SADC+) High-Level Roundtable on the Bonn Challenge in Lilongwe, Malawi