

# LANDSCAPE ACTION PLAN FOR MEKET AND GAZO WOREDAS, AMHARA REGIONAL STATE

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The legend FLR codes (Box 1) for Figure 5 below comes from the two Regional (**RFLR**) and Woreda (**WFLR**) FLR maps that were combined. Note that on the map (Figure 5) only FLR codes for



exclusive (non-overlapping) interventions are shown, and all possible overlap combinations are aggregated as **two overlaps, three overlaps or more than three overlaps**

### Box 1 | Map Legend of FLR Codes

☐ Meket-Gazo Kebeles	■ AF-RSF	■ AgSLV-WLE-HLBMB-AASA	■ HLBMB-WWBF-AASA	■ SILVO-HLBMB-WWBF-AASA
■ AASA	■ AfR-SILVO-HLBMB	■ AgSLV-WLE-HLBMB-WWBF-AASA	■ IMDNF-AASA	■ SILVO-WWBF-AASA
■ AF	■ AfR-SILVO-HLBMB-WWBF	■ AgSLV-WLE-WWBF-AASA	■ IMDNF-HLBMB	■ WBY
■ AF-FIS-RSF	■ AfR-SILVO-LLBMB	■ AgSLV-WWBF	■ IMDNF-HLBMB-AASA	■ WBY-FIS-RSF
■ AfR-AgSLV-HLBMB	■ AfR-SILVO-WWBF	■ AgSLV-WWBF-AASA	■ IMDNF-HLBMB-WWBF-AASA	■ WBY-RSF
■ AfR-AgSLV-HLBMB-WWBF	■ AfR-WLE-HLBMB	■ CPE	■ IMDNF-WWBF	■ WLE
■ AfR-AgSLV-WLE-HLBMB	■ AfR-WLE-HLBMB-WWBF	■ CPE-AASA	■ RF-BDPA	■ WLE-AASA
■ AfR-AgSLV-WLE-HLBMB-WWBF	■ AfR-WLE-WWBF	■ CPE-AgSLV-AASA	■ RIVN-BDPA	■ WLE-HLBMB
■ AfR-AgSLV-WLE-WWBF	■ AfR-WWBF	■ CPE-AgSLV-HLBMB-AASA	■ RIVN-WWBF	■ WLE-HLBMB-AASA
■ AfR-AgSLV-WWBF	■ AF-WBY	■ CPE-AgSLV-WLE-HLBMB-AASA	■ RSF	■ WLE-HLBMB-WWBF-AASA
■ AfR-CPE	■ AF-WBY-FIS-RSF	■ CPE-HLBMB	■ SHL	■ WLE-RSF
■ AfR-CPE-AgSLV	■ AF-WBY-RSF	■ CPE-HLBMB-AASA	■ SHL-FIS-RSF	■ WLE-SHL
■ AfR-CPE-AgSLV-HLBMB	■ AF-WLE	■ CPE-WLE	■ SHL-RSF	■ WLE-SHL-RSF
■ AfR-CPE-AgSLV-WLE-HLBMB	■ AF-WLE-RSF	■ CPE-WLE-AASA	■ SHL-WBY	■ WLE-SHL-WBY-RSF
■ AfR-CPE-HLBMB	■ AF-WLE-WBY-RSF	■ CPE-WLE-HLBMB	■ SHL-WBY-FIS-RSF	■ WLE-WWBF
■ AfR-CPE-WLE-HLBMB	■ AgSLV-HLBMB	■ FIS	■ SHL-WBY-RSF	■ WWBF-AASA
■ AfR-HLBMB	■ AgSLV-HLBMB-AASA	■ FIS-RSF	■ SILVO-AASA	
■ AfR-HLBMB-WWBF	■ AgSLV-HLBMB-WWBF-AASA	■ HLBMB	■ SILVO-HLBMB	
■ AfR-Incense-WWBF	■ AgSLV-WLE-AASA	■ HLBMB-AASA	■ SILVO-HLBMB-AASA	

Box 2 describes the names corresponding to the abbreviated FLR codes used with these maps. The combination codes are separated by “-” sign indicating the overlap scenario (those areas are suitable for more than one intervention). Box 1 and Tables 10 -15 in Annex I lists complete set of those overlapping combinations.

### Box 2 | Interpretation of FLR Codes of the Map Legend



## EXECUTIVE SUMMARY

The government of Ethiopia has committed to a landscape approach to restoration under various international initiatives. Under its development blueprint, the climate resilient green economy strategy, Ethiopia aims by 2030 to sustainably manage 4 million hectares of forest, afforest 2 million hectares, and reforest 1 million hectares. Ethiopia is also committed to contributing to the African Forest Landscape Restoration Initiative, the Bonn Challenge, and the New York Declaration on Forests by restoring 15 million hectares of degraded and deforested land within the same time frame.

In 2017 and 2018, the Ethiopian Forest, Climate Change Commission (EFCCC) and World Resources Institute (WRI) carried out a landscape restoration potential and priority study in two Ethiopia Woredas: in Sodo Woreda (Southern Nations, Nationalities, and Peoples' region) and Meket Woreda (Amhara region) using the Restoration Opportunities Assessment Methodology (ROAM) developed by IUCN and WRI. The study indicated that different barriers were identified as obstacles to improve economic, social, and environmental goal and commitments. Barriers were identified that inhibited to improve the current economic, social and environmental objectives, where forest degradation and deforestation, loss of soil fertility, overgrazing, soil erosion and sedimentation of water bodies, flooding and landslide, as well as climate change impacts, all of which can be addressed to various extends by an increase in tree-based landscape restoration activities. A number of tree-based landscape restoration options based on their contributions to the Woredas' goals were identified and prioritized. These include: (i) Restoration of secondary forests (i.e., (assisted) natural regeneration ((A)NR)), (ii) agroforestry promotion (iii) woodlots/plantations development, (iv) enrichment planting in shrubland, (v) buffer restoration/plantation to protect waterbody and (vi) frankincense development.

This Landscape Restoration Action Plan (LRAP) for Meket and Gazo Woredas is prepared in response to causes and impacts of deforestation and forest degradation through FLR intervention options being identified and prioritized by key stakeholders for intervention. On the other hand, the objective of the action plan is to reverse land and forest degradation and engage in landscape restoration to tackle multiple social and environmental challenges, including climate change mitigation and adaptation, land degradation, food insecurity and biodiversity loss.

In addition to previous studies made by EFCCC/WRI (2017) about the Woredas, the methodologies used by the consulting team for the preparation of FLR action plan were, conducting field level verification through transect walk and taking geo-referenced points, conducting stakeholder meetings and discussions on the prevailing challenges and opportunities, and identifying different FLR intervention options. In addition, the vision of the FLR intervention, objectives of the action plan, and roles and responsibilities of the different actors in the restoration process were identified during the workshop.

Based on reports from the previous studies, field level verification and stakeholder suggestion, the tree-based restoration action plan has identified a total land area of 352,240 ha of which 159,800 ha restoring secondary forest; 9,300ha for enrichment plantation in shrubland; 25,800



ha for woodlots/plantations development; to reach 140,000 households through agroforestry promotion; 240 ha riparian forest development and restoration of 17,100 ha of frankincense.

The following strategies and recommendations are made in support of successful implementation of the action plan:

- A detailed sustainable forest resources management plan preparation for different forest types and livelihood improvement interventions are very important;
- Close and sustainable technical and financial support would be very critical until the farmers start to generate income from the tree-based forest landscape restoration interventions;
- Coordination, collaboration and commitment of the stakeholders and capacity building of the local communities would be essential to ensure success of the interventions;
- Diversification of income of the local communities would be necessary to minimize pressure on the forest and tree resources.

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## ACRONYMS AND ABBREVIATIONS

AGP	Agricultural Growth Program
ANRS	Amhara National Regional State
WRI	Word Resource Institute
BOA	Bureau of Agriculture
SNNPR	South Nations, Nationalities People Regions
CRGES	Climate Resilient Green Economy Strategy
CSA	Central Statistical Agency
DA	Development Agent
EEFRI	Ethiopian Environment and Forest Research Institute
EPFA	Environmental Protection and Forest Authority
FAO	Food and Agriculture Organization of the United Nations
ROAM	Restoration Opportunities Assessment Methodology
FDRE	Federal Democratic Republic of Ethiopia
FLR	Forest Landscape Restoration (FLR)
GDP	Gross Domestic Product
GOE	Government of Ethiopia
GTP	Growth and Transformation Plan
ISFL	Initiative for Sustainable Forest Landscapes
IUCN	International Union for Conservation of Nature
LULC	Land Use and Land Cover
EFCCC	Environment, Forest and Climate Change Commission of Ethiopia





# 1 INTRODUCTION

Under the auspices of UN commitments and international multi-stakeholder initiatives, nations are increasing their efforts to reverse land and forest degradation and engage in landscape restoration to tackle multiple social and environmental challenges, including climate change mitigation and adaptation, degradation neutrality, food security and biodiversity loss. Therefore, Forest Landscape Restoration (FLR) has received international attention as a practical means for realizing many existing international commitments to restore ecosystem integrity while improving human well-being through multifunctional landscapes (Zeleeke and Vidal, 2020). The Bonn Challenge is a global effort “to bring 150 million hectares of the world’s deforested and degraded lands into restoration by 2020, and 350 million hectares by 2030” (IUCN, 2011) as well as regional initiatives support the Bonn Challenge such as 20x20 in Latin America and AFR100 in Africa.

Forests and trees outside of forests contribute to human well-being and ecosystem health (Zeleeke and Vidal, 2020). They directly support the livelihoods of farm- and forest-dependent communities through their provision of timber and non-timber forest products, income generation and increasing agricultural productivity (e.g., nitrogen fixation in cropland, fodder for livestock, pollination). In addition, they can play crucial roles in regulating water flows, decreasing floods and landslides; supporting biodiversity; and sequestering carbon. Different tree species deliver different ecosystem goods and services based on their location, management, and spatial pattern within a landscape (EFCCC, 2020). For example, trees in settlements can provide food, shade, carbon sequestration, and beautification, while trees in cropland can contribute animal feed, high-value non-timber tree products, wood fuel, erosion control, protection from landslides, soil fertility, and carbon sequestration. Even more, trees within the same land use-land cover can be associated with different ecosystem goods and services based on their spatial pattern. Trees along farmland boundaries, and trees scattered within the field, have most likely been planted or retained for different reasons: in the first case, the farmer’s main goal might be the procurement of timber or wood fuel; in the latter case, it might be to increase the productivity of his/her crops or livestock.

FLR offers demonstrated opportunities for win-win scenarios that can achieve increases in ecosystem productivity that simultaneously deliver food security, poverty alleviation, and broader socio-economic development objectives. Bringing back these benefits is especially needed and most urgent in areas where forest ecosystems have been severely disrupted or degraded. Therefore, there is a need to create enabling conditions to help realize such success factors and close gaps on factors that undermine FLR initiatives.

In late 2018, the Environment, Forest and Climate Change Commission (EFCCC) launched the country’s 10-Year National Forest Sector Development Program (NFSDP) (EFCCC, 2018) targeted to serve as the main guiding document for coordinating strategic policy interventions and sector-wide investments. Its goal is to build on the country’s considerable forest resources and leverage existing momentum to transform Ethiopia’s forestry sector. This goal will be achieved by attracting foreign investment, catalyzing GDP growth, generating employment, contributing



towards self-sufficiency in forest products and enhancing ecosystem services. FLR interventions fall under this umbrella.

Factors leading to the successful implementation of FLR initiatives are localized and context-specific. In Ethiopia, the Restoration Diagnostic for FLR implementation (WRI, 2015) was successfully carried out in 2017 and 2018 in two Ethiopia districts or Woredas: in Sodo Woreda (Southern Nations, Nationalities, and Peoples' region) and Meket Woreda (Amhara region). In addition, field verification visit was made in March 2021 where stakeholders meetings and transect walk was conducted. The objective of running these diagnostics and field verification were to identify the barriers and opportunities leading to the successful implementation of FLR and design strategies that close gaps or overcome such obstacles. This action plan is prepared based on baseline situations obtained through assessment and discussions made with stakeholders for FLR interventions to harness existing opportunities and overcome deforestation and forest degradation of the Woredas.

## 1.1 VISION AND OBJECTIVE OF THE ACTION PLAN

The vision of this action plan is to see a restored and sustainably managed landscapes to boost provisions of goods and ecosystem services to humanity and all life that depend on those landscapes by restoring an optimal balance of ecological, economic and social benefits where forests and trees are an integral part.

The goal of the landscape restoration action plan is to guide the journey towards the vision of those landscapes. By that we mean the landscape action plan has the following objectives:

- Establish a shared vision for landscape restoration among local stakeholders, clarify roles and responsibilities, and strengthen local ownership of FLR activities.
- Create a collaborative platform to develop joint implementation plans for identified FLR intervention.
- Strengthen Woreda, Kebele, and Landscape level platforms for FLR coordination to mainstream into sectoral plans and accelerate implementation of FLR initiatives.
- Ultimately enable restoration at scale to restore ecological functioning and by doing so the human well-being in degraded and deforested landscapes of Meket and Gazo Woredas.



## 1.2 APPROACHES AND METHODOLOGY

The action plan builds upon multiple previous studies conducted in Meket and some covering the entire Amhara region. Six main studies that this action plan builds upon cover components of the original Restoration Opportunities Assessment Methodology (ROAM) developed by the International Union for the Conservation of Nature (IUCN) and WRI (IUCN and WRI 2014)<sup>1</sup>. WRI, EFCCC and Amhara regional partners implemented those ROAM components in phased approach contextualizing to local conditions of Meket Woreda. The following products were generated from these studies:

1. Assessing tree cover and distribution for tracking progress towards targets and informing adaptive management<sup>2</sup>. This study evaluates the change in tree cover percent, tree cover distribution patterns, and the land cover changes of Meket between 2010 and 2015 using Collect Earth Mapathons<sup>3</sup>.
2. Contributing to scaling up forest landscape restoration in Ethiopia. Restoration diagnostic applied in Sodo Guragie (SNNPR) and Meket (Amhara region) Woredas<sup>4</sup>. This one looks at the restoration diagnostic that covers the biophysical and socio-economic and policy enabling environment.
3. Tree-based Landscape Restoration Potential and Priority Maps for Meket (Amhara Regional State)<sup>5</sup>. This study identified list of restoration intervention types and maps and statistics for Meket.
4. Trees, Forests and Profits in Ethiopia: An Assessment of Tree-Based Landscape Restoration Investment Opportunities in Ethiopia.<sup>6</sup> The study evaluated the investment opportunities in forest sector of Ethiopia (timber and non-timber) with a deep dive on 8 existing companies in and across different regions.
5. Potential for Tree-based Landscape Restoration (FLR) for Amhara Regional State<sup>7</sup>. The FLR regional map covers the entire Amhara and builds up on the national potential atlas and previous UNIQUE study in Amhara region. It refines and further improves the maps and statistics of the available FLR potential by catering the mapping criteria and discussion with local stakeholders in Amhara.
6. Forest Landscape Restoration in Ethiopia, specific to Amhara National Regional State<sup>8</sup>. This study on Amhara FLR potential by UNIQUE Forest Company and GIZ was conducted in 2015/2016 which was also used to improve the latest map of restoration potential for Meket and Gazo.

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<sup>1</sup> IUCN and WRI (2014). A guide to the Restoration Opportunities Assessment Methodology (ROAM): Assessing forest landscape restoration opportunities at the national or sub-national level. Working Paper (Road-test edition). Gland, Switzerland: IUCN. 125pp

<sup>2</sup> EFCCC 2020. Assessing tree cover and distribution for tracking progress towards targets and informing adaptive management: Meket (Amhara Regional State), Ethiopia. Addis Ababa: EFCCC

<sup>3</sup> Collect earth Mapathons

<sup>4</sup> Zeleke, A. and Vidal, A. (2020). Contributing to scaling up forest landscape restoration in Ethiopia. Restoration diagnostic applied in Sodo Guragie (SNNPR) and Meket (Amhara region) woredas. Gland, Switzerland: IUCN

<sup>5</sup> Environment, Forest, and Climate Change Commission. 2019. Tree-Based Landscape Restoration Potential and Priority Maps for Meket (Amhara Regional State). Addis Ababa: EFCCC

<sup>6</sup> Environment, Forest, and Climate Change Commission. 2020. Trees, Forests and Profits in Ethiopia: An Assessment of Tree-Based Landscape Restoration Investment Opportunities in Ethiopia. Addis Ababa: EFCCC

<sup>7</sup> Potential for Tree-based Landscape Restoration (FLR) for Amhara Regional State

<sup>8</sup> Forest Landscape Restoration in Ethiopia, specific to Amhara National Regional State- Options for GIZ to support its implementation in the context of the Bonn Challenge 2.0 Methodology and results for Ethiopia 2015



Meket was redistricted recently pausing a challenge to capitalize on the above listed Woreda level studies in the past. However, the majority (9) of the old Meket Kebeles (sub-districts) moved to Gazo Woreda which is included in this study. Since the majority of Gazo Kebeles are from old Meket, we believe the study is representative enough to the entire Gazo and Meket Woreda. Besides the map and statistics of FLR for the missing Gazo Kebeles were extract from regional study<sup>9</sup> that was produced using the same methodology and approach.

BAGER consulting team presented summaries of the previous studies during the inception workshop. In developing the action plan, the consultants with support from WRI partnered with Meket and Gazo Woreda administrations, the environment and land use office, Offices for Agriculture, Water, Energy and Mining, Woreda officers of various government departments, such as forests, energy, livestock, attorney, cooperatives, women, and youth as well as farmers, and other nongovernmental organizations (NGOs). The discussions during the workshop and focus groups emphasized answering five principal questions:

- Restoration potential: Which restoration interventions are suitable?
- Ecosystem services analysis: What ecosystem services and benefits can be derived from the identified restoration interventions?
- Policy, legal, and institutional analysis: What enabling conditions are in place or missing to achieve landscape restoration?
- Social landscape analysis: Who are the actors that can facilitate implementing landscape restoration?
- Cost analysis: What is the financial cost of implementing the identified restoration interventions?



<sup>9</sup> Potential for Tree-based Landscape Restoration (FLR) for Amhara Regional State



## 2 THE BASELINE (THE CURRENT STATE)

### 2.1 BIOPHYSICAL PROFILE OF MEKET

According to Zeleke and Vidal (2020), Meket and Gazo Woredas/districts form part of the northern Ethiopian highlands and are characterized by rough topography, consists of mountains and gorges, steep slopes that are unsuitable for agriculture and with over 45% of the land classified as degraded and unusable. The Woreda extends between the Tekeze and Bashilo watersheds northwards, with elevation gradients peaking over 3,000 meters above sea level along the eastern part of its southern border to 1,300 m at the northwestern most point. The same study had roughly classified the Woredas into three agro-ecologies or climatic zones; the DEGA (highland) zone above 2,400m, representing 22% of the landscape; the WOINA DEGA (midland) zone, ranges from 1,800-2,400m, covering roughly 65% of the Woredas, and the KOLA (lowland) zone, below 1,800m covers 13% of the Woredas. The major soil types and their spatial coverage in the district are Camisol 58.03%, also other soil types are found in the study area (Litosol 12%, Roaksol 15.47%, Ntosol 6.12% and Vertisol 15.47%).

EFCCC (2019) report showed that Meket Woreda has a total land area of 193,700ha of land area of which about 4.8 and 12% covered with forest and shrubland, respectively. Most of the Woreda's land (62.2%) was cropland while 15.3% was pastureland. The remaining 4.8, 0.1 and 0.8% were categorized as bare land, waterbody (wetlands), and settlement areas, respectively.

**Table 1** | 2016-2017 Land Use-Land Cover – Area Statistics

Land use-land cover class	Area (ha) <sup>2</sup>	Area (%)
Forest	9,300	4.8
Cropland	120,500	62.2
Grassland	29,600	15.3
Shrubland	23,300	12
Bare land	9,200	4.8
Waterbody	1,500	0.8
Settlement	300	0.1
<b>TOTAL</b>	<b>193,700</b>	<b>100</b>

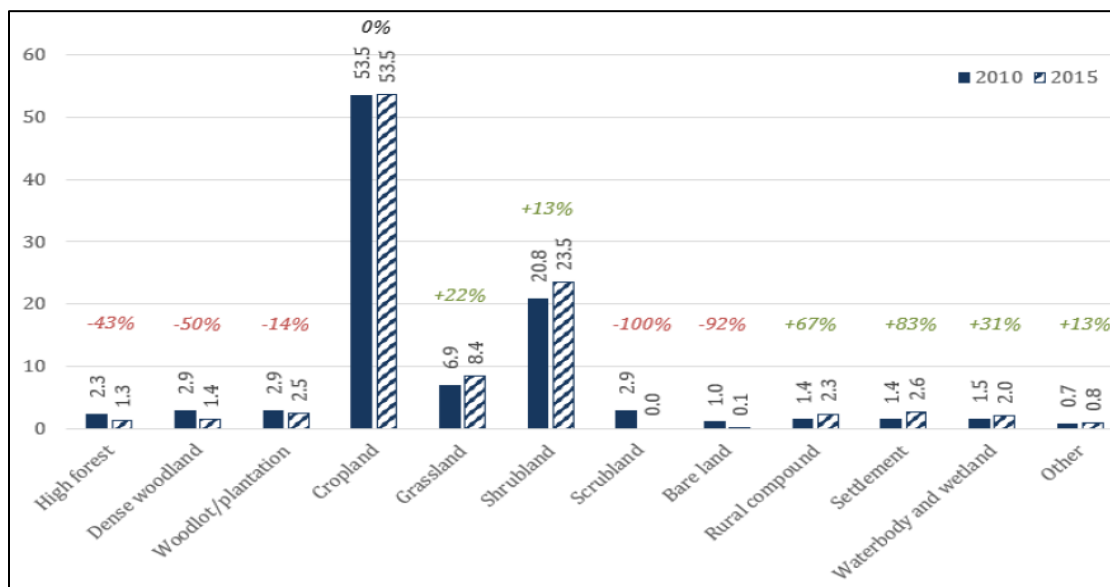
Source: EFCCC, 2019.

The change assessment study conducted by Zeleke & Vidal (2020) showed that the forest cover (high forest, dense woodland, and woodlot/plantation) of Meket Woreda was about 8% in 2010 and decreased to 5.2% in 2015 mainly attributed to a decrease in both high forest and dense woodlands. There is wide disparity among the kebeles with more than half (27) of the 47 kebeles have tree cover percentage of below-Woreda-average. The kebeles with the highest percent tree cover are concentrated in the western part of the Woredas.



The EFCCC, 2020 report showed that Meket experienced significant decreases in tree cover in both cropland and grasslands, where percent tree cover, while there are noticeable gains in tree cover in rural compound and settlement. Achieving GTP I percent forest cover target of 10% for Meket and Gazo Woredas will require to reverse deforestation in the 30 kebeles that are losing high forest and/or dense woodland, with a focus on the six kebeles that lost more than 5%. This can be achieved through afforestation/reforestation and assisted natural regeneration, and sustainably managed woodlots/plantations, and to protect the forests in the 16 kebeles. In addition, forest restoration should take place in all kebeles with potential for high forest, whereas, kebeles with no high forest on steep slope (>60%) are prime candidates for being prioritized for restoring secondary forests (for example, through ex-closures), which can improve groundwater recharge and sedimentation control.

**Figure 1** | Land Use-Land Cover Percent Area: 2010-2015, and Relative\* Change



\*Relative change is the change from 2010 to 2015 reported as a fraction of 2010.

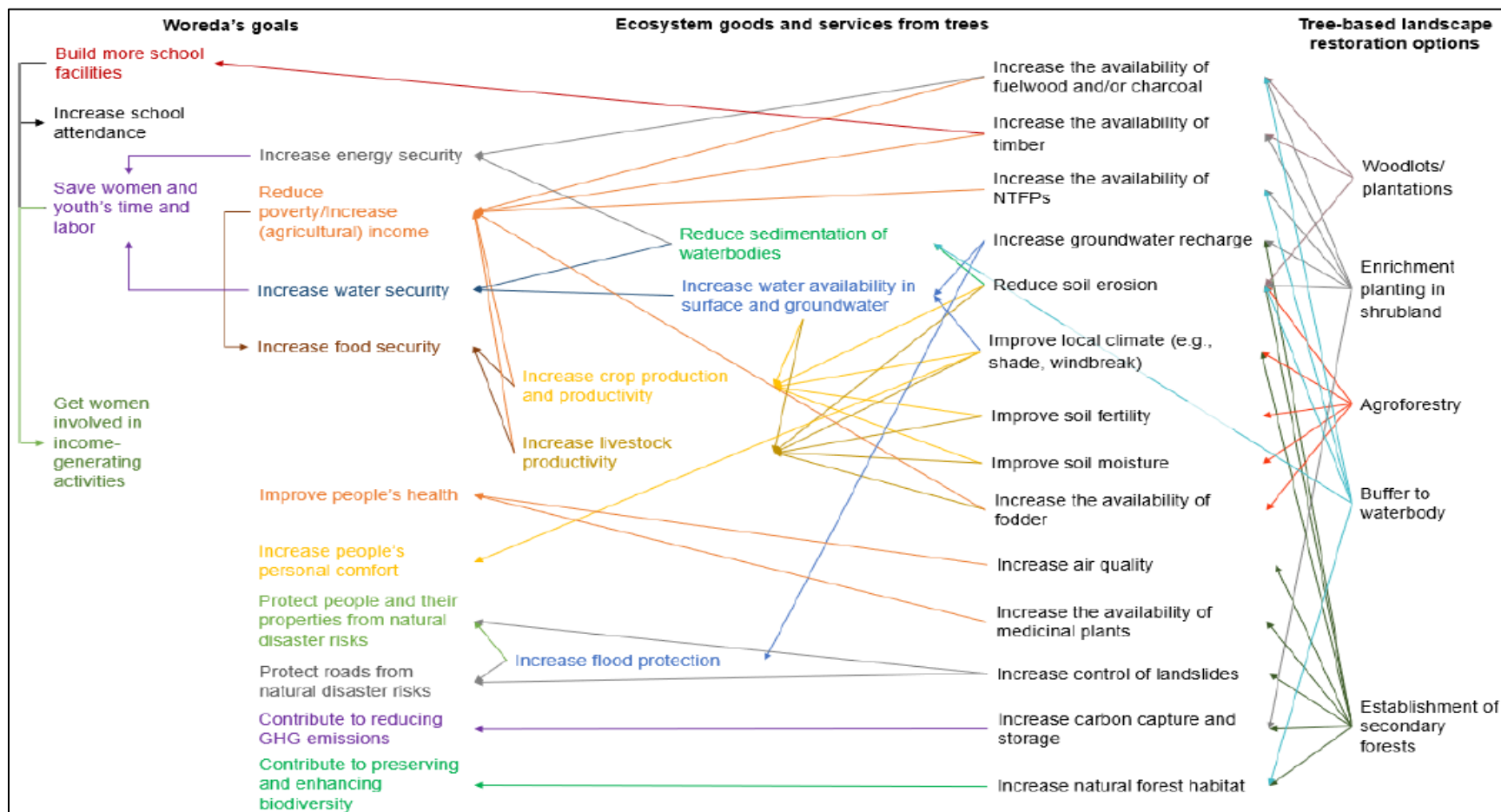
Source: EFCCC 2020

According to Zeleke and Vidal (2020), there are no protected areas managed by the government, and the state forest is reduced to areas around public buildings (schools, churches, government offices) and roadsides. Shrublands have a canopy cover = 10% or combined cover of woody perennial plants  $\leq 10\%$ , 2m in height at maturity *in situ*. Woodlots are heavily present in private lands next to croplands, and a small percentage of woodlots in communal lands. The tree cover report by EFCCC (2019) showed that about 96% (186,100 ha) of the Woreda has less 10% tree cover, and only 2.3% has 80-100%.

Three of the Restoration Potential (FLR) studies (ibid) show that about 87% (213,000ha) of the Meket and Gazo Woredas have potential for more trees. The graphic here shows the menu of intervention options stakeholders recommended, how they contribute to the woreda goals and the key ecosystem services that will be restored by implementing those interventions. Detailed analysis that draw up on these studies will be further discussed in under action plan section.



**Figure 2** | Linking Meket's Goals, Ecosystem Goods and Services from Trees, and Selected Tree-based Landscape Restoration Options



Source: EFCCC 2019<sup>10</sup>

<sup>10</sup> EFCCC (2019). *Environment, Forest, and Climate Change Commission. 2019. Tree-Based Landscape Restoration Potential and Priority Maps for Meket (Amhara Regional State). Addis Ababa: EFCCC*



## 2.2 CHALLENGES AND OPPORTUNITIES (SWOT)

On the challenges, the regional study (EFCCC, 2020) identified key environmental challenges:

1. Habitat fragmentation/loss of biodiversity, Deforestation, Forest degradation, Overgrazing/Free grazing,
2. Soil erosion, Loss of soil fertility, Flooding, Landslides, Water scarcity (in water bodies and soils), Siltation/sedimentation of water bodies.
3. Air pollution (in urban areas), Climate change impacts,

The Restoration Diagnostic study conducted by Zeleke and Vidal (2020) for Meket Woreda (Amhara region) showed expansion of agricultural lands and overgrazing, coupled with rapid population growth resulted in increased demand for biomass. Recurrent droughts and chronic poverty have accelerated the overexploitation of Ethiopia's natural resources. Deforestation and degradation of forests lead to increased erosion, loss of water resources, shortage of firewood and construction materials, low agricultural productivity, decline in live-stock production, soil nutrient depletion and degradation. Furthermore, the described impacts from degradation leads to unemployment and outmigration, food shortages and conflicts between communities for limited resources (UNIQUE, 2015). In fact, Meket Woreda has been listed as one of the most food-insecure and drought-prone districts of the Amhara region.

Due to over exploitation of the natural forest, the remaining patches of forest constitutes very few native tree species, such as *Juniperus procera*, *Olea europea* and acacia spp. Biodiversity of the remaining patches of forests is highly deteriorated which needs immediate interventions through area ex-closure to enhance natural regeneration, enrichment planting and reforestation. Yet, eucalyptus may undermine the native biodiversity and wetland ecosystems, particularly in the high plateau area, which are the critical ecosystem and high hydrological importance as headwaters of the Blue Nile tributaries.

Community participation is often regarded as a one-off campaign in a top-down process which should be addressed. Promoting communal plantations in Meket would not work well if there are no communal lands reserved or allotted for the purpose. Promotion of forest successions in area enclosures needs to be considered to enable generation of income by communities. Knowledge exchange and capacity building whereby farmers are involved in decision-making processes for planning and implementation of FLR on communal lands is an important area of focus. Market remains local and value addition is near to nil.

Tree-product value chain development, including for high-value trees (timber and NTFP), and private sector finance for FLR<sup>11</sup> are not yet developed in the Woredas. Improving the production and marketing for NTFPs and timber needs to be a focus by promoting the establishment and capacity building of community-based organizations (such as small cooperatives), and the private sector engaged in trading of forest products. This strategy coupled with an effective

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<sup>11</sup> Zeleke, A. and Vidal, A. (2020). Contributing to scaling up forest landscape restoration in Ethiopia. Restoration diagnostic applied in Sodo Guragie (SNNPR) and Meket (Amhara region) woredas. Gland, Switzerland: IUCN





value chain reinforcement and value addition is essential to create income opportunities for landless youth organized as small co-op groups and entrepreneurs interested in investing in small to medium sized forest industries.

**On the side of opportunities**, the stakeholders in Meket and Gazo identified multiple ways that trees could contribute towards resolving multifaceted challenges their Woredas, are facing, including but not limited to:

- (i) Income through timber, agroforestry (trees-crop -livestock mix), non-timber forest products (NTFPs), charcoal and wood fuel;
- (ii) Water security through increased water availability and reduction of sedimentation of waterbody;
- (iii) Energy security through access to charcoal and wood fuel;
- (iv) Physical security through protection from landslides and increased flood protection;
- (v) Greenhouse gas reduction from carbon sequestration; and
- (vi) Biodiversity conservation from restoration of natural forest habitat.

Zelege and Vidal (2020) reports and the field observation and focus group discussion by the consultants (March 2021) showed that the livelihood of most rural inhabitants of Meket and Gazo Woredas are practicing integrated rainfed-crop-livestock production systems in an attempt to cope with environmental risks and meet household consumption needs by generating income; households income from the sales of timber and wood from eucalyptus woodlots.

The various indigenous trees on communal lands, churches, and schools compounds provide the ecological capital required for natural regeneration as well as for the collection of seeds, which can be raised in nurseries for the restoration of degraded forestlands that no longer respond to passive restoration. The wide (1400m - 3500m) altitudinal and rainfall (800mm - 1200mm) gradient in both districts play critical role in floral diversity.

Based on the agroecological factors mapped, about 17,100 hectares of the study area in the Northern and Southern tips of Meket is candidate for frankincense development. restoration of the two native bamboo species or careful introduction of exotic bamboo species in Meket and Gazo is another potential for addition to the wood/timber mix. Moreover, Meket can expand on their banana and apple tree crops. These are important commercially rewarding tree crops.

The woody vegetation of Meket and Gazo Woredas are mainly located in dry evergreen Afromontane zone of which Friis, *et al.* (2010). The identified different plant communities across the different terrains (highland and mid to lowland) include *Juniperus procera*, *Cordia Africana*, *Olea Africana*, *Carissa edulis* (Agam), *Dodonia viscosa* and *Acacia abyssinica* for similar vegetation type. Meket and Gazo Woredas have multiple exotic species including *Eucalyptus globulus*, *Eucalyptus camaldulnesis*, *Grevillea robusta*, *Melia azedarach*, *Moringa stenopetala*, *Cupressus lusitanica*, *Acacia decurrens*, *Acacia saligna*, *Shinus molle*, and *Sesbania sesban* which are also of high commercial value.



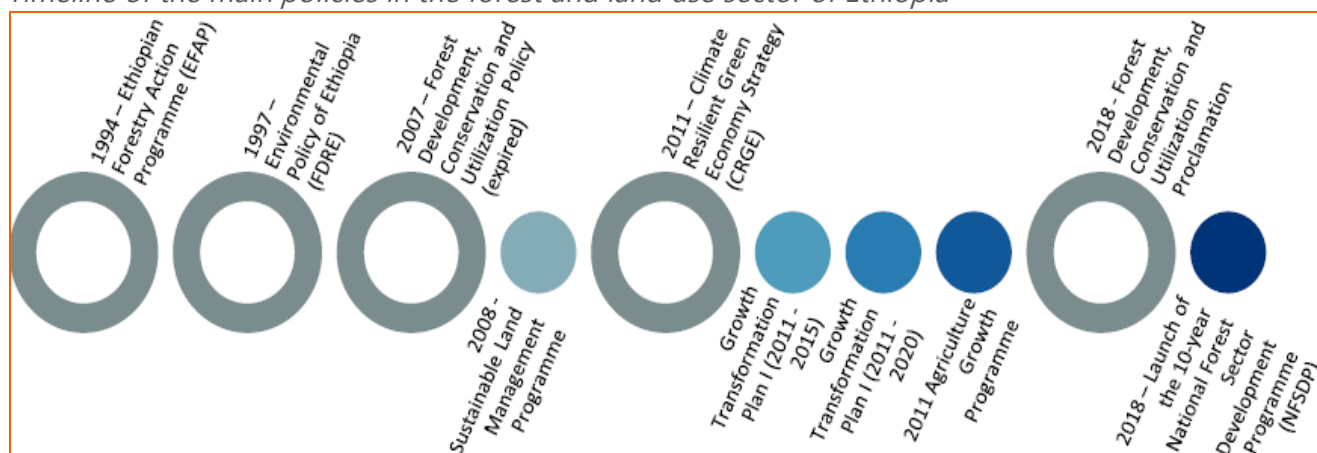
Farmers in Meket value eucalyptus as a major source of income, and it is prominent on farmland and around homes and road boundaries. In addition, to high income generation, low cost of establishment, fast vegetative growth, and high market demand (wood and wood products) appear to drive the expansion of eucalyptus. Eucalyptus managed carefully can help to fill the gap for wood fuel and timber needs for household consumption and local sales and reduce pressure on remaining natural forest or those to be restored.

**Regarding policies and political will**, there are clear recognitions by the Government of Ethiopia, for the need and urgency of addressing the environmental challenges as they pose critical threat to the country’s economic growth and development.

*“Aggregated data show the forestry sector’s contribution to total GDP is 12.8% in 2012/13 (UNEP, 2016). Of this, forest industries contribution to the GDP is 6.09%. Forest ecosystems contributions to other sectors, particularly agriculture, is valued at 6.77% of GDP.” Zeleke and Vidal (2020)*

Restoration is a high priority agenda for Ethiopian government manifested through several legislations and policies. The government has prepared various policies, strategies, proclamations, programs and plans since the 1990s to safeguard the country’s forest and to address the conservation and development of forest resources that incorporates landscape restoration interventions directly or indirectly.

*Timeline of the main policies in the forest and land use sector of Ethiopia*



Source: Zeleke, A. and Vidal, A. (2020)<sup>12</sup>

<sup>12</sup> Zeleke, A. and Vidal, A. (2020). *Contributing to scaling up forest landscape restoration in Ethiopia. Restoration diagnostic applied in Sodo Guragie (SNNPR) and Meket (Amhara region) woredas.* Gland, Switzerland: IUCN.



By advancing the land certification programs and providing incentives for tree planting, the government is also showing the willingness and understanding of the need to address restoration programs. The presence and functioning of AFE (Amhara Forest enterprise)- a state owned forest enterprise working on afforestation and forest product marketing; AFE's functional structure for close collaboration with communities who own acceptable sizes of closure areas; the community forest systems established during Derg era are-still functional, co-managed by government and the community are other indicators.

Strong community mobilization experiences exist despite the need for reforming them to make it more grassroots and persistent approach rather than top down, one-off approach as suggested by workshop participants are from existing knowledge resources to capitalize on.

Regarding market conditions, the workshops and focus group discussions, highlighted that experience with private forest companies has been growing as well. Meket and Gazo Woreda are predominantly rural with farmers producing primarily for consumption or for local markets. However, markets for some of the minor forest products, like wood fire are moderately developed.

The well decentralized institutional structures in Ethiopia with staff at Woreda level are supportive of FLR implementation. The roles and responsibilities for restoration are clearly defined in their mandate to ensure effective implementation of FLR activities and institutional coordination is in place. At the national level the most important government organ for FLR is the Ethiopian Forest, Climate Change Commission (EFCCC), as a national institution responsible for environmental management and forestry development and protection. Other state institutions playing an important role in FLR include: Ministry of Agriculture (which has comprehensive, operational, and well-staffed extension system at all levels of the organizational structure, including Regional, Zonal, Woreda and Kebele).

The quick social network analysis of the Meket and Gazo Woredas provide insights into the actors involved in the implementation of the landscape restoration in Meket Gazo. Amhara region wide, the Regional Bureau of Agricultural (BoA) takes full responsibility towards the planning and implementation of FLR activities. The Environment, Forest and Wildlife Protection and Development Authority (EFWPDA) with the Rural Land Administration and Use office (RLAUO) at zonal and Woreda level is coordinating the implementation of FLR related activities in their jurisdiction.

In summary, the following diagnostic chart, summarizes the state of strengths, opportunities, and weaknesses towards successful implementing of FLR in Meket and Gazo Woredas<sup>13</sup>.

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<sup>13</sup> Zeleke, A. and Vidal, A. (2020). Contributing to scaling up forest landscape restoration in Ethiopia. Restoration diagnostic applied in Sodo Guragie (SNNPR) and Meket (Amhara region) woredas. Gland, Switzerland: IUCN



**Figure 3** | Diagnostic Analysis of Meket and Gazo

### 4.3. Restoration diagnostic results - Meket

GREEN= IN PLACE  
YELLOW= PARTLY IN PLACE  
RED= NOT IN PLACE

Theme	Feature	Key success factor	Response
<b>Motivate</b>	a. Benefits	Restoration generates economic benefits	Yes
		Restoration generates social benefits	Yes
		Restoration generates environmental benefits	Partially
	b. Awareness	Benefits of restoration are publicly communicated	No
		Opportunities for restoration are identified	Partially
	c. Crisis events	Crisis events are leveraged	Yes
	d. Legal requirements	Law requiring restoration exists	Yes
		Law requiring restoration is broadly understood and enforced	No
<b>Enable</b>	e. Ecological conditions	Soil, water, climate, and fire conditions are suitable for restoration	Partially
		Plants and animals that can impede restoration are absent	No
		Native seeds, seedlings, or sources populations are readily available	Partially
	f. Market conditions	Competing demands (e.g., food, fuel) for degraded forestlands are declining	Partially
		Value chains for products from restored areas exists	No
	g. Policy conditions	Land and natural resource tenure are secure	Partially
		Policies affecting restoration are aligned and streamlined	Partially
		Restrictions on clearing remaining natural forests exist	Yes
	h. Social conditions	Forest clearing restrictions are enforced	No
		Local people are empowered to make decisions about restoration	Partially
		Local people are able to benefit from restoration	partially
	i. Institutional conditions	Roles and responsibilities for restoration are clearly defined	Partially
Effective institutional coordination is in place		Partially	
<b>Implement</b>	j. Leadership	National and/or local restoration champions exist	Partially
		Sustained political commitment exists	Yes
	k. Knowledge	Restoration "know how" relevant to candidate landscapes exist	Partially
		Restoration "know how" transferred via peers or extension services	Partially
	l. Technical design	Restoration design is technically grounded and climate resilient	Partially
		Restoration limits "leakage"	Partially
	m. Finance and incentives	Positive incentives and funds for restoration outweigh negative incentives	No
		Incentives and funds are readily accessible	No
	n. Feedback	Effective performance monitoring and evaluation system is in place	Partially
		Early wins are communicated	Partially

Source: Zeleke, A. and Vidal, A. (2020)



## 3 THE ACTION PLAN: A BLUEPRINT TOWARDS THE ENVISIONED FUTURE

The Landscape Action Plan (LAP) development covers the two Woredas of Meket and Gazo in Amhara state. The action plan is an effort to guide restoration implementation planning to reverse land and forest degradation to tackle multiple social and environmental challenges, including climate change mitigation and adaptation, land degradation, food insecurity and biodiversity loss that Meket and Gazo districts are facing. The plan covers five years and it is expected to be mainstreamed into the Woredas' five-year plan of Growth and Transformation Plan III (GTP III) to ensure sustainability and ownership by the government. The action plan draws lessons from multiple previous studies on those landscapes.

The LAP is a blueprint that sets the envisioned future of the landscape and not a project implementation plan. The latter is ideally the next step and accomplished on project by project basis. In addition, the action plan is built up on multiple previous studies in these landscapes referenced in this report. It should be evaluated in combination with those study reports.

### 3.1 LANDSCAPE ZONING

The need and concept landscape zoning here is to stratify the landscape into homogeneous blocks to help planning and implementation of priority interventions in respective zones. By doing so also to restore priority ecosystems services and targeted community needs within the respective zones. Both biophysical and socioeconomic factors were considered to stratify the landscape. Hence, the areas inside a given landscape zoning share more communality both in biophysical and socio-economic setup compared to the areas in a different zone. This way, specific priorities within each zone will come out clearer for easier decision making and implementation. Likewise, the primary beneficiaries and services to be restored will be clearer as well. This also will help with stakeholder engagement strategy, as primary responsible leads in implementation of the selected interventions within a given zoning. In a nutshell, the zones will serve as a foundation for planning and implementation.

To create a more homogeneous zoning, the map of Potential Natural Vegetation Atlas of Ethiopia (PNV)<sup>14</sup> and classified altitude (TrdAlt) layer were combined<sup>15</sup>. According to PNV atlas, there are four vegetation categories in the study area. These are the Afroalpine (AA), Ericaceae/sub-Afro-alpine belts (EB), Dry Evergreen Montane Forest and Grassland Complex (DAF), and the Combretum-Terminalia Woodland (CTW). Meket and Gazo have a wide elevation diversity ranging from 1450m (KOLLA) to 3470m (WURCH). Elevation is a critical factor in tropical countries. In mountainous countries the topography, in particular altitude and slope characteristics, play an important role in agroecological zonation (Friis, *et al.* 2010). Using visual inspection of GIS overlay of the terrain and the traditional agroclimatic classification used in Ethiopia, the study area (Meket & Gazo) was classified into five agroclimatic zones. These are, the Kolla (KOLA, 1500-1900m), Woyina Dega, (WDEGA, 1900-2200m), Dega (DEGA, 2220-2500m)

<sup>14</sup> Natural Potential Vegetation Atlas of Ethiopia

<sup>15</sup> <https://www.esri.com/arcgis-blog/products/arcgis-living-atlas/imagery/high-resolution-data-updates-to-living-atlas-world-elevation-layers-and-tools-march-2021/>



High Dega (HDEGA, 2500-2800m and Wurch (WURCH, 2800-3473m). In addition, the Atlas of Livelihood Zones (LHZ)<sup>16</sup> was used to accommodate for socioeconomic variables. The Atlas of Ethiopian Livelihood Zones was used for further stratification accommodating the socio-economic/livelihood variables. The LHZ atlas itself is built based on multiple topographic and geographic factors that affect bioclimate, population density, main agricultural practices, and market factors. According to the Livelihood zone atlas, only two livelihood zones (LHZ)<sup>17</sup> namely, the “Abay Tekeze Watershed (ATW)” livelihood zone, which is entirely in Meket Woreda and the “North Wollo Highland Belg (NHB)” livelihood zone dominantly in Gazo, are found in the study area.

By combining these three maps we got five main zones (PNV-ELV), and twelve sub-zones (PNV-ELV-LHZ) when further stratified using the two livelihoods zones.

**Table 2 | Landscape Zoning Overview Table**

PNV-ELV ZONING *	DOMINANT ZONING	LANDSCAPE ZONING	PNV CODE	ELV CODE	LHZ CODE	LANDSCAP ZONE AREA (ha)
AA-WURCH	AA-WURCH-ATW	AA-WURCH-ATW	AA	WURCH	ATW	3,058
AA-WURCH	AA-WURCH-NHB	AA-WURCH-NHB	AA	WURCH	NHB	22,483
CTW-KOLA	CTW-KOLA-ATW	CTW-KOLA-ATW/CTW-WDEGA-ATW	CTW	KOLA	ATW	16,729
DAF-DEGA	DAF-DEGA-ATW	DAF-DEGA-ATW	DAF	DEGA	ATW	35,682
DAF-DEGA	DAF-DEGA-NHB	DAF-DEGA-NHB/DAF-WDEGA-NHB	DAF	DEGA	NHB	758
DAF-HDEGA	DAF-HDEGA-ATW	DAF-HDEGA-ATW/EB-HDEGA-ATW	DAF	HDEGA	ATW	14,920
DAF-HDEGA	DAF-HDEGA-NHB	DAF-HDEGA-NHB	DAF	HDEGA	NHB	2,098
DAF-WDEGA	DAF-WDEGA-ATW	DAF-WDEGA-ATW/DAF-KOLA-ATW	DAF	WDEGA	ATW	77,421
DAF-WURCH	DAF-WURCH-NHB	DAF-WURCH-NHB/EB-HDEGA-NHB	DAF	WURCH	NHB	2,579
DAF-WURCH	DAF-WURCH-ATW	DAF-WURCH-ATW	DAF	WURCH	ATW	18,343
EB-WURCH	EB-WURCH-ATW	EB-WURCH-ATW	EB	WURCH	ATW	6,020
EB-WURCH	EB-WURCH-NHB	EB-WURCH-NHB	EB	WURCH	NHB	13,021

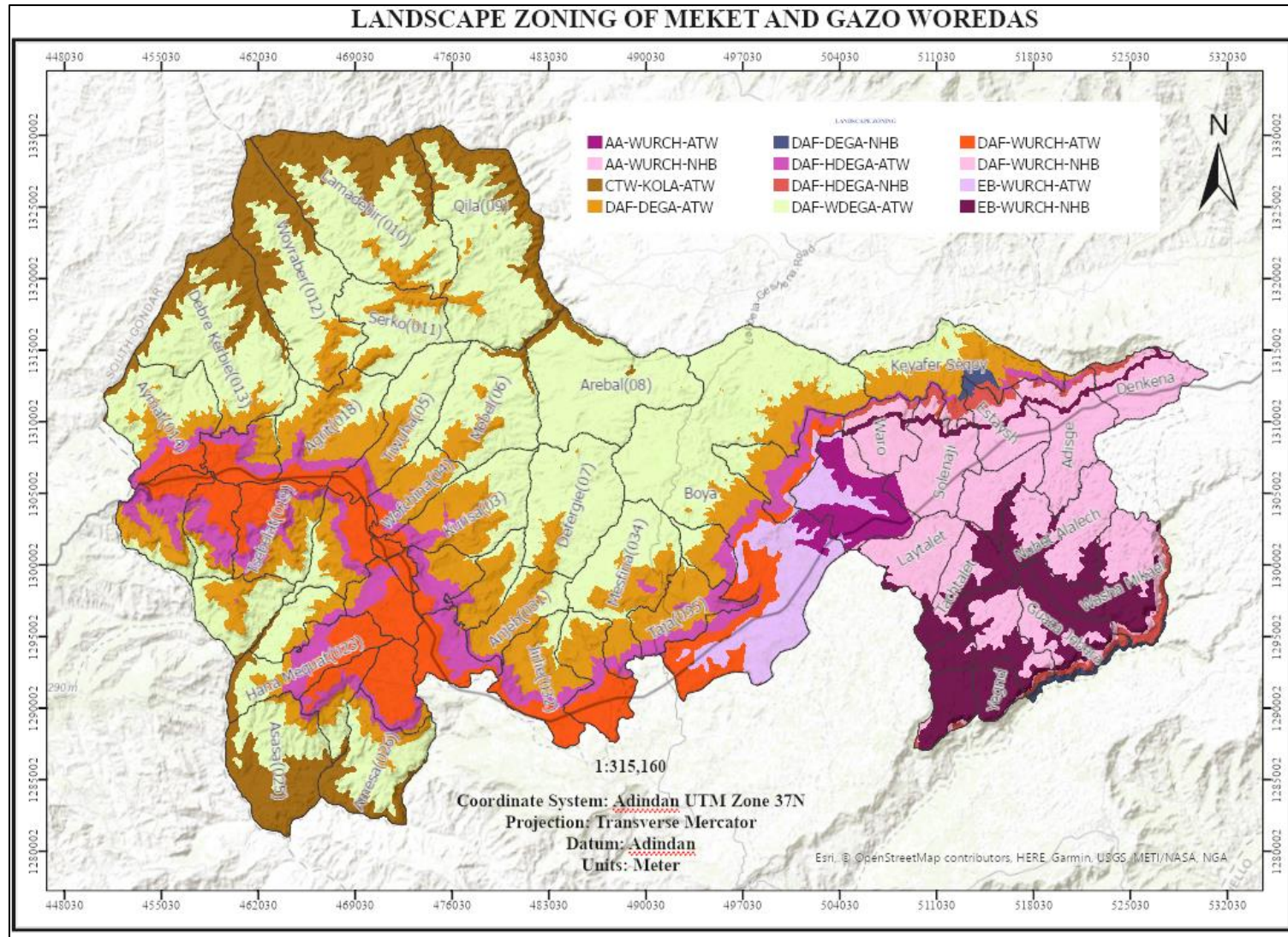
The map on figure 4 presents the five primary zones further stratified into 12 sub-zones using livelihood zone atlas. Each of the five primary (aggregated) zones are described in the following sections. Please, refer to the Annex I, 7.1 section for detailed descriptions of the abbreviated zoning codes.

<sup>16</sup> [http://foodeconomy.com/wp-content/uploads/2016/02/Atlas-Final-Web-Version-6\\_14.pdf](http://foodeconomy.com/wp-content/uploads/2016/02/Atlas-Final-Web-Version-6_14.pdf)

<sup>17</sup> [http://foodeconomy.com/wp-content/uploads/2016/02/Atlas-Final-Web-Version-6\\_14.pdf](http://foodeconomy.com/wp-content/uploads/2016/02/Atlas-Final-Web-Version-6_14.pdf)



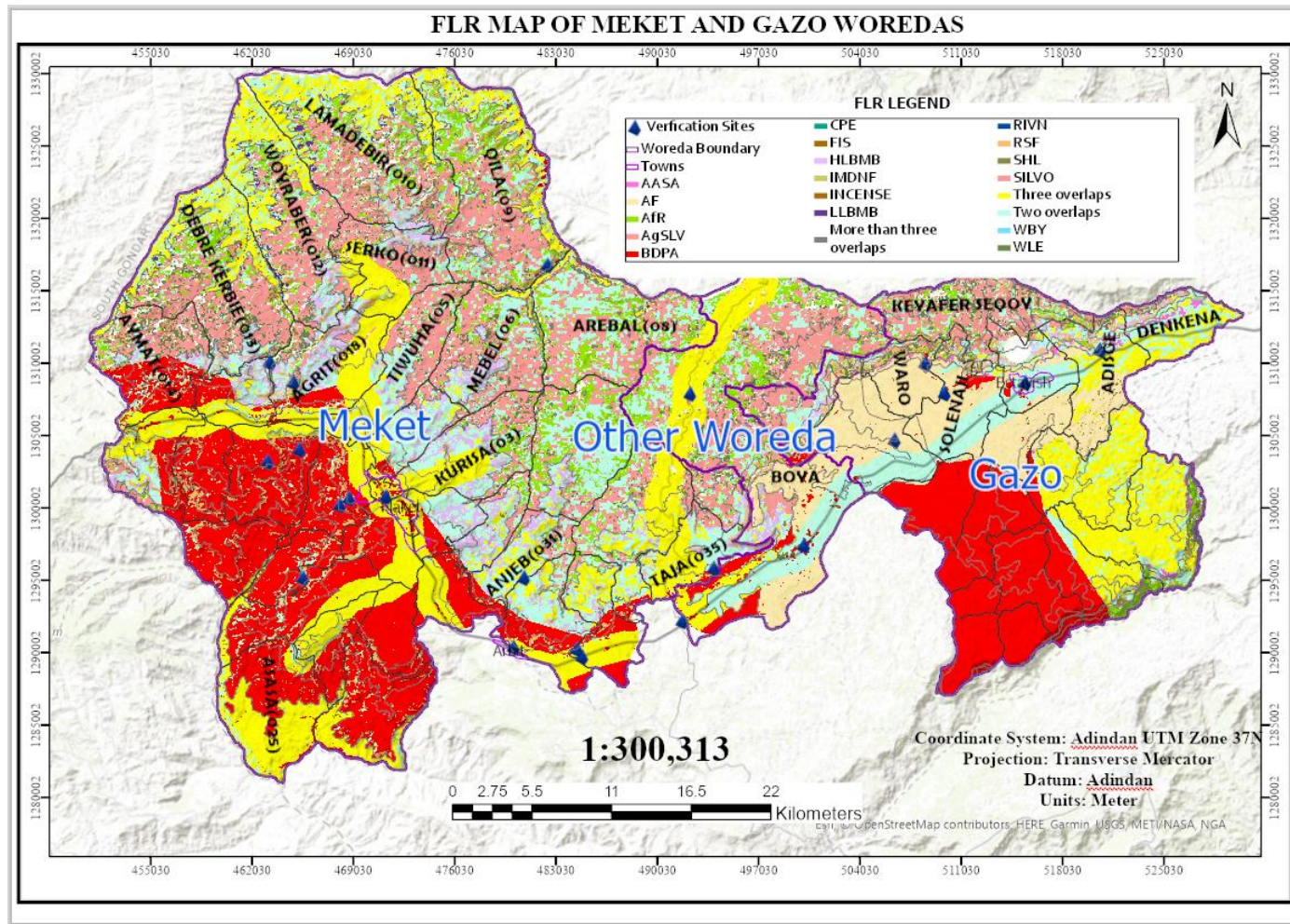
**Figure 4** | Map of Landscape Zoning



### 3.2 RESTORATION POTENTIAL SUMMARY

The final FLR potential map (Figure 5) draws on the lessons, data, and approaches tested on the previous FLR studies in refining the final FLR potential for both Meket and Gazo Woredas. Additional Kebeles that are situated in between Meket and Gazo Woredas were also included in the analysis (see "Other Woreda" boundary in bold purple line on Figure 5).

**Figure 5** | Map of FLR Potential for Meket and Gazo Woredas





The legend FLR codes (Box 1) for Figure 5 below comes from the two Regional (**RFLR**) and Woreda (**WFLR**) FLR maps that were combined. Note that on the map (Figure 5) only FLR codes for exclusive (non-overlapping) interventions are shown, and all possible overlap combinations are aggregated as **two overlaps, three overlaps or more than three overlaps**

**Box 1 | Map Legend of FLR Codes**

□ Meket-Gazo Kebeles	■ AF-RSF	■ AgSLV-WLE-HLBMB-AASA	■ HLBMB-WWBF-AASA	■ SILVO-HLBMB-WWBF-AASA
■ AASA	■ AfR-SILVO-HLBMB	■ AgSLV-WLE-HLBMB-WWBF-AASA	■ IMDNF-AASA	■ SILVO-WWBF-AASA
■ AF	■ AfR-SILVO-HLBMB-WWBF	■ AgSLV-WLE-WWBF-AASA	■ IMDNF-HLBMB	■ WBY
■ AF-FIS-RSF	■ AfR-SILVO-LLBMB	■ AgSLV-WWBF	■ IMDNF-HLBMB-AASA	■ WBY-FIS-RSF
■ AfR-AgSLV-HLBMB	■ AfR-SILVO-WWBF	■ AgSLV-WWBF-AASA	■ IMDNF-HLBMB-WWBF-AASA	■ WBY-RSF
■ AfR-AgSLV-HLBMB-WWBF	■ AfR-WLE-HLBMB	■ CPE	■ IMDNF-WWBF	■ WLE
■ AfR-AgSLV-WLE-HLBMB	■ AfR-WLE-HLBMB-WWBF	■ CPE-AASA	■ RF-BDPA	■ WLE-AASA
■ AfR-AgSLV-WLE-HLBMB-WWBF	■ AfR-WLE-WWBF	■ CPE-AgSLV-AASA	■ RIVN-BDPA	■ WLE-HLBMB
■ AfR-AgSLV-WLE-WWBF	■ AfR-WWBF	■ CPE-AgSLV-HLBMB-AASA	■ RIVN-WWBF	■ WLE-HLBMB-AASA
■ AfR-AgSLV-WWBF	■ AF-WBY	■ CPE-AgSLV-WLE-HLBMB-AASA	■ RSF	■ WLE-HLBMB-WWBF-AASA
■ AfR-CPE	■ AF-WBY-FIS-RSF	■ CPE-HLBMB	■ SHL	■ WLE-RSF
■ AfR-CPE-AgSLV	■ AF-WBY-RSF	■ CPE-HLBMB-AASA	■ SHL-FIS-RSF	■ WLE-SHL
■ AfR-CPE-AgSLV-HLBMB	■ AF-WLE	■ CPE-WLE	■ SHL-RSF	■ WLE-SHL-RSF
■ AfR-CPE-AgSLV-WLE-HLBMB	■ AF-WLE-RSF	■ CPE-WLE-AASA	■ SHL-WBY	■ WLE-SHL-WBY-RSF
■ AfR-CPE-HLBMB	■ AF-WLE-WBY-RSF	■ CPE-WLE-HLBMB	■ SHL-WBY-FIS-RSF	■ WLE-WWBF
■ AfR-CPE-HLBMB	■ AgSLV-HLBMB	■ FIS	■ SHL-WBY-RSF	■ WWBF-AASA
■ AfR-HLBMB	■ AgSLV-HLBMB-AASA	■ FIS-RSF	■ SILVO-AASA	
■ AfR-HLBMB-WWBF	■ AgSLV-HLBMB-WWBF-AASA	■ HLBMB	■ SILVO-HLBMB	
■ AfR-Incense-WWBF	■ AgSLV-WLE-AASA	■ HLBMB-AASA	■ SILVO-HLBMB-AASA	

Box 2 describes the names corresponding to the abbreviated FLR codes used with these maps. The combination codes are separated by “-” sign indicating the overlap scenario (those areas are suitable for more than one intervention). Box 1 and Tables 10 -15 in Annex I lists complete set of those overlapping combinations.

**Box 2 | Interpretation of FLR Codes of the Map Legend**

1 = <b>IMDNF</b> = Improved Management of Degraded Natural Forest	9 = <b>Myrrh</b> = Commiphora Woodlands
2 = <b>AfR</b> = Afforestation Reforestation	10 = <b>Incense</b> = Combretum Woodlands
3 = <b>CPE</b> = Commercial Plantation	11 = <b>RF</b> = Religious Forest
4 = <b>AgSLV</b> = Agri-silvicultural	12 = <b>Riverine</b> = Riverine Forest
5 = <b>SILVO</b> = Silvopastoral	13 = <b>AASA</b> = Afro-Sub Afroalpine ecosystems
6 = <b>WLE</b> = Woodlot establishment	
7 = <b>LLBMB</b> = Lowland Bamboo	
8 = <b>HLBMB</b> = Highland Bamboo	

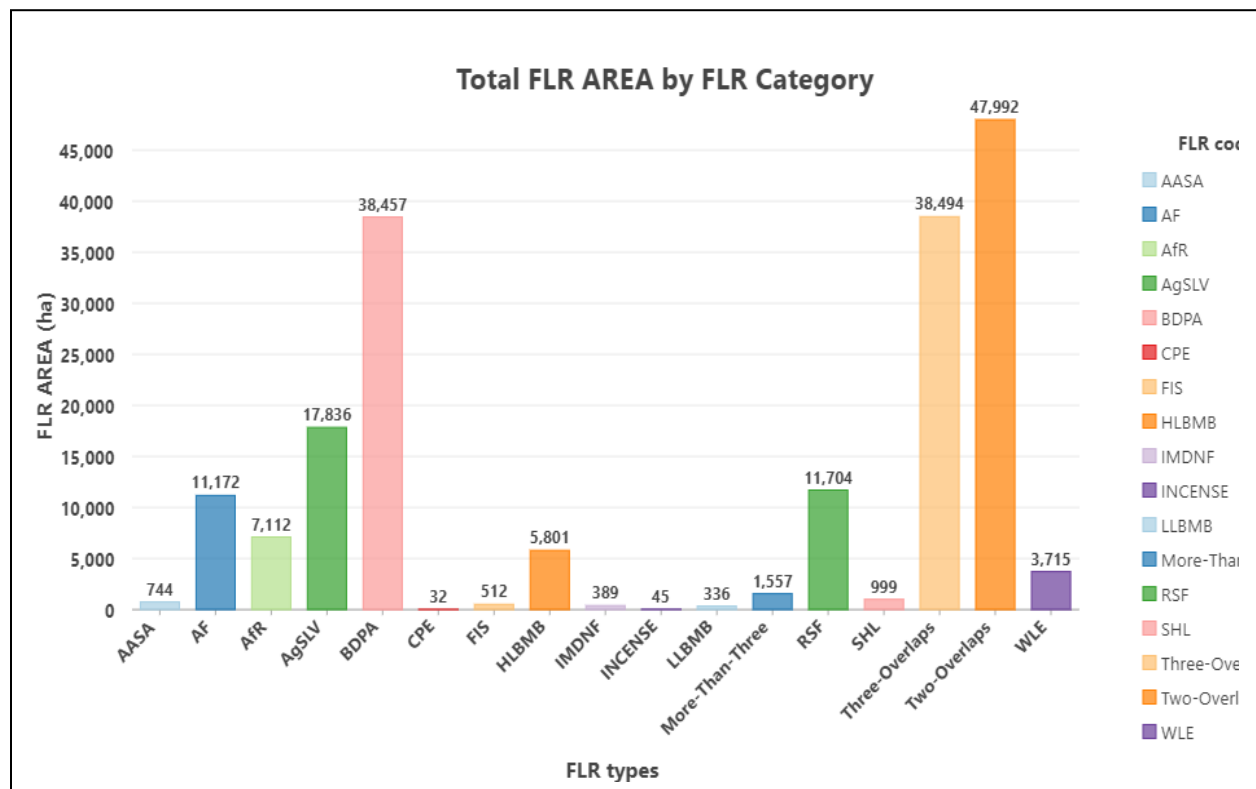
WFLR Potential	WFLR Combo Code	WFLR-RFLR EQUIVALENT
Frankincense	FIS	FIS = INCENSE
Secondary Forest Restocking	RSF	RSF = IMDNF
Agroforestry	AF	AF = AgSLV = SILVO
Enrichment Planting in Shrubland	SHL	
Waterbody Buffer	WBY	WBY = WWBF = RIVN
Woodlots	WLE	



The corresponding colors & FLR codes separated by "=" sign in "WFLR-RFLR EQUIVALENT" column in box 2 imply that those FLR types are the same but originated from two maps where they were originally named differently (Box 2).

**Note:** As it can be seen from the graph on Figure 6, there is significant areas with two or three FLR overlaps. The implication of overlaps is important here. "Overlaps" (more than one option) means that those areas are feasible for more than one FLR intervention type. The overlaps can be combinations of any number of the identified individual FLR types on the map. Overlaps also entails the need for ranking and prioritizing to select which one from the competing options to choose or divide the area among those overlapping ones to implement.

**Figure 6** | Graph of the FLR Areas



### 3.3 TABLE OF FIELD PRIORITIZED FLR INTERVENTION FOR MEKET & GAZO WOREDAS

The table presents the breakdown of the final mapped and Field verified matrix FLR interventions by Woredas. The redistricted study area covers Meket, Gazo, and some Kebeles of "Other Woreda" that falls in-between Gazo and Meket. This is the total potential that was further refined by workshop participants for implementation planning.

**Table 3** | Summary Table of Refined FLR Interventions

FIELD VERIFIED	AF (AgSLV)	AfR (BDPA)	AfR	HLBMB	RSF (IMDNF)	FIS (INCENSE)	LLBMB	RSF (IMDNF)	RSF (SHL)	WLE	FIELD TOTAL
<b>AF</b>	1,0514										<b>10,514</b>
<b>AfR (Closure-Plantation)</b>			514								<b>514</b>
<b>FIS</b>			1,106		63	37		989		284	<b>2,479</b>
<b>HLBMB</b>				4,245							<b>4,245</b>
<b>LLBMB</b>							336				<b>336</b>
<b>RIVN</b>											<b>0</b>
<b>RSF</b>		18,533		601	253			3,988		2,670	<b>2,6045</b>
<b>RSF (Closure-Plantation)</b>		7,129			52			3,813		348	<b>11,342</b>
<b>WBY</b>											<b>0</b>
<b>WLE</b>	648		359						74	218	<b>1,299</b>
<b>Total</b>	<b>11,162</b>	<b>25,662</b>	<b>1,979</b>	<b>4,846</b>	<b>368</b>	<b>37</b>	<b>336</b>	<b>8,790</b>	<b>74</b>	<b>3,520</b>	<b>56,774</b>

Please, refer to Annex I for detailed Landscape Zoning descriptions and respective FLR potential tables.

To support implementation, some supplementary information was collected and summarized in tables 4 and 5. Table 4 presents the key native species community (Ethiopian Biodiversity Institute)<sup>18</sup> by zoning.

<sup>18</sup> <https://www.ebi.gov.et/biodiversity/ecosystems-of-ethiopia/combretum-terminalia-woodland-ecosystem/>



**Table 4** | Native Species and Popular FLR Practices by Zoning

PNV-ELV ZONING	PNV-ELV-LHZ ZONING	DOMINANT NATIVE VEGETATION COMMUNITY		
		Big Trees	Smaller trees	Shrubs/ Perennial Grasses
AA-WURCH	AA-WURCH-ATW			Erica, Hypericum
	AA-WURCH-NHB			
CTW-KOLA	CTW-KOLA-ATW		Cmbretum spp., Terminalia spp., Oxytenanthera abyssinica, Boswellia papyrifera, Anogeissus lieocarpa, Sterospermum kuntianum, Pterocarpus lucens, Lonchocarpus laxiflorus, Lannea spp. Albizia malacophylla, Enatada Africana	Lowland bamboo- Oxytenanthera abyssinica
DAF-DEGA	DAF-DEGA-ATW	Afrocarpus falcatus, Olea capensis ssp. hochstetteri, Prunus Africana, Apodytes dimidiata, Celtis kraussiana, Euphorbia amplipylla, Dracaena spp. Carissa edulis, Rosa abyssinica, Mimusops kummel, Ekebergia capensis, Acacia abyssinica or Acacia negrii	Allophyllus abyssinicus, Euphorbia abovalifolia, Rapanea simensis, Olinia aequipetala	Discopodium penninervium, Myrsine Africana, calpurina aurea, Dovyalis Abyssinica, Highland Bamboo (Arundinaria alpina)
	DAF-DEGA-NHB			
DAF-HDEGA	DAF-HDEGA-ATW	Olea europea subsp. Africana, Juniperus procera		Highland Bamboo (Arundinaria alpina)
	DAF-HDEGA-NHB			
DAF-WDEGA	DAF-WDEGA-ATW	Celtis kraussiana, Euphorbia amplipylla, Dracaena spp. Carissa edulis, Rosa abyssinica, Mimusops kummel, Ekebergia capensis, Acacia abyssinica or Acacia negrii	Allophyllus abyssinicus, Euphorbia abovalifolia, Rapanea simensis, Olinia aequipetala	Discopodium penninervium, Myrsine Africana, calpurina aurea, Dovyalis Abyssinica

Sources: extracted from [Ethiopian Biodiversity Institute](#)



Table 5 summarizes the priority benefits restored by implementing specific FLR interventions. It also highlights to which goals of the Woredas the specific interventions will contribute to.

**Table 5** | Summary of Benefits Restored, and Goals Achieved by Implementing Specific Interventions in Meket and Gazo Woredas

SPECIFIC RESTORATION OBJECTIVES	BENEFITS	PRIMARY CONTRIBUTION TO Woredas' GOAL
<i>Management of deforested and degraded forests, including forest reserves, natural trees outside forests.</i>	<ul style="list-style-type: none"> <li>• Decreased sedimentation in catchments of hydropower infrastructure,</li> <li>• Protection of water sources/watersheds,</li> <li>• Increased access to forest products for subsistence use, sale, conservation of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Climate resilience</li> <li>• Sustainable energy</li> <li>• Water quality and supply</li> <li>• Biodiversity conservation</li> <li>• Erosion control</li> <li>• Tourism</li> </ul>
<i>Restore forest cover on degraded customary land/communal land and non-arable land in agricultural landscapes by expanding area and improving management of village forest areas and woodlots through demarcation, strengthened community bylaws, and bylaws for protection against uncontrolled cutting, grazing, and fire</i>	<ul style="list-style-type: none"> <li>• Locally managed, more sustainable sources of fuelwood</li> <li>• Increased access to forest products for subsistence and sale.</li> <li>• Reduced burden on women in collecting fuelwood</li> </ul>	<ul style="list-style-type: none"> <li>• Food security</li> <li>• Sustainable energy</li> <li>• Poverty alleviation</li> <li>• Gender equity and equality</li> <li>• Firewood &amp; Construction material supply</li> </ul>
<i>Restoration of deforested areas for biodiversity conservation, environmental protection, and income generation</i>	<ul style="list-style-type: none"> <li>• Sources of income,</li> <li>• Fuelwood and construction materials,</li> <li>• Biodiversity conservation and</li> <li>• Soil and water conservation</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality and supply</li> <li>• Climate resilience</li> <li>• Biodiversity conservation</li> </ul>
<i>Increase tree cover on degraded, low-yielding cropland and pastures in agricultural landscapes through farmer-managed assisted natural regeneration, direct seeding, and planting of agroforestry trees and shrubs-implement climate smart agriculture techniques like continuous cover crops, crop rotation, other agroforestry practices</i>	<ul style="list-style-type: none"> <li>• Increased crop yields with reduced dependence on inorganic inputs,</li> <li>• Reduced soil/nutrient loss,</li> <li>• Increased resilience to drought and another climate shocks</li> </ul>	<ul style="list-style-type: none"> <li>• Food security</li> <li>• Climate resilience</li> </ul>



SPECIFIC RESTORATION OBJECTIVES	BENEFITS	PRIMARY CONTRIBUTION TO Woredas' GOAL
<i>Increase tree cover in denuded buffer zones of rivers and streams through natural regeneration and tree planting</i>	<ul style="list-style-type: none"> <li>• Protection of source water and decreased sedimentation in catchments of hydropower infrastructure,</li> <li>• Reduced impacts of flood events</li> </ul>	<ul style="list-style-type: none"> <li>• Climate resilience</li> <li>• Sustainable energy</li> <li>• Water quality and supply</li> <li>• Gender equity and equality</li> </ul>
<i>Restoration and management of degraded lowland combretum-terminalia woodland</i>	<ul style="list-style-type: none"> <li>• Reduce biodiversity loss</li> <li>• Improve income generation from frankincense</li> <li>• Reduce soil and water loss</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity conservation</li> <li>• Improve productivity</li> <li>• Water quality and quantity</li> <li>• Climate resilience</li> </ul>

Photo courtesy of BAGER Consultant



## 3.4 FINANCIAL NEED ANALYSIS

*The financial analysis section is adapted primarily from Dawit W. Mulat 2019<sup>19</sup>, Zeleke, A. and Vidal, A. (2020)<sup>20</sup> additional studies as referenced here.<sup>21, 22</sup>*

### Restoration of Secondary Forest (RSF)

There is a mapped total of 44,000ha potential of Restoration of Secondary Forest (RSF). To manage degraded remnant forests/forestlands primarily through strict conservation, implemented by the government would cost about USD 3/ha/year borne exclusively by the government. Assuming the forest is degraded, when such forestlands are under communal use and unmanaged, except for limited harvesting of grasses by communities from natural forests, there are no other material benefits, no management activities are undertaken, meaning no costs incurred. If the forests were not degraded, communities could sustainably harvest other NTFPs in addition to grasses. Hence, we considered the lost opportunity values from NTFPs, estimated at about 14USD/ha as additional cost associated with degraded remnant forest/forestlands.

Restoration will be implemented using a Participatory Forest Management (PFM) approach. Therefore, the costs would be shared between local communities and government and non-government actors. The former would contribute labor for managing and protecting the forests, and the latter provide material support e.g., seedlings for enrichment planting, and financial and technical support required to establish (including formally registering) the PFM institutions. The cost of establishing a PFM institution was estimated at USD 45/ha.

There are three main material (goods) benefits expected from the restored natural forests:

1. Fuelwood – based on estimate of fuelwood harvested from the Humbo restoration project, SNNP, about 3 m<sup>3</sup> would be harvested annually per hectare.
2. Roundwood – about 0.20 m<sup>3</sup>/ha/year is expected to be harvested – assuming volume equivalent to about two trees are harvested every year.
3. NTFPs – particularly honey, medicinal plants, and others e.g., materials for mats and baskets. For the values of NTFPs, we used NTFPs revenues and costs estimated for Yayu forest in southern Ethiopia.

Based on those figures, the total costs required to restore degraded remnant forests/forestlands were estimated at USD 281/ha against the benefits of USD 375/ha over a 20-year, indicating restoring degraded remnant forests/forest lands present a positive return on investment. The baseline case presents zero ROI, and negative NPV.

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<sup>19</sup> Dawit W. Mulatu (2019). Economic and Financial Analysis of Forest Restoration Opportunities in Ethiopia-Sodo and Meket Woreda.

<sup>20</sup> Contributing to scaling up Forest Landscape Restoration in Ethiopia

<sup>21</sup> Trees, Forests and Profits in Ethiopia: An Assessment of Tree-Based Landscape Restoration Investment Opportunities in Ethiopia

<sup>22</sup> Forest Landscape Restoration in Amhara / Ethiopia. Options for GIZ to support its implementation in the context of the Bonn Challenge 2.0



### **Afforestation/Reforestation (AfR)**

Considering the total area of 25,000ha potential for AfR, and per ha cost of USD 1,838/ha to restore, the total cost for AfR was estimated at USD 283.64 million over 20 years. Assuming the previously stated cost, about 75% of the costs would come from the community in form of labor for tree planting and management. This is considered non-monetary cost. The remainder is the monetary costs or the financial requirements of the restoration, which is expected to be contributed by government and non-government actors.

### **Woodlot Establishment (WLE)**

The costs of woodlot establishment are borne mainly by the farmer/community in form of labor spent in planting and managing the planted trees. Government and non-government actors would incur costs associated with seedlings and training. Training is catered for by existing extension staff (i.e., government salaried Development Agents). Thus, training costs are not additional and not included.

The main material benefit that would accrue from the established woodlots is wood in form of poles, and to a smaller extent firewood. An average of 5,000 poles is expected to be harvested from 1ha of woodlot every six years, assuming average spacing of 1x1 m and 70% survival. Based on the proportion of fuelwood obtained from wood-lots about 3 m<sup>3</sup> of fuelwood would be harvested annually from the planted established woodlots.

The total costs required to establish and manage 1ha of woodlots for one rotation was estimated at USD 3,384/ha against benefits of USD 7,418/ha over a 20-year period. Hence, woodlot establishment presents a positive return on investment – assuming there are three rotations, each 6 years, in the 20-year period. In the baseline situation, degraded/unproductive formerly cultivated land presents a ROI of zero and negative NPV.

## **I. FLR Practices and Direct Economic Benefits in Meket and Gazo**

**Forest plantations** such as eucalyptus have been also harvested for a long period of time in Meket area. **Home gardens** such as *Cordia Africana (wanza)* with coffee and *buckthorn* with *banana* are cultural and traditionally developed agro ecosystem practices in Meket through maintenance of indigenous trees or by planting trees on farmlands, grazing fields, around individual household are common practices. This is the most indispensable option particularly on highland “*Dega*” part of Meket, for delivering multiple products and services essential for food security, sustaining livelihoods and wellbeing of rural households.

**Area ex-closures** with and without enrichment planting has high potential in Meket Woreda, particularly on communal lands which are dominant in drier “*Kola*” and mid-highland (*Woyna Dega*) parts of the Woreda.

### **Indirect Benefits of FLR in Meket and Gazo**

Some of the indirect benefits of restoration are through ecosystem services restoration like carbon sequestration, soil erosion protection and water regulation. Therefore, the economic analysis included the estimates of carbon and soil erosion protection benefits.





Different reports showed that the average level of soil organic Carbon (SOC) for forest covers is 56.5 tons /ha/year. Shrubs, grasslands, and sparse vegetation contribute 26.2 tons /ha/year of soil carbon labels. Frankincense (Combretum) woodlands of sparse vegetation are grouped under this category due to its sparse canopy nature. The SOC from cropland is about 41.9 tons /ha/year. Home gardens are composed of sparse trees, fruits, vegetables, plants like coffee and others averaging to SOC level of 41.53 tons/ha/year. Therefore, we estimated the carbon value of US\$20/ton/ha (which is around 827 ETB/ton of carbon) from FLR implementation in Meket and Gazo Woredas.

If land use transitions from cropland to forest cover, about 58.43 tons/ha of soil can be conserved from erosion. If land use transitions from grassland to agroforestry practice, about 51.1 tons/ha of soil can be conserved from erosion. Similarly, if land use transitions from degraded cropland to agroforestry practice, about 58.43 tons/ha of soil can be conserved from erosion. For the case of degraded cropland, soil erosion control is assumed to be zero due to limits of conservation practices and the land is vulnerable to degradation. For degraded shrubland, it is estimated about 80% soil erosion. So, if we preserve shrubland, we can save (49.44-27.47) ton/ha. According to Ayele *et al.* (2015), the total cost of soil erosion is estimated \$22 per ton/ha /year (which is currently about 910 ETB), associated with the high cost of controlling erosion.

## **II. Monetization and Discounting Costs and Benefits in the lifecycle (Summary)**

The present value of total costs for restoring degraded agricultural land using forest plantations is estimated at USD\$26,653.64/ha. The main benefits obtained from forest plantations in Meket setting are timber, firewood, carbon sequestration, and soil erosion protection. The present value of cumulative benefits from restoration is about USD\$104,689.51/ha. Using the present value of benefits and costs, the NPV of restoring forest plantations is estimated to be USD\$78,045.54/ha in 50 years (average of about USD\$1,560.89/ha/year).

Well-managed agricultural practices through agroforestry, i.e., trees and crops, is recommended in Meket area. Degraded croplands and degraded grasslands can be transitioned to agroforestry- crops mixed with *Cordia Africana*. The present value (PV) of total costs of agroforestry practices is estimated to be USD\$18,128.65/ha. While the accrued benefits in 22 years life span is USD\$46,093.23/ha. The total NPV of agroforestry practices is USD\$27,964.59/ha (on average about USD\$1,271.11/ha/year). The second land use transition scenario is from degraded grassland agroforestry practices with the mix of crop and *Cordia Africana*. This practice incurs present value of total cost of 911,506 birr/ha and a present value of total benefits of USD\$46,093.23/ha, resulting in NPV of USD\$24,060.21 (on average about USD\$1,093.64/ha/year).

In areas like Meket where landscape degradation is enormous, area ex-closure is highly recommended for restoration of natural vegetation through protection and regeneration. Currently, stakeholders believe that closure practices are growing in the Woreda and the community is aware of its benefits. The estimated present value of costs of practicing closures is USD\$6,929.91/ha/year. The present value of benefits from closure is estimated at



USD\$12,434.94/ha. Accordingly, NPV of restoration through closure becomes USD\$5,505.03/ha in 25 years' time frame (on average about USD\$220.18/ha/year).

Closures without soil and water conservation and active planting are less productive. Therefore, it was calculated that the present value of total costs will be higher than the above and estimated to USD\$15,181.43/ha. Diversity of benefits will be realized, i.e., timber, firewood, hay, carbon sequestration and soil erosion protection. The present value of benefits is estimated at USD\$105,686.50/ha, resulting a NPV of returns equal to USD\$90,505.07/ha (on average about USD\$3,620.18/ha/year).

Home garden practices of coffee with *Cordia Africana* is considered. The present value of costs for this home garden practice is estimated at USD\$39,113.63/ha. Similarly, the present value of benefits is amounted USD\$201,332.59/ha. From this the NPV of home garden practices of coffee with *Cordia Africana* appears to be very profitable at USD\$162,218.95/ha in a period of 30 years (on average about USD\$5,407.30/ha/year).

Finally, different types of non-timber plantations are practiced (like bamboo, frankincense gums and resins), where commercialized incense plantations were considered in the analysis, that would bring enormous benefits. The present value of costs and benefits for commercial incense plantation is estimated at USD\$25,552.19/ha and USD\$211,098.12/ha, respectively, which has NPV of USD\$185,547.18/ha (on average about USD\$6,184.89/ha/year).



Photo courtesy of BAGER Consultant

**Table 6** | Discounted Costs and Benefits of Potential Forest Landscape Restoration Options in Meket and Gazo Woreda, Amhara Region

TYPES OF COSTS AND BENEFITS	FOREST PLANTATION (WOODLOTS)	AGROFORESTRY (CROP + CORDIA AFRICANA)18	AGROFORESTRY19 (CROP + CORDIA AFRICANA)	ONLY CLOSURE	CLOSURE WITH SOIL AND WATER CONSERVATION AND PLANTATION	HOME GARDEN COFFEE WITH CORDIA AFRICANA	INCENSE PLANTATION
<b>IMPLEMENTATION COST</b>	19,800.19	13,371.42	13,371.42	1,598.24	8,786.15	30,500.80	16,830.02
<b>TRANSACTION COST</b>	9.67	664.91	664.91	214.63	195.25	253.44	236.52
<b>TRANSPORTATION COST</b>	1,428.90	200.45	200.45	3,027.90	517.24	3,806.81	3,933.04
<b>OPPORTUNITY COST</b>	5,414.88	3,891.86	7,796.24	2,089.13	5,682.79	4,552.60	4,552.60
<b>TOTAL COST</b>	26,643.97	18,128.65	22,033.02	6,929.91	15,181.43	39,113.63	25,552.19
<b>REVENUES</b>							
<b>BENEFIT FROM PLANTATION (TIMBER)</b>	69,544.14	7,697.86	7,697.86		59,260.24	13,565.99	
<b>FIREWOOD</b>	20,254.96			734.46	35,556.15		
<b>NON-TIMBER (INCENSE)</b>							196,652.04
<b>BENEFITS FROM CROP (INCLUDING COFFEE)</b>		19,243.37	19,243.37			173,637.40	
<b>CARBON SEQUESTRATION</b>	2,617.92	1,399.82	1,399.82	937.21	2,974.91	1,590.71	1,908.85



TYPES OF COSTS AND BENEFITS	FOREST PLANTATION (WOODLOTS)	AGROFORESTRY (CROP + CORDIA AFRICANA)18	AGROFORESTRY19 (CROP + CORDIA AFRICANA)	ONLY CLOSURE	CLOSURE WITH SOIL AND WATER CONSERVATION AND PLANTATION	HOME GARDEN COFFEE WITH CORDIA AFRICANA	INCENSE PLANTATION
SOIL EROSION CONTROL	14,890.39	10,736.37	10,736.37	4,324.41	7,450.75	12,538.50	12,538.50
BENEFITS FROM HAY, FODDER, AND GRASS		7,015.81	7,015.81	6,438.86	444.45		
<b>TOTAL BENEFITS</b>	104,689.51	46,093.23	46,093.23	12,434.94	105,686.50	201,332.59	211,099.37
NET PRESENT VALUE	78,045.54	27,964.59	24,060.21	5,505.03	90,505.07	162,218.95	185,547.18
LIFECYCLE (IN YEARS)20	<b>50</b>	<b>22</b>	<b>22</b>	<b>25</b>	<b>25</b>	<b>30</b>	<b>30</b>

Source: Adopted from (Dawit W. Mulatu, 2019)



**Table 7** | Key Performance Indicators for Meket and Gazo Woredas

Cost/benefit indicators	Area closure	Plantation/ Woodlots	Agroforestry	Frankincense plantation
<i>Discounted cost/ha</i>	6,929.91	26,643.97	18,128.65	25,552.19
<i>discounted benefit/ha</i>	12,434.94	104,689.51	46,093.23	211,099.37
<i>Assumed potential size of one business case (ha)</i>	143,400	147,574	140,400	16,400
<i>Total discounted cost for one business case</i>	993,749,094.00	3,931,957,228.78	2,545,262,460.00	419,055,916.00
<i>Total discounted benefit for one business case</i>	1,783,170,396.00	15,449,449,748.74	6,471,489,492.00	3,462,029,668.00
<i>NPV (5%)</i>	789,421,302.00	11,517,492,519.96	3,926,227,032.00	3,042,973,752.00
<i>NPV (10%)</i>	458,524,290.35	574,599,776.56	2,593,152.04	1,511,155,039.21

**NB:** the numbers were discounted at 5%, except the last row (10%), for fifty years rotation period. Exchange rate: USD\$1 is equivalent to ETB 41.37 (April 22, 2021)



### 3.5 STAKEHOLDER ENGAGEMENT

A landscape action plan preparation followed an iterative process of multi-stakeholder engagement from inception stage to ensure that the previously identified FLR options of the Woredas are in line with national and sub-national and local priorities. The landscape action plan preparation was commenced through a kickoff meeting with head and team leader of the EFCCC at national level, and with deputy commission at Amhara Regional State's- Environment, Forest and Wildlife Protection and Development Authority (EFWPDA). At Woreda level, discussions were conducted with the Woreda administration, Office of Agriculture and the land Administration and Land use that represents EFCCC in local (sub-national) offices.

Two workshops of stakeholders were organized for Meket and Gazo Woredas and participants of the workshop were drawn from key stakeholders, government offices, NGOs, and the community. The BAGER consultants presented the findings of the diagnostic studies conducted (WRI:2017). Brainstorming session was conducted focused on the following thematic areas:

1. Refining and prioritizing of mapped FLR options.
2. Assessment of enabling legal and policy environment to implement Forest Landscape Restoration (FLR), as well as gaps and barriers.
3. Landscape vision setting to build this action plan for the next 5 to 10 years.

Going forward, the different stakeholders participated in the workshop were agreed to discharge roles and responsibilities entrusted upon them mandated by law. Table 8 presents those role and responsibilities of the stakeholders to be involved in the implementation of FLR activities.

Photo courtesy of BAGER Consultant



**Table 8** | Roles of Stakeholders

ACTOR/INSTITUTIONS/ STAKEHOLDER	CURRENT SITUATION	DESIRED SITUATION CHANGES REQUIRED
<p><b>WOREDA ADMINISTRATION (WA)</b></p> <p><b>TWO WOREDA ADMINISTRATION OFFICES ARE ESTABLISHED AND OPERATIONAL AT MEKET AND GAZO WOREDA</b></p>	<p>WA has special responsibility to coordinate and supervise the implementation of the social services and economic development programs of the Woredas. Including the kebele development programs</p> <p>Ensure the implementation of the polices, legislation and directives of the national and the regional government</p>	<ul style="list-style-type: none"> <li>• WA needs to establish a steering committee to be drawn from key stakeholders to oversee the progress implementation of the landscape action plan</li> <li>• Ensure the FLR options &amp; priorities are aligned with those of the Woredas and stakeholders are fully engaged in the co-funding and implementation of agreed joint actions</li> <li>• Finalize co-funding discussions and confirm the role of counties in the implementation of the agreed joint actions</li> </ul>
<p><b>ANRS ENVIRONMENT, FOREST AND WILDLIFE PROTECTION AND DEVELOPMENT AUTHORITY</b></p>	<p>Conservation of natural resources such as forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. It is guided by the principle of sustainable development and enhancement of human wellbeing</p> <p>Government funding for program implementation</p>	<ul style="list-style-type: none"> <li>• Representing the Federal EFCCC at regional level with the responsibility to coordinate and follow up conservation of natural resources activities, especially initiative related to FLR option</li> <li>• Co-coordinating FLR initiatives with Bureau of Agriculture (ANRS) to minimize duplication of efforts and resource wastage</li> <li>• Issues of new regulations to mainstream the double responsibility on natural resource conservation (mainly forests)</li> <li>• Coordinating identification and co-funding with other potential donors on FLR options</li> </ul>
<p><b>ENVIRONMENTAL PROTECTION, LAND ADMINISTRATION AND USE OFFICE AT WOREDA LEVEL</b></p>	<p>Preserving and enhancing the productive capabilities of land in cropped and grazed areas</p> <p>Actions to stop and reverse degradation - or at least to mitigate the adverse effects of earlier misuse</p>	<ul style="list-style-type: none"> <li>• Representing the Regional ANRS Environment, Forest and Wildlife Protection and Development Authority at Woreda level with the responsibility to coordinate and follow up the implementation of conservation of</li> </ul>



ACTOR/INSTITUTIONS/ STAKEHOLDER	CURRENT SITUATION	DESIRED SITUATION CHANGES REQUIRED
		<p>natural resources activities, especially initiative related to FLR option;</p> <ul style="list-style-type: none"> <li>• Site planning and co-coordinating FLR initiatives &amp; Implementation with Office of Agriculture to ensure effective implementation at Kebele level;</li> <li>• Wider private sector representation from the landscape and beyond.</li> <li>• Clarity on how private sector can engage including co-funding and joint actions to be covered by each partner</li> <li>• Progress report submission with the Woreda steering committee periodically;</li> </ul>
<p><b>WOREDA OFFICE OF AGRICULTURE &amp; LIVESTOCK RESOURCES</b></p>	<p>Technical assistance to farmers on improved agriculture production techniques: fertilizer use, improved seed provision, land management practice, modern agroforestry practice, etc.</p> <p>Lead community mass mobilization to raise awareness on watershed development and protection (Soil erosion protection, reforestation, sustainable grazing practice, nursery management)</p>	<ul style="list-style-type: none"> <li>• Representing to Woreda’s steering committee avail professional staff to plan implementation</li> <li>• Technical assistance to the implementation of FLR options being proposed for implementation</li> <li>• Mobilize community for ensuring their participation in landscape development and pasture development</li> <li>• Jointly manage nursery site for Tree seedlings</li> </ul>
<p><b>WATER, ENERGY MINING OFFICE</b></p>	<ul style="list-style-type: none"> <li>• Responsible for the Woreda’s water sectors program design and implementation</li> <li>• Responsible for ensuring energy requirements of the woredas mainly renewable energy</li> <li>• Responsible to promote alternate energy sources and technology to save and protect the Woreda’s forest</li> <li>• Ensure water flow and quality from different sources</li> </ul>	<ul style="list-style-type: none"> <li>• Identification and establishment of a technical working group to coordinate activities under the water flow and access focus area for promoting renewable energy between government, private sector and another donor’s organization</li> </ul>





ACTOR/INSTITUTIONS/ STAKEHOLDER	CURRENT SITUATION	DESIRED SITUATION CHANGES REQUIRED
<b>OFFICE OF FINANCE AND ECONOMIC DEVELOPMENT</b>	<ul style="list-style-type: none"> <li>Responsible for the overall social, economic development of the Woreda by ensuring all supports, mainly in budgeting and resource mobilization</li> <li>Technical assistance to the budgeting process for the different social and economic development activities</li> <li>Oversees, approves and coordinate other offices in the Woreda to be a cosignatory when NGO's proposing development project to the Woreda</li> </ul>	<ul style="list-style-type: none"> <li>Technical support to guide and ensure the alignment of the NGOs program and resources with the overall Woreda's goal and objectives</li> <li>Identification and advising implementing partner(s)</li> <li>Explore fundraising opportunities with organizations from the different NGOs working in Woredas'</li> <li>Confirming co-funding commitments with partners and the engagement of implementing partners</li> </ul>
<b>WOREDA'S ATTORNEY</b>	<ul style="list-style-type: none"> <li>Follow and ensure the rule of law respected and applied in the Woredas</li> <li>Technical support to enforce laws</li> </ul>	<ul style="list-style-type: none"> <li>Support the enforcement of laws relevant to Forest sector's development and protection</li> <li>Promote the creation of awareness on the different laws promogulated in forest sector for protection and development</li> </ul>
<b>COOPERATIVE DEVELOPMENT OFFICE</b>	<ul style="list-style-type: none"> <li>Organize cooperative organization to be engaged in agriculture activities, mainly in forest sector development</li> </ul>	<ul style="list-style-type: none"> <li>Support the issuance of by law for the group/cooperatives to be established in Forest sector development</li> <li>Facilitate the promotion of laws promogulated in forest sector for the creation of awareness</li> </ul>
<b>AMHARA FOREST ENTERPRISE</b>	<ul style="list-style-type: none"> <li>Reinforce enabling conditions for the expansion of community forests and woodlots by prioritizing the transfer of management rights and securing benefits of community forests and woodlots for local communities, village associations, and forest user groups.</li> <li>It promotes to conserve, develop forest and forest products to ensure food security by maximizing land use practice; introduce farm-forestry (agroforestry) practices among farming and semi pastoral communities.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate to support the private sector engaged in Forest trading</li> </ul>



ACTOR/INSTITUTIONS/ STAKEHOLDER	CURRENT SITUATION	DESIRED SITUATION CHANGES REQUIRED
<b>WOODWORK PRIVATE ENTERPRISE</b>	<ul style="list-style-type: none"> <li>• Mostly run by a youth entrepreneur interested in using wood from indigenous trees but these raw materials are scarce. Allows of eucalyptus timber production, the quality of logs is improved for carpentry</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure networking with Amhara Forest Enterprise for market expansion</li> </ul>
<b>OFFICE OF TRADE AND INDUSTRY</b>	<ul style="list-style-type: none"> <li>• Licensing and renewal licenses for production and trade of marketable FLR products and Linking enterprises to market</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitate the provision of land for forest product business in the Woreda</li> </ul>
<b>OFFICE OF SMALL AND MEDIUM ENTERPRISES</b>	<ul style="list-style-type: none"> <li>• Register unemployed youth; identify potential resources in the Woreda/District</li> <li>• Organize the youth in their respective groups based on their business interests, provide training on entrepreneurship, facilitate and link the youth with credit associations</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitate the provision of land to youth organized for forest product business in the Woreda</li> <li>• Facilitate the provision of financial products for forest business</li> </ul>
<b>COMMUNITIES AND FARMERS WITH WOODLOTS</b>	<ul style="list-style-type: none"> <li>• Involved in the production of fuelwood, timber, wood carvings and forest-based foods</li> <li>• They combine vegetables, crops, fruits, fodder, trees and cash crops</li> </ul>	<ul style="list-style-type: none"> <li>• Technical support needs to be provided</li> </ul>
<b>KNOWLEDGE INSTITUTIONS</b>	<ul style="list-style-type: none"> <li>• BahirDar University, Wedia University and agricultural research, Forest sector Institutions are the key knowledge institution carrying out research and study on Forest sector</li> <li>• Involvement of more knowledge institutions including the local and international universities and research institutes</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitate to bring the knowledge institutions for landscape action plan implementation etc.</li> </ul>



ACTOR/INSTITUTIONS/ STAKEHOLDER	CURRENT SITUATION	DESIRED SITUATION CHANGES REQUIRED
<b>NGOS AND DEVELOPMENT PROJECT RELATED TO SUSTAINABLE LAND MANAGEMENT AND NATURAL RESOURCE MANAGEMENT</b>	<ul style="list-style-type: none"> <li>Promote energy efficiency at all levels (especially the efficient use of biomass resources at the households)</li> <li>Promote the developments of Renewable Energy (RE) promote rational use of natural resources, poverty reduction and food security</li> <li>Enhance the capacity of the different development partners to integrate into their programmes and execute energy development measures</li> <li>Apply sustainable land management measures in combination with income-generating activities</li> </ul>	<ul style="list-style-type: none"> <li>Relevant NGOs to be involved and informed as necessary as members of the steering, technical and working groups and implementing partner teams.</li> <li>Ensure positive publicity and support from local and international NGOs</li> <li>Need to align their development program intervention with the Woreda's Landscape action plan and resource requirements</li> <li>Co-funding mechanisms in the implementation of the action plan</li> </ul>

Photo courtesy of BAGER Consultant



## 4 MONITORING OF PROGRESS

Monitoring is an integral part of project implementation. The reasons for monitoring are for documenting, reporting, learning, adapting, and communicating. Specifically, monitoring is needed to gauge short- and long-term success; to determine if, and when further intervention is needed; and to identify unintended consequences that threaten the sustainability of the restoration project.

The FLR interventions in Meket and Gazo Woreda aim to restore multiple ecological, social, and economic functions across landscape zones and generate a range of ecosystem goods and services that benefit multiple stakeholder groups. According to the assessment made by EFCCC/WRI:2020<sup>23</sup>, the tree-based landscape action plan seeks to enhance the resilience of the landscape and its stakeholders over the medium (5 years) and long-term (20 years). Trees in- and outside of forests contribute to human well-being and ecosystem health in many ways. People would get to know more about landscape restoration activities and be aware of the benefits they secure from restoration which directly support the livelihoods of farm- and forest-dependent communities through the provisions of timber and non-timber forest products. Trees can also indirectly contribute to income generation by increasing agricultural productivity (e.g., nitrogen fixation in cropland, fodder for livestock, pollination). In addition, trees can play crucial roles in regulating water flows, decreasing floods and landslides; supporting biodiversity; and sequestering carbon.

Based on the Millennium Ecosystem Assessment (MA, 2003) and experts' input, a monitoring framework for tree-based landscape restoration was developed (Figure 7). As indicated in the monitoring framework, the monitoring activities for tree-based intervention should go beyond the biophysical aspects and include both the changes/progress in institutions, management, policy and regulation, enforcement laws and regulations as drivers of progress implementation.

### 4.1 RESULTS CHAIN

A landscape action plan for Meket and Gazo Woreda demands to ensure results from intervention in terms of key outcomes over the plan intervention in medium (5 years) and long term (20 years). Progress made in the landscapes will be tracked against four indicators, beyond biophysical measurements through many existing tools like Collect earth, Global Forest watch and others that exist locally. Restoration impact measurement will go beyond biophysical to consider four returns described in "Commonland Foundation's approach"<sup>24</sup>. These are the return **inspiration, social capital, natural capital, and financial capital** due to FLR implementation.

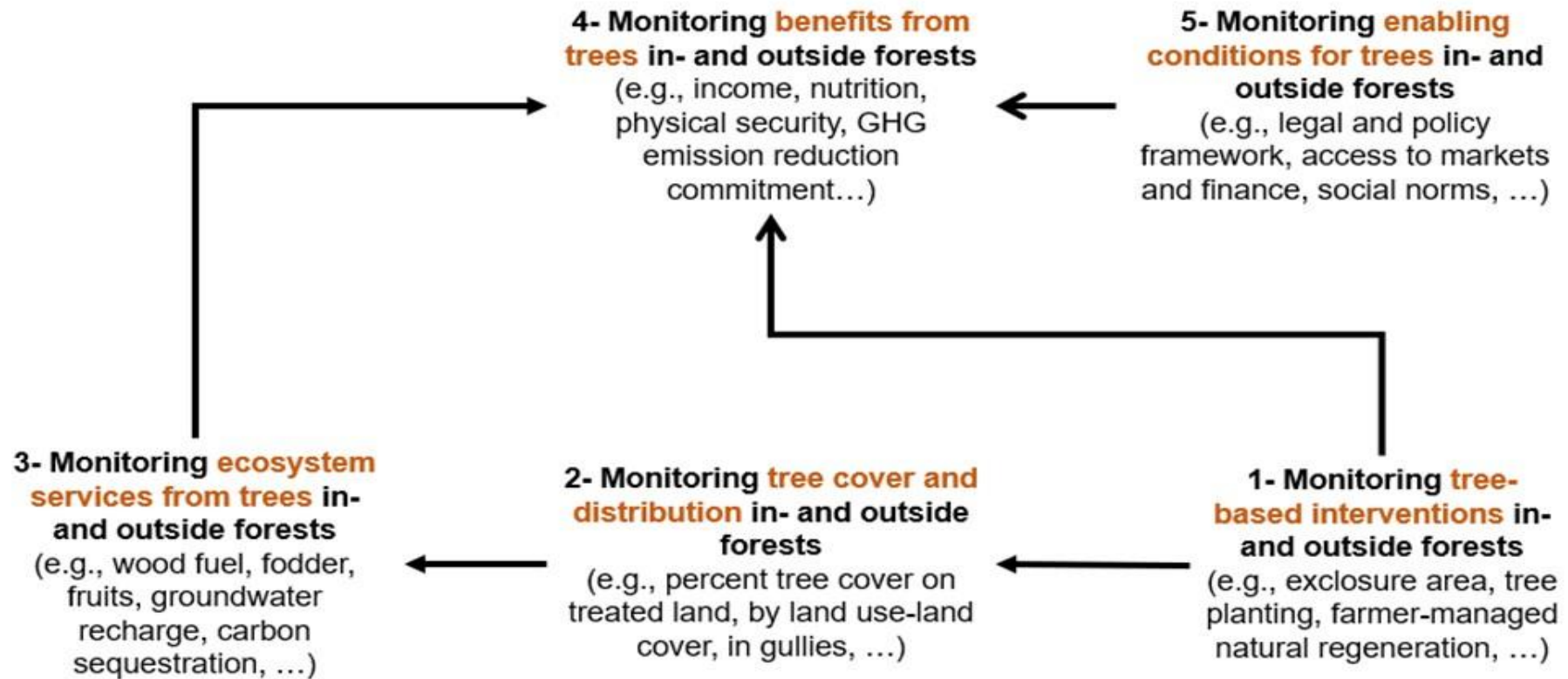
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<sup>23</sup> Environment, Forest and Climate Change Commission. 2020. Assessing tree cover and distribution for tracking progress towards targets and informing adaptive management: Meket (Amhara Regional State), Ethiopia. Addis Ababa: EFCCC.

<sup>24</sup> 4 RETURNS FROM LANDSCAPE RESTORATION: A systemic and practical approach to restore degraded landscapes



**Figure 7** | Monitoring Bio-physical and Socio-economic Components of Tree-based Landscape Restoration



Source: Environment, Forest, and Climate Change Commission. 2020. Assessing tree cover and distribution for tracking progress towards targets and informing adaptive management: Meket (Amhara Regional State), Ethiopia. Addis Ababa: EFCCC



**Figure 8** | A Sketch of 4 Returns and 3 Landscape Zones



**Inspiration**

Giving people hope and a sense of purpose.



**Social Capital**

Bringing back jobs, business activity, education and security.



**Natural Capital**

Restoring biodiversity, soil, water quality and capturing carbon.



**Financial Capital**

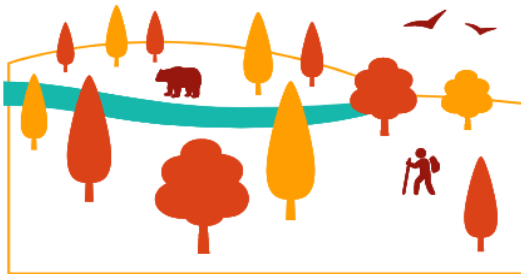
Realising long-term sustainable profit.

Today, many people are disconnected from nature and unable to see the connection between healthy landscapes, a stable climate, food security and their own well-being. We see this loss of connection and inner purpose as a severe threat from landscape degradation, as landscapes are the mirror of our soul.

We believe that by making people aware and engaging them, a sense of hope and purpose will return. We pursue this by deeply understanding local and indigenous ownership and wisdom, grasping the meaning of long-term commitment for governments, companies and investors, and taking time for inner reflection.

### 3 landscape zones

The 4 Returns holistic framework breaks down landscape restoration into 3 distinct landscape zones – natural, economic and combined.



**Natural zone**

Regenerating a landscape’s ecological foundation by restoring and protecting native vegetation, trees, and biodiversity.



**Combined zone**

Restoring the topsoil and biodiversity, and delivering sustainable economic returns through regenerative agriculture, agroforestry and rotational grazing.



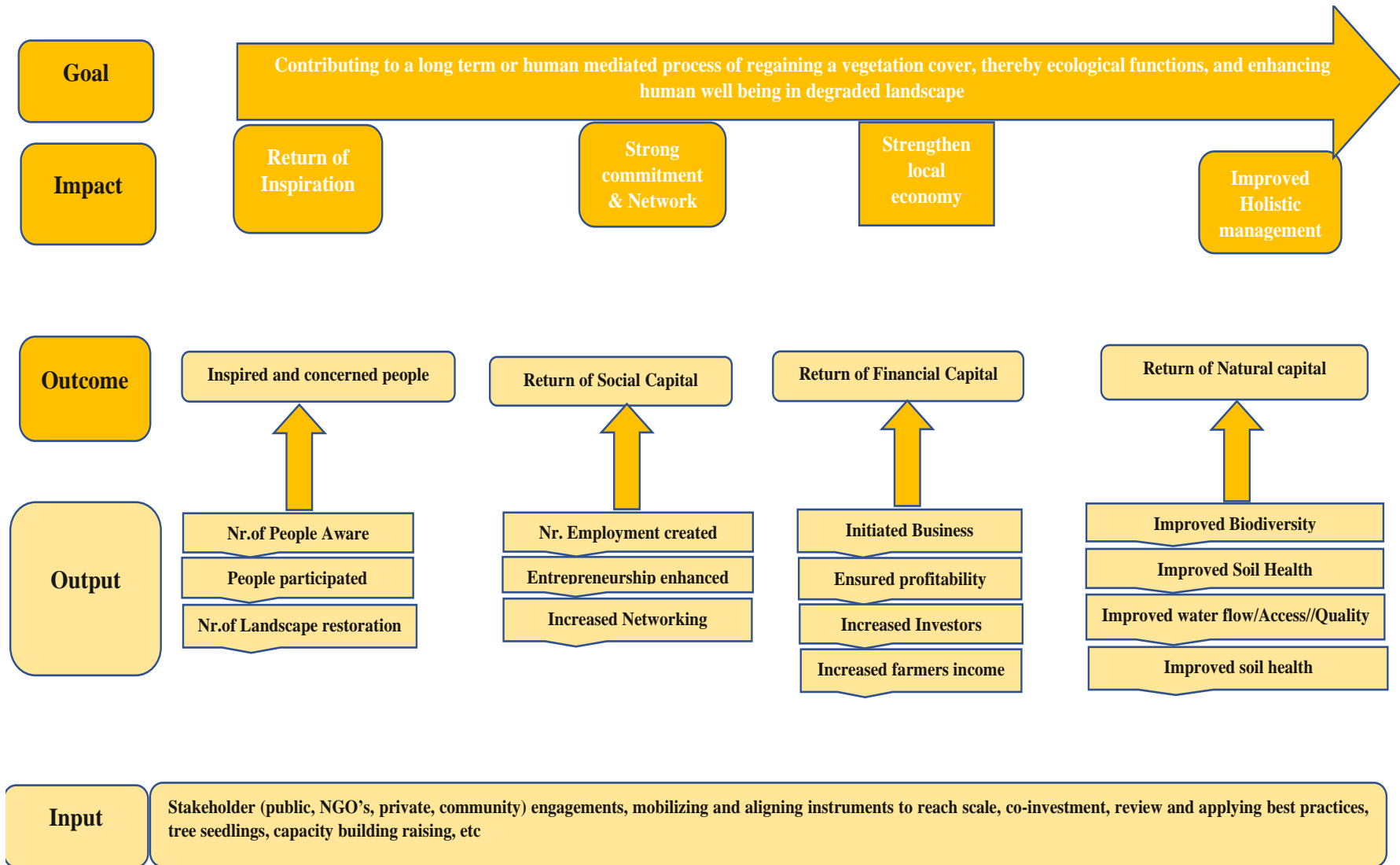
**Economic zone**

For delivering sustainable economic productivity with dedicated areas for value-adding activities like processing, typically concentrated in urban areas.

Source: <https://www.commonland.com/4-returns/>



**Figure 9** | Results Chain



## 4.2 INDICATORS

The four outcomes of a tree-based intervention are categorized according to the ecosystem goods and services to be generated from intervention. Table 9 showed the proposed core indicators for each outcome, the domain to be managed and proposed indicators for each domain and timing for measurement. Core indicators will be augmented by additional information culled from research reports and field surveys. Benchmarks are also suggested for each of the core indicators, to provide a target to assess against: in some cases, these require further discussion by the EFCCC and WRI intermittently.

**Table 9** | Outcomes and Indicators for Tree Based Intervention for Landscape Restoration

Nr.	Outcomes	Outcome Justification	Outcome Domain	Indicator examples	Tools to be applied for Progress Monitoring	Timing
1	Return of Inspiration	Inspired & Connected people: Combined number of people aware of the opportunity of landscape restoration, participated in the 4 returns approach, and start 4 returns initiatives	Awareness	<ul style="list-style-type: none"> <li># of people demonstrating positive attitudes and beliefs towards landscape restoration and its practices</li> <li># of people exposed through on- and offline interactions</li> </ul>	<ul style="list-style-type: none"> <li>Report on people participated in the awareness creation program</li> <li>KAP survey</li> </ul>	
			Participation	<ul style="list-style-type: none"> <li># of people participating in landscape restoration initiatives and/or in 4 returns restorative businesses</li> <li># of people engaged in different FLR activities</li> </ul>	<ul style="list-style-type: none"> <li>Activity report</li> </ul>	
			Replication	<ul style="list-style-type: none"> <li># of landscape restoration initiatives conducted</li> <li># enterprises being established inside or outside the respective target landscapes</li> </ul>	<ul style="list-style-type: none"> <li>Activity report</li> </ul>	





Nr.	Outcomes	Outcome Justification	Outcome Domain	Indicator examples	Tools to be applied for Progress Monitoring	Timing
				<ul style="list-style-type: none"> <li># of new businesses, initiatives, or projects created/ piloted</li> </ul>		
			Most Significant Change stories*	<ul style="list-style-type: none"> <li>Most significant stories show that, by Returning of Inspiration, people have a deeper connection to their landscape</li> </ul>		
2	Return of Social Capital	Outcome indicator Strong communities & Networks: combined (In)direct employment rates, entrepreneurial skills and social landscape network(s) have increased and/or improved.	Employment	<ul style="list-style-type: none"> <li>Number of direct/indirect jobs created/supported* at the venture/landscape level (# jobs created/supported)</li> </ul>	<ul style="list-style-type: none"> <li>Activity report</li> <li>Survey</li> </ul>	
			Entrepreneurship	<ul style="list-style-type: none"> <li># of people whose entrepreneurial and professional skills have been improved</li> <li># of participants in entrepreneurial and skills trainings, surveys</li> </ul>	<ul style="list-style-type: none"> <li>KAP Survey</li> </ul>	
			Network	<ul style="list-style-type: none"> <li>Number of different groups connected to convey knowledge, information, and other support for innovation (# of network partners, e.g., Universities, community centers, Business schools, government etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Survey</li> <li>Activity report</li> </ul>	
			Most Significant Change stories*	<p>MSC Stories show that by Return of Social Capital people have a deeper connection to their landscape</p>		



Nr.	Outcomes	Outcome Justification	Outcome Domain	Indicator examples	Tools to be applied for Progress Monitoring	Timing
3	Return of Natural Capital	Outcome indicator Improved holistic management: Number of hectares (# ha) under improved management (aggregating the progress made on soil, biodiversity, water, and other)	Biodiversity	<ul style="list-style-type: none"> <li>Total area/hectares where abundance and diversity of species are improved/ maintained,</li> <li>Type and number of practices initiated to improve and maintain biodiversity (# pro-biodiversity ha / # pro-biodiversity practices)</li> <li>Species planted in different FLR options</li> </ul>	<ul style="list-style-type: none"> <li>Activity report</li> <li>Survey</li> <li>Field level observation</li> </ul>	<ul style="list-style-type: none"> <li>Annually</li> <li>2 years</li> <li>Annually</li> </ul>
			Soil Health	<ul style="list-style-type: none"> <li>Soil Organic Matter, pH, Cation-exchange capacity (CEC) values increase over 5 year time periods and visual assessments of soil structure and water drainage levels of the soil improve (change in SOM, pH, CEC, soil structure, and/or water drainage)</li> </ul>	<ul style="list-style-type: none"> <li>Laboratory observation</li> </ul>	
			Water	<ul style="list-style-type: none"> <li>Improved water flow and / or improved water quality (m3 or % or another relevant unit)</li> </ul>	<ul style="list-style-type: none"> <li>Volume of water flow</li> <li>Laboratory testing</li> </ul>	
			Carbon	<ul style="list-style-type: none"> <li>Carbon is being sequestered into the landscape (tons of CO2 sequestered)</li> </ul>	<ul style="list-style-type: none"> <li>Laboratory testing</li> </ul>	
			Most Significant Change stories*	<ul style="list-style-type: none"> <li>MSC Stories show that by return of Natural Capital people have a deeper connection to their landscape</li> </ul>		



Nr.	Outcomes	Outcome Justification	Outcome Domain	Indicator examples	Tools to be applied for Progress Monitoring	Timing
4	Return of Financial Capital	Outcome indicator Strengthened local economy: Combined sum of additional grant and/or commercial funding flows mobilized for integrated 4 returns landscape interventions (both direct and indirect/leveraged).	Business development	<ul style="list-style-type: none"> <li>Business cases are being identified, set up, and/or tested** (# cases)</li> </ul>	<ul style="list-style-type: none"> <li>Annual registration</li> </ul>	
			Profitability	<ul style="list-style-type: none"> <li>Positive cash flows have been generated for the restorative (matured) business case(s) and/or there is room for reinvesting in the business (positive cash flow and/or reinvestment potential)</li> </ul>	<ul style="list-style-type: none"> <li>Annual profit/loss statement</li> </ul>	Annually
			Investors	<ul style="list-style-type: none"> <li>IRR for investors is met for their respective thresholds (IRR met)</li> </ul>	<ul style="list-style-type: none"> <li>Investment assessment</li> </ul>	Every 5 years
			Farmer Income	<ul style="list-style-type: none"> <li>Total increase in annual farmer income and/or beneficial cost/benefit ratio in favor of the farmer (amount or ratio)</li> </ul>	<ul style="list-style-type: none"> <li>survey</li> </ul>	Every 2 years
			Most Significant Change stories*	<ul style="list-style-type: none"> <li>MSC Stories show that by return of Financial Capital people have a deeper connection to their landscape</li> </ul>		



## 5 RECOMMENDATIONS FOR NEXT STEPS AND CONCLUSION

Forest landscape restoration is critical for Meket and Gazo Woredas due to over exploitation of the natural resources, where most of the landscape are remained bare, non-productive and extremely degraded. Restoration efforts have been undergoing for more than three decades with insignificant accomplishment. New approaches and technological intervention would be very important to overcome the obstacles and improve the restoration activities. Innovative restoration financing mechanisms are critical to scale up restoration. Thus, the following recommendations are made:

- Giving special attention for the restoration of the remained patches of secondary forest of dry montane evergreen forest would be very important for the conservation of gene pool of these species.
- Strengthening of intra and inter-institutional coordination mechanisms at the Woreda, regional, and national levels to tackle the different issues arising at all levels from lack of coordination, cooperation, and overlapping efforts.
- Capacity building of stakeholders and actors at each of these levels to design comprehensive strategies to integrate landscape restoration opportunities into multiple productive sectors.
- Assess the potential to introduce and promote alternative, short and medium-term rotations of economically productive tree plantations using alternate tree native/exotic species, including appropriate silvicultural practices.
- Assess the economic and physical potential to introduce high-value fruit-based bamboo agroforestry systems in agricultural areas.
- Establish of short rotation/economically productive communal and private woodlots, using existing structures, namely farmer training centers. Build the necessary capacity for provision of technical advice to farmers in district and kebele administrations, and in PFM cooperatives/groups.
- Integrating landless youth to markets through access to resources, capacity, and funds for forest-related activities such as forest enterprises, cooperatives for the production of timber and nontimber forest products. Identify potential for a role for the youth in the current situation of land scarcity.



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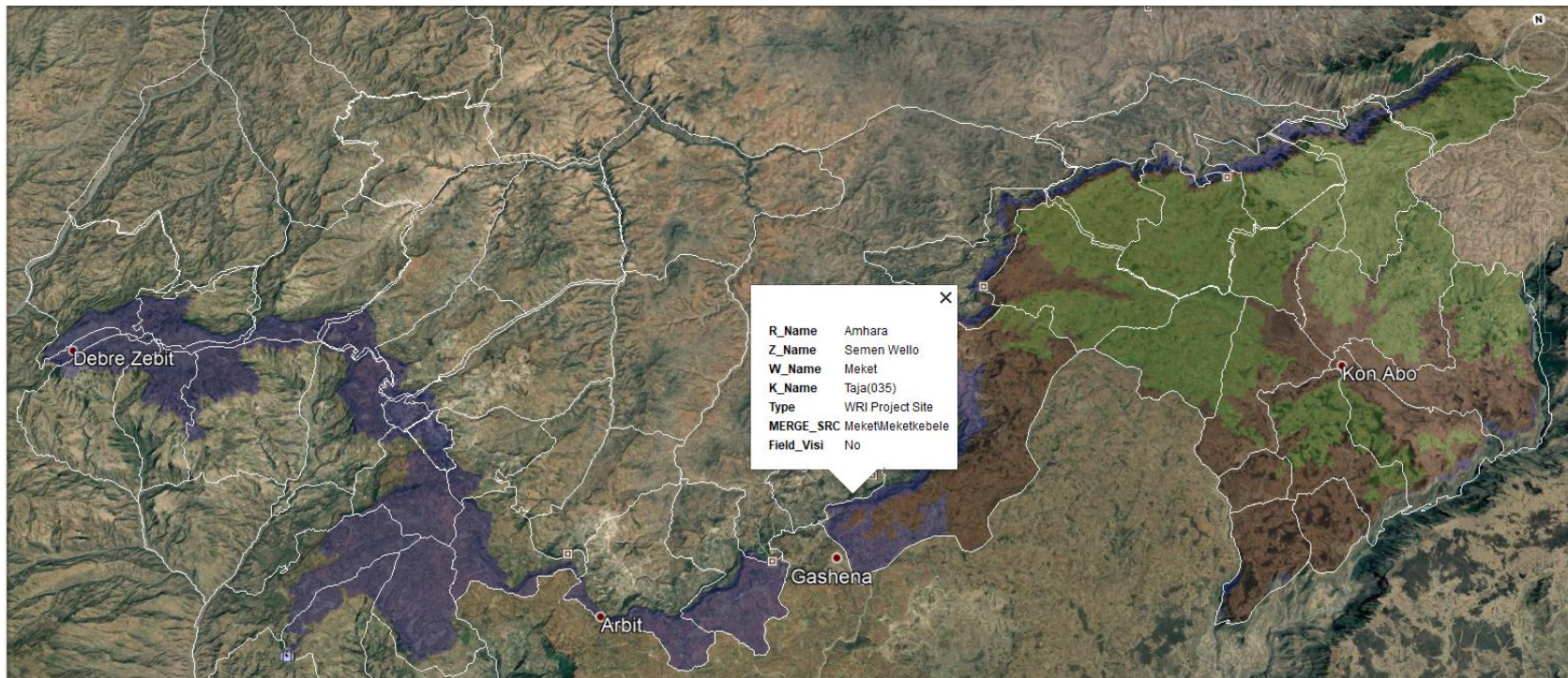
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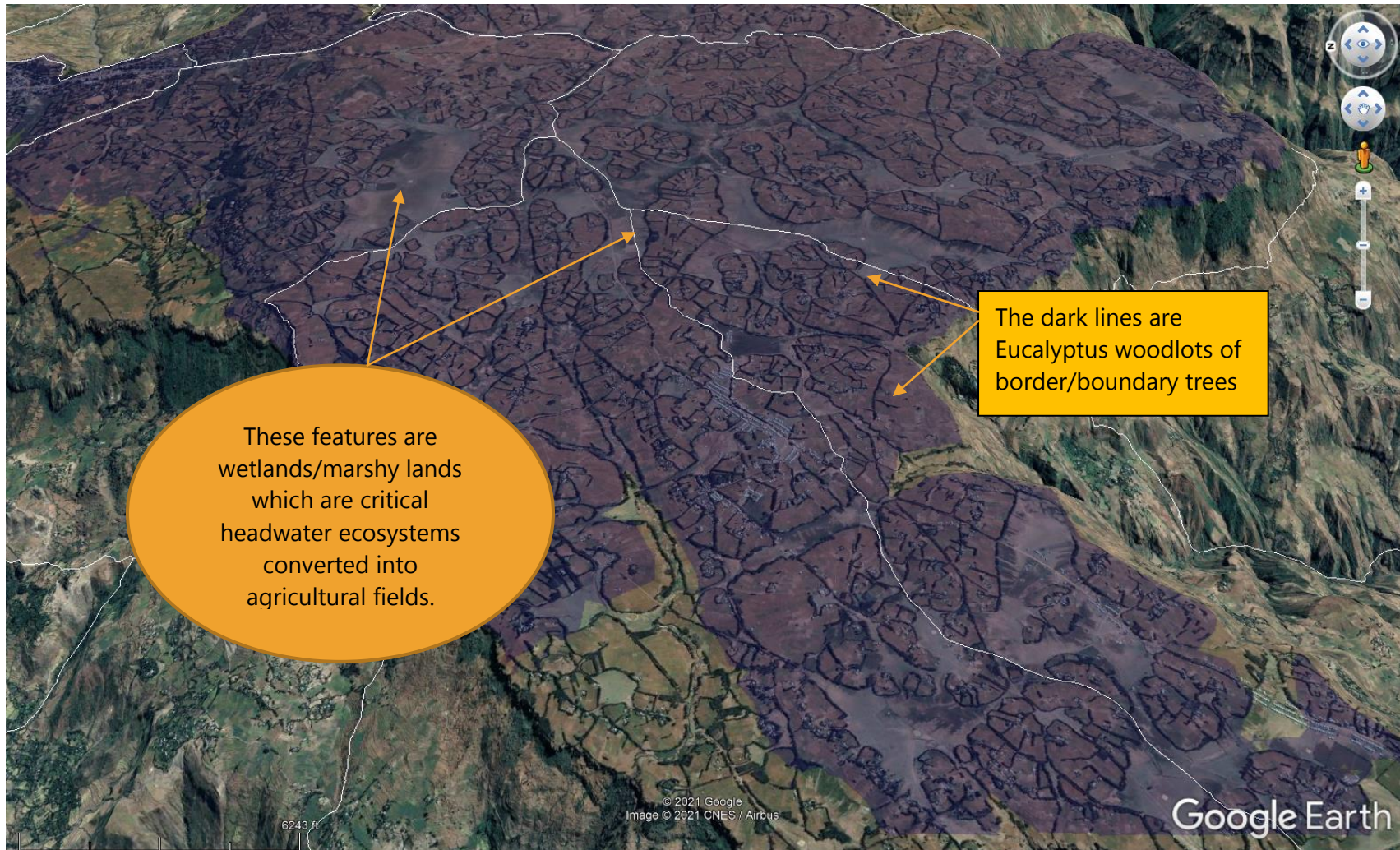
## 7 ANNEX I: LANDSCAPE ZONING DESCRIPTIONS AND RESPECTIVE FLR POTENTIAL

### 7.1 DESCRIPTION OF THE HIGH PLATEAU REGION OF AFROALPINE, ERECACEA BELT, DRY AFROMONTANE FOREST (AA/EB/DAF-WURCH)

This zone is constituted from three sub-zones the Afroalpine (AA-WURCH), Sub-Afroalpine/Ericaceae Belt (EB-WURCH) and the Dry Afromontane Forest and Grassland Complex (DAF-WURCH) on the high altitude (WURCH) region. It is dominantly plain with gently undulating plateaus between 2800-3473m altitude, except for a narrow strip of steep cliffy escarpments in the north west and south east edges of the plateau. It is intensively cultivated region. It has contagious farming system with potential for mechanization. As a highest elevation of the study area, this is the coldest zone in both districts and temperature might be the key ecological limiting factor.



Woody vegetation, especially in higher elevations (AA-WURCC & EB-WURCH), is restricted in traditionally above tree line zone. Eucalyptus appears to be an exception as there are abundant woodlots of eucalyptus in this zone. There are a lot of wetland/marshy areas in this zone. Good road access the main perennial road passes through this zone. Population is concentrated along the main road and in small towns Istayish and Kon Abo towns along.



This Afroalpine ecosystem supports Erica species, Hypericum, grasslands, and the herbaceous vegetation characterized by Giant Lobelia species (Mengesha Assefa, *et.al.* 2020). Barely is the only agricultural crop potentially grow in this altitudinal range. This zone is critical headwaters of many important tributaries including the ones to Blue Nile (Abay) river. The region is also of high biodiversity significance to high altitude flora of Ethiopia<sup>25</sup>. Unfortunately, this zone is densely populated and highly threatened by agricultural expansion and sensitive to climate change.

## 7.2 FLR POTENTIAL OF THE AA/EB/DAF-WURCH ZONE

There is a total area of about 64,000ha of FLR potential in this zone. 44,000ha of the total is in the Afroalpine (AA-WURCH) and Sub-Afroalpine (EB-WURCH) zone. The Restoration of Secondary Forest (RSF) by area ex-closures, (Eucalypts) Woodlots (WLE) Agroforestry are the main interventions recommended by field visits and workshop discussion, around farms and residences were prioritized in this region.

However, due to climatic limitations and ecosystems services to prioritize, the interventions should focus on restoring the delicate Ericaceae and Afroalpine ecosystems for environmental protection purposes, particularly, the wetland protection and other non-timber forest products. Eucalyptus management and control might be necessary for transition to happen. Ecofriendly livelihood alternatives should be introduced to help the population as well.

**Table 10** | FLR Potential of AA/EB-WURCH Zone

MAPPED FLR	1 <sup>ST</sup> LEVEL (PNV-ELV) ZONING					ZONE TOTAL (HA)
	FIELD PRIORITIZED FLR	AA-WURCH		EB-WURCH		
		2 <sup>ND</sup> Level (PNV-ELV-LHZ) ZONING				
		AA-WURCH-ATW	AA-WURCH-NHB	EB-WURCH-ATW	EB-WURCH-NHB	
AASA	WLE			34	33	67

<sup>25</sup> <https://www.ebi.gov.et/biodiversity/ecosystems-of-ethiopia/AfRoalpine-and-sub-AfRoalpine-ecosystem/>





	WLE-AF-RSF	13	238	44	186	<b>482</b>
<b>AF</b>	WLE			604	13	<b>617</b>
	WLE-AF-RSF	1,723	5,686	2,387	693	<b>10,489</b>
<b>AFR</b>	WLE-AF-RSF				12	<b>12</b>
<b>AFR-WWBF</b>	WLE-AF-RSF		198		153	<b>351</b>
<b>AF-WBY</b>	WLE-AF-RSF		10			<b>10</b>
<b>AF-WLE</b>	WLE			415		<b>415</b>
	WLE-AF-RSF	1,024	2,066	1,355	24	<b>4,469</b>
<b>AF-WLE-RSF</b>	WLE			14		<b>14</b>
<b>AGSLV-AASA</b>	WLE			7	9	<b>16</b>
	WLE-AF-RSF		359	13	171	<b>543</b>
<b>AGSLV-HLBMB-AASA</b>	WLE			6	16	<b>22</b>
	WLE-AF-RSF		4,697	9	2,143	<b>6,849</b>
<b>AGSLV-HLBMB-WWBF-AASA</b>	WLE-AF-RSF				10	<b>10</b>
<b>AGSLV-WLE-AASA</b>	WLE-AF-RSF		28		19	<b>47</b>
<b>BDPA</b>	WLE		7	52	225	<b>284</b>
	WLE-AF-RSF	122	5,679	382	6,825	<b>13,008</b>
<b>CPE-AGSLV-HLBMB-AASA</b>	WLE				7	<b>7</b>
	WLE-AF-RSF				14	<b>14</b>
<b>CPE-HLBMB-AASA</b>	WLE-AF-RSF				14	<b>14</b>
<b>HLBMB</b>	WLE-AF-RSF				5	<b>5</b>
<b>HLBMB-AASA</b>	WLE			23	81	<b>105</b>
	WLE-AF-RSF		1,814	27	668	<b>2,508</b>
<b>HLBMB-WWBF-AASA</b>	WLE				6	<b>6</b>
	WLE-AF-RSF				6	<b>6</b>
<b>IMDNF-AASA</b>	WLE-AF-RSF		8			<b>8</b>



<b>IMDNF-HLBMB-AASA</b>	WLE-AF-RSF		24		10	<b>34</b>
<b>SHL</b>	WLE			68	5	<b>74</b>
	WLE-AF-RSF	84	519	198	114	<b>915</b>
<b>SILVO-AASA</b>	WLE				7	<b>7</b>
	WLE-AF-RSF		136		151	<b>287</b>
<b>SILVO-HLBMB-AASA</b>	WLE				18	<b>18</b>
	WLE-AF-RSF		726		1,209	<b>1,935</b>
<b>WLE</b>	WLE			12		<b>12</b>
	WLE-AF-RSF	16	38	98	13	<b>166</b>
<b>WLE-AASA</b>	WLE			5		<b>5</b>
	WLE-AF-RSF			10	22	<b>32</b>
<b>WLE-HLBMB-AASA</b>	WLE-AF-RSF		15	7	20	<b>42</b>
<b>WLE-SHL</b>	WLE			25		<b>25</b>
	WLE-AF-RSF	62	167	120		<b>349</b>
FLR TOTAL (HA)		3,044	22,415	5,916	12,903	44,277



The third sub-Zone within this main (1<sup>st</sup> order) zoning is the Dry Afromontane Forest and Grassland Complex (DAF-WURCH). There is about 19,500ha of area within this sub-zone. The same category of FLR interventions are available for this zone. However, this zone lies in slightly lower elevations and originally part of the Dry Afromontane ecosystems. Focus of FLR here should be on restoration of secondary forest using area ex-closures, enrichment planting/natural regeneration, and improved management of remaining patches of forest. The table below presents details on area distribution of the available interventions both mapped and workshop/Field prioritized options.

**Table 11** | FLR Potential of DAF-WURCH Zone

<i>MAPPED FLR</i>		<i>PNV-ELV ZONING</i>		<i>ZONE TOTAL (ha)</i>
		<b>DAF-WURCH</b>		
	<b>LSZONING</b>	<b>FIELD</b>		
		<b>PRIORITIZED FLR</b>		
		<b>WLE</b>	<b>WLE-AF-RSF</b>	
<i>AASA</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	17		17
<i>AF</i>	DAF-WURCH-ATW	31	10	41
	DAF-WURCH-NHB/EB-HDEGA-NHB		15	15
<i>AfR</i>	DAF-WURCH-ATW	14	6	20
	DAF-WURCH-NHB/EB-HDEGA-NHB	143	72	215
<i>AfR-AgSLV</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	37	8	45
<i>AfR-AgSLV-HLBMB</i>	DAF-WURCH-ATW	25		25
	DAF-WURCH-NHB/EB-HDEGA-NHB	45	6	51
<i>AfR-AgSLV-WLE-HLBMB</i>	DAF-WURCH-ATW	12		12
	DAF-WURCH-NHB/EB-HDEGA-NHB	16		16
<i>AfR-CPE-HLBMB</i>	DAF-WURCH-ATW	6		6
<i>AfR-HLBMB</i>	DAF-WURCH-ATW	23		23
	DAF-WURCH-NHB/EB-HDEGA-NHB	63	46	109



<i>AfR-Incense-WWBF</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	24		24
<i>AfR-SILVO</i>	DAF-WURCH-ATW	5		5
	DAF-WURCH-NHB/EB-HDEGA-NHB	29	7	36
<i>AfR-SILVO-HLBMB</i>	DAF-WURCH-ATW	28		28
	DAF-WURCH-NHB/EB-HDEGA-NHB	32		32
<i>AfR-WLE-HLBMB</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	7		7
<i>AF-WLE</i>	DAF-WURCH-ATW	12	7	19
<i>AF-WLE-RSF</i>	DAF-WURCH-ATW	7,177	44	7,220
<i>AgSLV</i>	DAF-WURCH-ATW	176	17	193
	DAF-WURCH-NHB/EB-HDEGA-NHB	98	28	125
<i>AgSLV-HLBMB</i>	DAF-WURCH-ATW	195	9	205
	DAF-WURCH-NHB/EB-HDEGA-NHB	201	19	220
<i>AgSLV-HLBMB-AASA</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	5		5
<i>AgSLV-WLE-HLBMB-AASA</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	11		11
<i>BDPA</i>	DAF-WURCH-ATW	6,129	36	6,165
	DAF-WURCH-NHB/EB-HDEGA-NHB	124	16	140
<i>CPE-HLBMB</i>	DAF-WURCH-ATW	22		22
<i>HLBMB</i>	DAF-WURCH-ATW	280	13	292
	DAF-WURCH-NHB/EB-HDEGA-NHB	173	74	247
<i>HLBMB-AASA</i>	DAF-WURCH-ATW	6		6
	DAF-WURCH-NHB/EB-HDEGA-NHB	16	9	25
<i>HLBMB-WWBF-AASA</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	7		7
<i>IMDNF-HLBMB</i>	DAF-WURCH-ATW	13		13
<i>RSF</i>	DAF-WURCH-ATW	1,112	39	1,150
	DAF-WURCH-NHB/EB-HDEGA-NHB	188	103	291
<i>SHL-RSF</i>	DAF-WURCH-ATW	532	21	553



	DAF-WURCH-NHB/EB-HDEGA-NHB	98	33	131
<i>SILVO-AASA</i>	DAF-WURCH-NHB/EB-HDEGA-NHB	5		5
<i>WLE</i>	DAF-WURCH-ATW	42	12	54
	DAF-WURCH-NHB/EB-HDEGA-NHB	50	18	68
<i>WLE-HLBMB</i>	DAF-WURCH-ATW	17		17
	DAF-WURCH-NHB/EB-HDEGA-NHB	29	15	45
<i>WLE-RSF</i>	DAF-WURCH-ATW	947	12	958
<i>WLE-SHL-RSF</i>	DAF-WURCH-ATW	586	5	591
<b><i>FLR TOTAL (ha)</i></b>		<b>18,808</b>	<b>699</b>	<b>19,507</b>



### 7.3 DRY AFROMONTANT FOREST ON HIGH ALTITUDE REGION (DAF-HIGH DEGA)

This zone falls on steep slopes on high altitude (2500-2800) just below the WURCH. It falls entirely under the Dry Evergreen Afromontane Forest and Grassland Complex (DAF) of the PNV Atlas. It includes narrow transect of steep escarpments on the North West of Meket and a small part of the south east facing cliffs of Gazo. Because of the terrain there is not much cultivation or settlement in the most part of this zone, except for the lower edges of this zone where some agriculture is practiced. Ideally the intervention should focus on restoration of the native trees of Dry Afromontane Forest ecosystems.

The DAF in its original setting would represent a complex system of successions involving extensive grasslands rich in legumes, shrubs and small to large-sized trees to closed forest with a canopy of several strata. The Dry Evergreen Afromontane forest would have canopies usually dominated by Tid (*Juniperus procera*) as a dominant species, followed by Weira (*Olea europaea* subsp. *cuspidata*), etc. Zigba (*Podocarpus falcatus*) is also found in sheltered valleys. There is also of natural potential for Highland Bamboo in this zone though it may require re-introduction.

Dry evergreen montane forests experience long dry seasons (4-8 months) and the rainy period is somewhat unreliable. During the dry season, not only moisture stress but also temperature increases, and daytime humidity drops and watercourses either dry up or greatly diminish inflow (Demel Teketay, 1996). *The montane grassland in most places, derived from forest and other woody vegetation types. The relict patches of forest associated with the grassland ecosystem consists of species of Juniperus procera, Olea uropaea sub sp. cuspidata and Afrocarpus falcuatus (Zerihun Woldu 1988). The primary factor for the conversion is excessive human activity.*





The original climax vegetation on the montane grassland of Ethiopia was supposed to be a dry evergreen montane forest intermingled with small areas of grassland (ibid). Common tree species in this elevation range include *Prunus Africana*, *Juniperus procera*, *Olea europaea*. The vegetation is characterized by *Olea europea* subsp. *Africana*, *Juniperus procera*, *Celtis kraussiana*, *Euphorbia amplipylla*, *Dracaena* spp. *Carissa edulis*, *Rosa abyssinca*, *Mimusops kummel*, *Ekebergia capensis*, etc. This vegetation is also often associated with highland Bamboo (*Arundinaria alpina*) (Ethiopian biodiversity Institute)<sup>26</sup>. This zone also

<sup>26</sup> <https://www.ebi.gov.et/biodiversity/ecosystems-of-ethiopia/dry-evergreen-montane-forest-and-evergreen-scrub-ecosystem/>



falls within the natural habitat of Highland Bambo (Yushania alpina). Y. alpina is found in ecological zones of the country between 2200 – 3500 meters above sea level<sup>27</sup>. The Dry Evergreen Montane Forests are under severe pressure of destruction caused by deforestation for wood products, fire, encroaching agriculture, and overgrazing. (ibid).

## 7.4 FLR POTENTIAL OF THE DAF-HIGH DEGA ZONE

There is total of around 15,770ha of area shared among two main interventions. The interventions prioritized in the field are Woodlots (WLE) and Secondary forest restoration (RSF) through area closures and enrichment planting (RSF). Though not highlighted Highland Bamboo (HLBMB) restoration should be considered as well.

**Table 12** | FLR Potential of DAF-HIGH DEGA Zone

	<i>MAPPED (WFLR-RFLR)</i>	<i>FIELD PRIORITIZED FLR</i>			<i>ZONE TOTALS</i>
		<b>PNV-ELV ZONING</b>	<b>RSF (Closure-Plantation)</b>	<b>WLE</b>	
	AASA	DAF-HDEGA		5	5
	AF	DAF-HDEGA		5	5
	AfR	DAF-HDEGA	122	202	324
	AfR-AgSLV	DAF-HDEGA	48	91	139
	AfR-AgSLV-HLBMB	DAF-HDEGA	81	73	154
	AfR-AgSLV-WLE	DAF-HDEGA	2	5	8
	AfR-AgSLV-WLE-HLBMB	DAF-HDEGA	9	4	14
	AfR-AgSLV-WLE-WWBF	DAF-HDEGA	0	4	5
	AfR-AgSLV-WWBF	DAF-HDEGA	0	14	14
	AfR-HLBMB	DAF-HDEGA	63	116	179
	AfR-HLBMB-WWBF	DAF-HDEGA		5	5

<sup>27</sup> [https://www.unido.org/sites/default/files/2010-01/Guidelines\\_for\\_cultivating\\_Ethiopian\\_highland\\_bamboo\\_0.pdf](https://www.unido.org/sites/default/files/2010-01/Guidelines_for_cultivating_Ethiopian_highland_bamboo_0.pdf)





<i>AfR-Incense-WWBF</i>	DAF-HDEGA	12	42	54
<i>AfR-SILVO</i>	DAF-HDEGA	15	46	61
<i>AfR-SILVO-HLBMB</i>	DAF-HDEGA	12	12	24
<i>AfR-SILVO-WWBF</i>	DAF-HDEGA	0	6	6
<i>AfR-WLE</i>	DAF-HDEGA	14	18	32
<i>AfR-WLE-HLBMB</i>	DAF-HDEGA	14	11	24
<i>AfR-WLE-WWBF</i>	DAF-HDEGA	2	7	9
<i>AF-WBY-RSF</i>	DAF-HDEGA	1	2	3
<i>AF-WLE-RSF</i>	DAF-HDEGA	706	1,131	1,836
<i>AgSLV</i>	DAF-HDEGA	194	302	496
<i>AgSLV-HLBMB</i>	DAF-HDEGA	633	461	1,094
<i>AgSLV-WLE-HLBMB-AASA</i>	DAF-HDEGA	19	26	45
<i>AgSLV-WWBF</i>	DAF-HDEGA	0	8	8
<i>BDPA</i>	DAF-HDEGA	2,215	3,515	5,730
<i>CPE-AgSLV-WLE-HLBMB-AASA</i>	DAF-HDEGA	1	3	5
<i>CPE-HLBMB</i>	DAF-HDEGA	3	6	9
<i>HLBMB</i>	DAF-HDEGA	309	353	661
<i>HLBMB-AASA</i>	DAF-HDEGA		3	3
<i>IMDNF</i>	DAF-HDEGA	6	9	14
<i>IMDNF-HLBMB</i>	DAF-HDEGA	20	9	29
<i>RSF</i>	DAF-HDEGA	842	1,461	2,303
<i>SHL-RSF</i>	DAF-HDEGA	597	821	1,418
<i>SILVO-HLBMB-WWBF-AASA</i>	DAF-HDEGA	4	20	23
<i>WLE</i>	DAF-HDEGA	54	114	168



<i>WLE-HLBMB</i>	DAF-HDEGA	91	92	183
<i>WLE-RSF</i>	DAF-HDEGA	87	298	386
<i>WLE-SHL-RSF</i>	DAF-HDEGA	97	185	282
<i>WLE-WWBF</i>	DAF-HDEGA	3	4	7
<i>WWBF-AASA</i>	DAF-HDEGA	5	4	9
<b><i>FLR TOTALS</i></b>		<b>6,281</b>	<b>9,493</b>	<b>15,773</b>

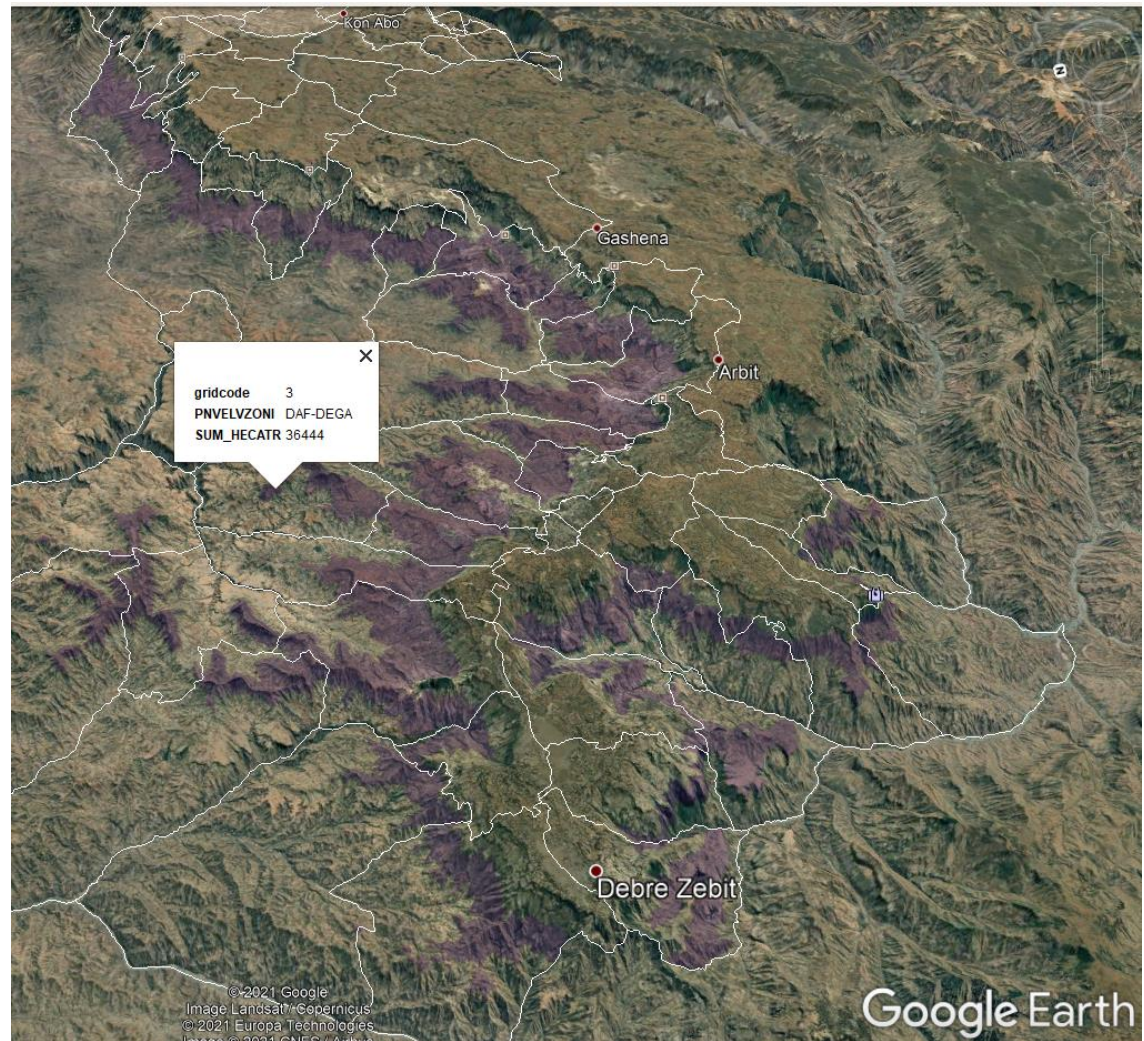


## 7.5 DRY AFROMONTANT FOREST ON DEGA (DAF-DEGA)

The DAF-DEGA zone falls between 2220-2500m just below HIGH DEGA zone. The upper parts of this zone are steep escarpment transition from the zone. At lower elevation however, the slope drops into undulating plateaus towards WDEGA zone below it. No dense population or extensive cultivation in this zone. The terrain rugged and steep with considerable mountain tops and ridges in high altitude. It would be ideal to focus on restoring Dry Afromontane forest for natural ecology and hydrology restoration.

## 7.6 FLR POTENTIAL OF THE DAF-DEGA ZONE

There is total of around 33,660ha of area shared among three main interventions. These are Area Ex-closures for both restoration of secondary forest (RSF) and afforestation reforestation (AfR) purposes. This should focus on the upper limits of the steep slopes. Waterbody buffer/Riverine forest (WBY/RIVN) restoration. Agroforestry in lower limits of this zone is also a viable intervention. Highland Bamboo (HLBMB) restoration might be an option though not identified in the field as it is shown in mapped potential (see first column in the table below).



**Table 13** | FLR Potential of the DAF-DEGA Zone

MAPPED FLR	PNV-ELV ZONING	LANDSCAPE ZONING					ZONE TOTAL (ha)
		DAF-DEGA-ATW		DAF-DEGA-NHB/DAF-WDEGA-NHB			
		FIELD PRIORETIZED FLR					
		AfR (Closure-Plantation)	AF-RSF-WBY	RSF (Closure-Plantation)	AfR (Closure-Plantation)	AF-RSF-WBY	RSF (Closure-Plantation)
<i>AfR</i>	DAF-DEGA	294	49		98		442
<i>AfR-AgSLV</i>	DAF-DEGA	568	51		31		651
<i>AfR-AgSLV-HLBMB</i>	DAF-DEGA	1,843	159				2,002
<i>AfR-AgSLV-WLE-HLBMB</i>	DAF-DEGA	47					47
<i>AfR-HLBMB</i>	DAF-DEGA	881	120				1,001
<i>AfR-Incense-WWBF</i>	DAF-DEGA				7		7
<i>AfR-SILVO</i>	DAF-DEGA	104	9		10		122
<i>AfR-SILVO-HLBMB</i>	DAF-DEGA	261	10				271
<i>AfR-WLE</i>	DAF-DEGA	62	7		11		81
<i>AfR-WLE-HLBMB</i>	DAF-DEGA	207	21				227
<i>AF-WBY-RSF</i>	DAF-DEGA			13			13
<i>AF-WLE-RSF</i>	DAF-DEGA		97	2,461			2,558
<i>AgSLV</i>	DAF-DEGA		263	1,992		127	2,383
<i>AgSLV-HLBMB</i>	DAF-DEGA		516	5,136			5,651
<i>AgSLV-WLE-HLBMB-AASA</i>	DAF-DEGA					11	11

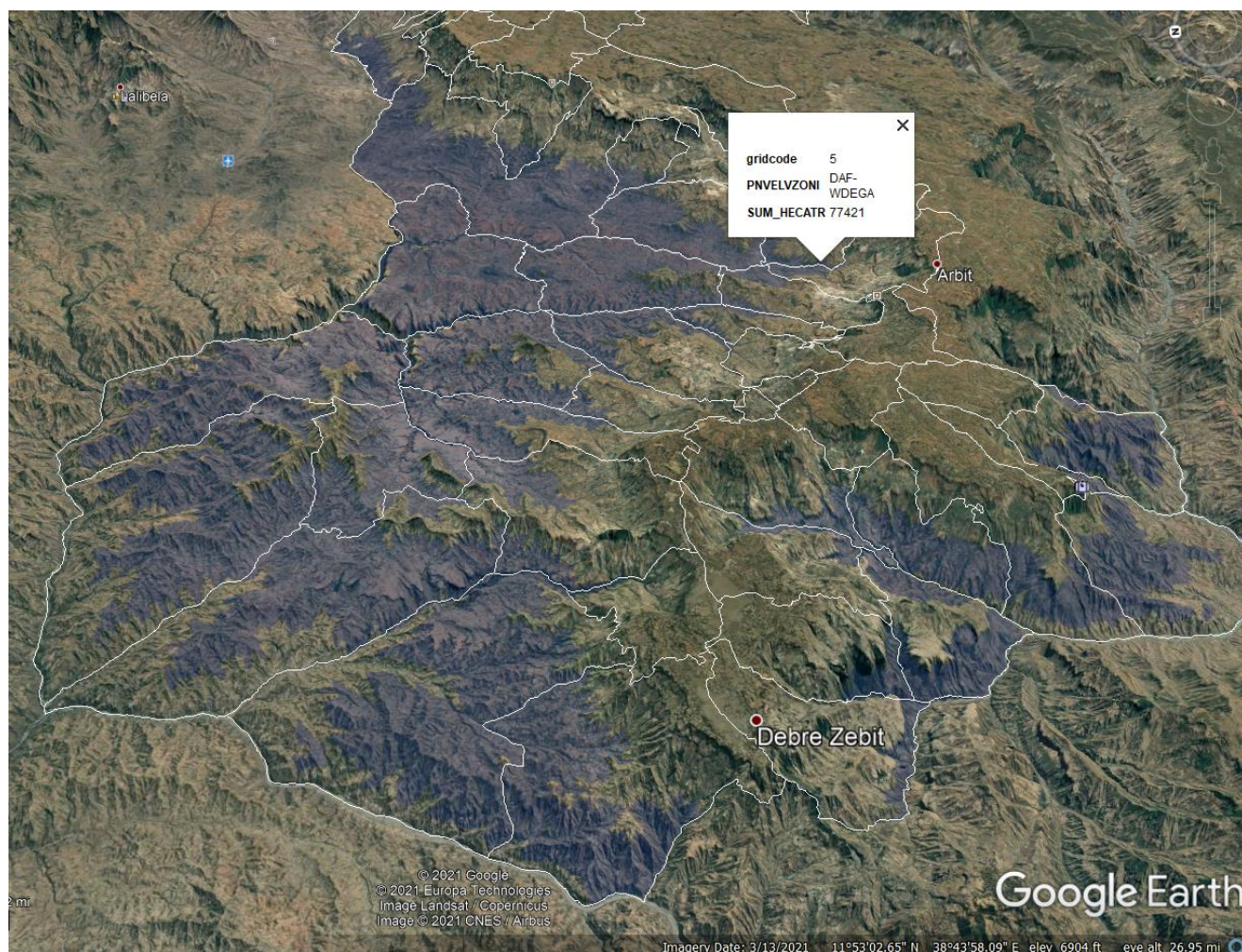


<i>BDPA</i>	DAF-DEGA	319	4,760	21	154	5,253		
<i>HLBMB</i>	DAF-DEGA	474	3,937			4,411		
<i>IMDNF</i>	DAF-DEGA		40		12	52		
<i>IMDNF-HLBMB</i>	DAF-DEGA	8	294			302		
<i>RSF</i>	DAF-DEGA	235	2,945		27	3,207		
<i>SHL-RSF</i>	DAF-DEGA	288	2,777		35	3,100		
<i>SILVO-HLBMB- WWBF-AASA</i>	DAF-DEGA	5	51			57		
<i>WLE</i>	DAF-DEGA	52	272		22	346		
<i>WLE-HLBMB</i>	DAF-DEGA	104	891			995		
<i>WLE-RSF</i>	DAF-DEGA		173			173		
<i>WLE-SHL-RSF</i>	DAF-DEGA	14	272			286		
<i>WWBF-AASA</i>	DAF-DEGA		12			12		
<b><i>FLR Total (ha)</i></b>		<b>4,267</b>	<b>2,802</b>	<b>26,027</b>	<b>157</b>	<b>21</b>	<b>387</b>	<b>33,660</b>



## 7.7 DRY AFROMONTANT FOREST ON WOYNA DEGA (DAF-WDEGA)

This DAF-WDEGA zone lies just below DEGA with the elevation range of 1900-2220m. It is characterized by undulating terrain of gentle slopes. Cultivated zone compared to the two preceding it but less than the plateau top. Warmer zone transitioning to KOLLA lowlands. This zone covers the lower limit of the Dry Afromontane Forest (DAF) vegetation, transitioning to Combretum woodland. Largescale plantation might be one option here this zone constitutes the single biggest area in the study site. On the lower limits of this zone frankincense development might be viable business opportunity.



## 7.8 FLR POTENTIAL OF THE DAF-WDEGA ZONE

There is total of around 57,376ha of area shared among Afforestation (AfR), Waterbody/Riverine forest (WBV/RIVN) and Restoration of Secondary Forest (RSF/IMDNF). Shrubland management and Frankincense might be candidates in KOLLA transitioning lower limits of this zone (see the mapped interventions in first column of the table below.

**Table 14** | FLR Potential of the DAF-WDEGA Zone



<i>WFLR-RFLR COMBO</i>	<i>PNV-ELV ZONING</i>	<i>PNV-ELV-LHZ ZONING</i>		<i>ZONE TOTAL (ha)</i>
		DAF-WDEGA-ATW/DAF-KOLA-ATW		
		FIELD-WORKSHOP		
		AF-RSF-WBY	WBY-RSF-SHL-AF	
<i>AF-FIS-RSF</i>	DAF-WDEGA	13	126	140
<i>AfR</i>	DAF-WDEGA	4,983	1,083	6,067
<i>AfR-AgSLV</i>	DAF-WDEGA	7,974	537	8,510
<i>AfR-AgSLV-HLBMB</i>	DAF-WDEGA	54		54
<i>AfR-AgSLV-HLBMB-WWBF</i>	DAF-WDEGA		7	7
<i>AfR-AgSLV-LLBMB</i>	DAF-WDEGA		104	104
<i>AfR-AgSLV-WLE</i>	DAF-WDEGA	10		10
<i>AfR-AgSLV-WLE-LLBMB</i>	DAF-WDEGA		10	10
<i>AfR-AgSLV-WLE-WWBF</i>	DAF-WDEGA	8	10	18
<i>AfR-CPE-AgSLV</i>	DAF-WDEGA	5	12	18
<i>AfR-HLBMB</i>	DAF-WDEGA	37		37
<i>AfR-LLBMB</i>	DAF-WDEGA		349	349
<i>AfR-LLBMB-Incense</i>	DAF-WDEGA		17	17
<i>AfR-SILVO</i>	DAF-WDEGA	437	103	540
<i>AfR-SILVO-HLBMB-WWBF</i>	DAF-WDEGA		11	11
<i>AfR-SILVO-LLBMB</i>	DAF-WDEGA		23	23
<i>AfR-WLE</i>	DAF-WDEGA	819	146	965
<i>AfR-WLE-HLBMB</i>	DAF-WDEGA	7		7
<i>AfR-WLE-LLBMB</i>	DAF-WDEGA		55	55
<i>AF-WBY-RSF</i>	DAF-WDEGA	44		44
<i>AF-WLE-RSF</i>	DAF-WDEGA	3,675	34	3,709
<i>AgSLV</i>	DAF-WDEGA	13,403	1,090	14,493
<i>AgSLV-AASA</i>	DAF-WDEGA		7	7
<i>AgSLV-HLBMB</i>	DAF-WDEGA	149		149
<i>AgSLV-LLBMB</i>	DAF-WDEGA		156	156
<i>AgSLV-WLE-HLBMB-WWBF-AASA</i>	DAF-WDEGA		8	8
<i>AgSLV-WWBF-AASA</i>	DAF-WDEGA		62	62
<i>BDPA</i>	DAF-WDEGA	5,134	2,313	7,447



<i>CPE-AgSLV-WLE-HLBMB-AASA</i>	DAF-WDEGA	36	7	43
<i>CPE-HLBMB</i>	DAF-WDEGA		5	5
<i>FIS</i>	DAF-WDEGA		8	8
<i>FIS-RSF</i>	DAF-WDEGA		25	25
<i>HLBMB</i>	DAF-WDEGA	126		126
<i>HLBMB-WWBF-AASA</i>	DAF-WDEGA		14	14
<i>IMDNF</i>	DAF-WDEGA	253	39	292
<i>IMDNF-HLBMB</i>	DAF-WDEGA		7	7
<i>IMDNF-LLBMB</i>	DAF-WDEGA		7	7
<i>INCENSE</i>	DAF-WDEGA		18	18
<i>LLBMB</i>	DAF-WDEGA		318	318
<i>LLBMB-Incense</i>	DAF-WDEGA		17	17
<i>RSF</i>	DAF-WDEGA	3,754	961	4,714
<i>SHL-FIS-RSF</i>	DAF-WDEGA		15	15
<i>SHL-RSF</i>	DAF-WDEGA	4,019	940	4,959
<i>SHL-WBY-RSF</i>	DAF-WDEGA	7		7
<i>SILVO-HLBMB-AASA</i>	DAF-WDEGA		12	12
<i>SILVO-HLBMB-WWBF-AASA</i>	DAF-WDEGA	282	35	317
<i>WLE</i>	DAF-WDEGA	2,619	261	2,880
<i>WLE-HLBMB</i>	DAF-WDEGA	27		27
<i>WLE-LLBMB</i>	DAF-WDEGA		61	61
<i>WLE-RSF</i>	DAF-WDEGA	8		8
<i>WLE-SHL-RSF</i>	DAF-WDEGA	398	7	405
<i>WWBF-AASA</i>	DAF-WDEGA	50	22	72
<b>FLR TOTAL (ha)</b>		<b>48,333</b>	<b>9,042</b>	<b>57,376</b>





## 7.9 COMBRETUM WOODLAND IN KOLLA (CTW-KOLA)

The CTW-KOLLA zone lies between 1450-1905m. It is the lowest elevation range in both districts. It is characterized by both moderate slopes and steep gorges near the edges of major rivers. This ecosystem is characterized by small to moderate sized trees with large deciduous leaves.

These include Yetan Zaf (*Boswellia papyrifera*), *Anogeissus leiocarpa* and *Stereospermum kunthianum* and species of *Weyba* (*Terminalia*), *Combretum* and *Lannea*. The solid stemmed lowland bamboo, *Shimel* (*Oxytenanthera abyssinica*) is prominent in river valleys [and locally on the escarpment] of western Ethiopia. Forest resources assessment showed that about 17,640ha of land was covered with frankincense in the lowland of the Meket Woreda.



## 7.10 FLR POTENTIAL OF THE CTW-KOLA ZONE

There is total of around 15,800ha of area shared among four interventions (see table below). These interventions are Afforestation/reforestation (AfR), Commercial plantations (CPE) and Lowland Bamboo restoration (HLBMB), Riparian Forest restoration (RIVN), Woodlots (WLE), and Silvopastoral (SILVO), and Restoration Secondary Forest (RSF).

**Table 15** | FLR Potential of CTW-KOLA Zone



<i>WFLR-RFLR COMBO</i>	<i>PNV-ELV ZONING</i>	<i>PNV-ELV-LHZ ZONING</i>		<i>ZONE TOTAL (ha)</i>
		<i>CTW-KOLA-ATW/CTW-WDEGA-ATW</i>	<i>FIELD-WORKSHOP FLR</i>	
		<i>AF-RSF-WBY</i>	<i>WBY-RSF-SHL-AF</i>	
<i>AASA</i>	CTW-KOLA	16	141	157
<i>AF-FIS-RSF</i>	CTW-KOLA	111	6,001	6,112
<i>AfR</i>	CTW-KOLA	6	23	29
<i>AfR-AgSLV</i>	CTW-KOLA		438	438
<i>AfR-AgSLV-HLBMB-WWBF</i>	CTW-KOLA		10	10
<i>AfR-AgSLV-LLBMB</i>	CTW-KOLA		18	18
<i>AfR-AgSLV-WLE</i>	CTW-KOLA		46	46
<i>AfR-AgSLV-WLE-HLBMB-WWBF</i>	CTW-KOLA		8	8
<i>AfR-AgSLV-WLE-WWBF</i>	CTW-KOLA	60	200	261
<i>AfR-AgSLV-WWBF</i>	CTW-KOLA		296	296
<i>AfR-CPE-AgSLV</i>	CTW-KOLA		10	10
<i>AfR-HLBMB</i>	CTW-KOLA		72	72
<i>AfR-Incense-WWBF</i>	CTW-KOLA		14	14
<i>AfR-LLBMB</i>	CTW-KOLA		69	69
<i>AfR-LLBMB-Incense</i>	CTW-KOLA		41	41
<i>AfR-SILVO</i>	CTW-KOLA		95	95
<i>AfR-SILVO-HLBMB</i>	CTW-KOLA	17	124	141
<i>AfR-WLE</i>	CTW-KOLA		93	93
<i>AfR-WLE-LLBMB</i>	CTW-KOLA		11	11
<i>AfR-WWBF</i>	CTW-KOLA	8	73	81
<i>AF-WBY-FIS-RSF</i>	CTW-KOLA		20	20
<i>AgSLV</i>	CTW-KOLA	6	134	140
<i>AgSLV-AASA</i>	CTW-KOLA	45	408	453
<i>AgSLV-HLBMB</i>	CTW-KOLA		35	35
<i>AgSLV-HLBMB-AASA</i>	CTW-KOLA		5	5
<i>AgSLV-LLBMB</i>	CTW-KOLA		15	15
<i>AgSLV-WLE-HLBMB-AASA</i>	CTW-KOLA		227	227
<i>AgSLV-WLE-HLBMB-WWBF-AASA</i>	CTW-KOLA		36	36



<i>AgSLV-WWBF-AASA</i>	CTW-KOLA		112	112
<i>BDPA</i>	CTW-KOLA		428	428
<i>CPE</i>	CTW-KOLA		28	28
<i>CPE-AASA</i>	CTW-KOLA		8	8
<i>CPE-AgSLV-HLBMB-AASA</i>	CTW-KOLA		239	239
<i>CPE-HLBMB</i>	CTW-KOLA		1,584	1,584
<i>CPE-WLE-HLBMB-AASA</i>	CTW-KOLA		10	10
<i>FIS</i>	CTW-KOLA	17	487	504
<i>FIS-RSF</i>	CTW-KOLA	35	904	939
<i>HLBMB</i>	CTW-KOLA		54	54
<i>IMDNF</i>	CTW-KOLA		25	25
<i>IMDNF-HLBMB</i>	CTW-KOLA		598	598
<i>IMDNF-HLBMB-AASA</i>	CTW-KOLA	18	170	187
<i>INCENSE</i>	CTW-KOLA		19	19
<i>LLBMB</i>	CTW-KOLA		19	19
<i>LLBMB-Incense</i>	CTW-KOLA		66	66
<i>RIVN-BDPA</i>	CTW-KOLA		10	10
<i>RIVN-WWBF</i>	CTW-KOLA		57	57
<i>RSF</i>	CTW-KOLA		28	28
<i>SHL-FIS-RSF</i>	CTW-KOLA	16	1,303	1,319
<i>SHL-RSF</i>	CTW-KOLA	6	42	48
<i>SHL-WBY-FIS-RSF</i>	CTW-KOLA		7	7
<i>SILVO-HLBMB-AASA</i>	CTW-KOLA	52	493	545
<i>WBY-FIS-RSF</i>	CTW-KOLA		7	7
<i>WLE</i>	CTW-KOLA		23	23
<i>WLE-AASA</i>	CTW-KOLA		8	8
<i>WLE-HLBMB</i>	CTW-KOLA		15	15
<i>WLE-LLBMB</i>	CTW-KOLA		21	21
<b>FLR TOTAL (ha)</b>		<b>413</b>	<b>15,423</b>	<b>15,836</b>



## 8 ANNEX II: LIST OF PARTICIPANTS

NR.	PARTICIPANT NAME	ORGANIZATION	WOREDA	RESPONSIBILITY
1	Berihun Teref	Woreda Administration	Meket	Head, Administrator
2	Sefiw Bishaw	Woreda Administration	Meket	Administration Office
3	Adane Mekuria	Land Administration & Use	Meket	Head
4	Alemu Tsegasew	Water and Energy Office	Meket	Office head
5	Amha Fetaye	Water & Energy Office	Meket	Head, Energy Department
6	Yensay Arega	FSDP	Meket	Accountant
7	Habtamu Bekele	Agriculture Office	Meket	Office Head
8	Solomon Wondie	Agriculture Office	Meket	SWC expert
9	Ashagire Mollo	Agriculture Office	Meket	Forest Expert
10	Getaye Alemnew	Agriculture Office	Meket	Plant Expert
11	Abera Sisay	Agriculture Office	Meket	NRM Coordinator
12	Bisrat Tibabu	Agriculture	Meket	Expert
13	Shiferaw Fikadie	Finance & Economic development	Meket	Office Head
14	Yahaya Kebede	District Attorney Office	Meket	Office Head
15	Kassa Damite	Environment protection	Meket	Forester
16	Salim Birie	Cooperative	Meket	Office Head
17	Gkidan Azaw	Women youth children affair	Meket	Expert
18	Berihun Dejen	RLA office	Meket	Expert
19	Biset Welataw	Land Administration & Use	Gazo	Office Head
20	Amara Aseres	Agriculture Office	Gazo	Acting Office Head
21	Dr Taddess Nadew	Livestock Office	Gazo	Acting office Head
22	Wedajo Ayalew	Plan commission	Gazo	Team leader
23	Wassie Demlash	Water office	Gazo	Office Head
24	Amare Bayleygen	Cooperative office	Gazo	Office Head
25	Samuel Dabo	Land Administration & Use	Gazo	Team leader, environmental protection
26	Wala Semachew	Agriculture Office	Gazo	Expert

