



The Dryland forests of Ethiopia: Extent, Status, Threats and Measures



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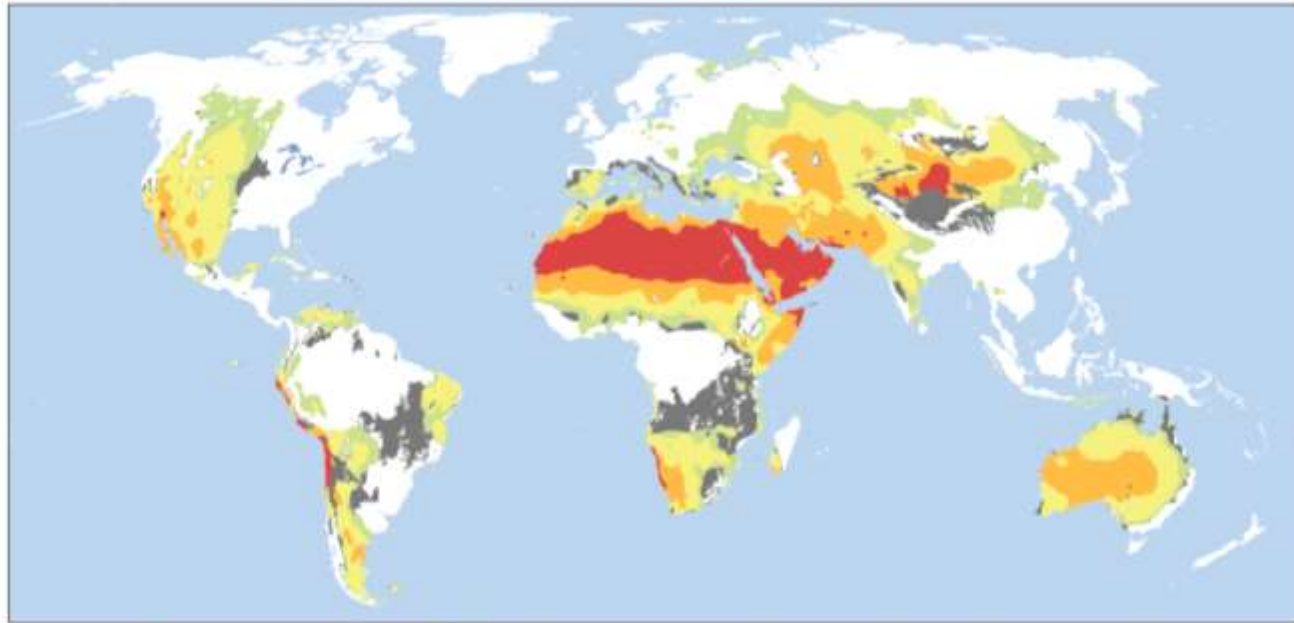
www.ethiopiareddplus.gov.et

Background

- Drylands cover about **41 %** of the Earth's land surface (6 billion ha), and are characterized by a scarcity of water. An estimated **2 billion people** live in drylands, and 90% of which are in developing countries.
- The majority of these people depend on forests and other wooded lands, grasslands and trees on farms to meet basic needs for food, medicines, shelter, cooking, heating, wood, and fodder for livestock, and for income.
- ***Life in the drylands is precarious***, and the socioeconomic status of people in drylands is significantly lower than that of people in many other areas.
- Water scarcity and high levels of ***spatial and temporal variability in water and fodder availability*** are the key factors that shape and constrain human livelihoods in dryland ecosystems.
- Dryland ecosystems are ***vulnerable to water shortage, drought, desertification, land-use change and degradation and climate change impacts***, with dangerous ramifications for the food security, livelihood and wellbeing of their populations.
- Though under threats, ***trees and forests*** in these lands help mitigate these challenges through provision of economic products and vital environmental services such as ***livestock forage, habitat for biodiversity***, prevention of erosion and desertification, and regulation of water, microclimate and soil fertility

What are drylands?

The world's drylands



■ Hyperarid ■ Semi-arid ■ Presumed drylands (not discussed)
■ Arid ■ Dry subhumid □ Non-drylands

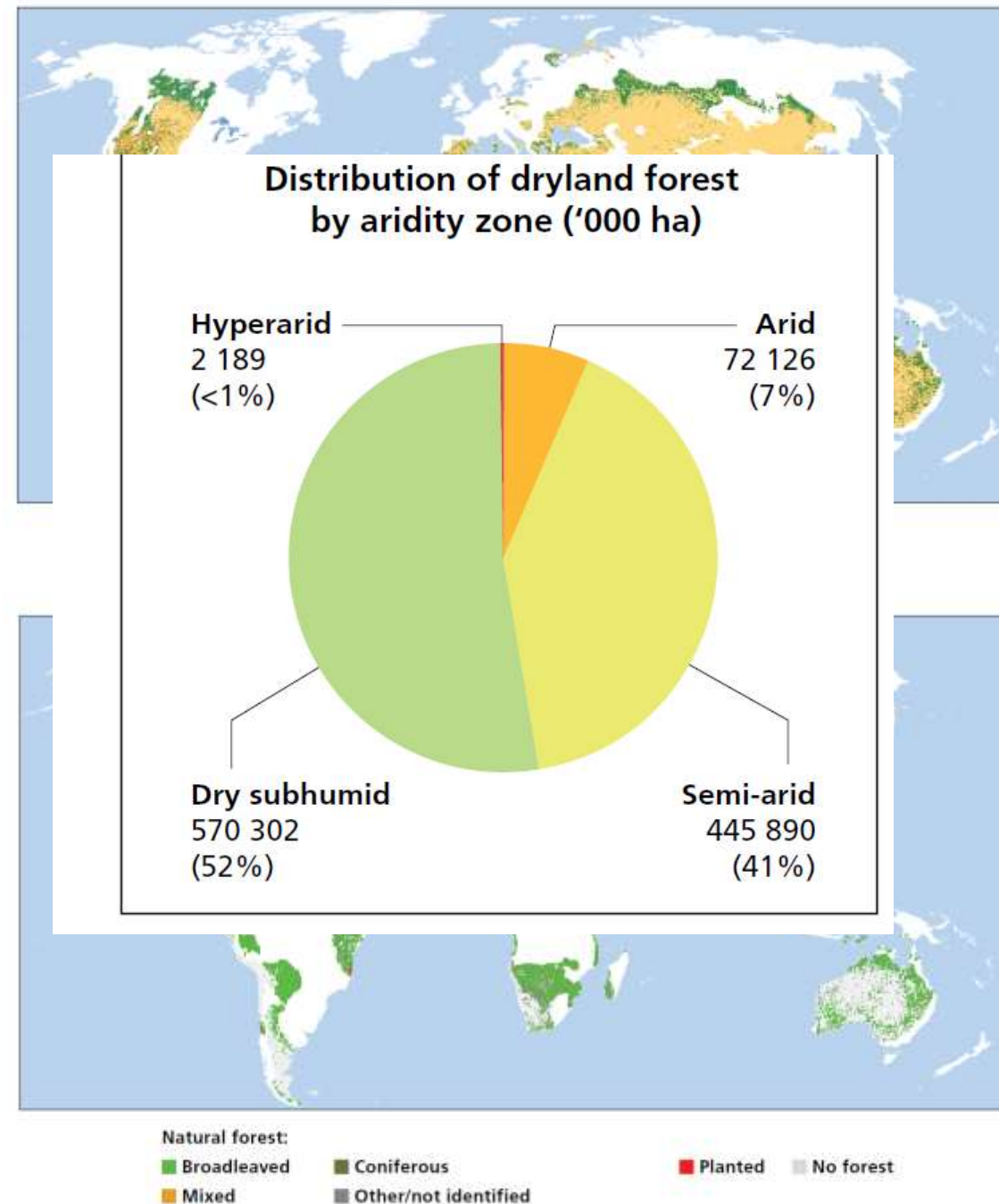
Source: UNEP-WCMC, 2007

- The United Nations (UNEP, 1992) defines drylands as lands where the ratio of *annual precipitation* and *mean annual potential evapotranspiration* (also known as the *aridity index* (AI), is no more than **0.65**.
- The UNEP-WCMC map divides these lands into four aridity zones:
 - (1) Hyper-arid: AI less than 0.05; (16%)
 - (2) Arid: AI greater than 0.05 but less than 0.2; (25%)
 - (3) Semi-arid: AI greater than 0.2 but less than 0.5; (37%)
 - (4) Dry sub-humid: AI greater than 0.5 but less than 0.65; (22%)

Drylands cover about **41 percent of the Earth's land surface, or about 6.1 billion hectares** – an area nearly four times the size of the Russian Federation. Drylands occur at all elevations, from sea level to above **2500 m**, but 80 percent of all drylands are found below **500 m**.

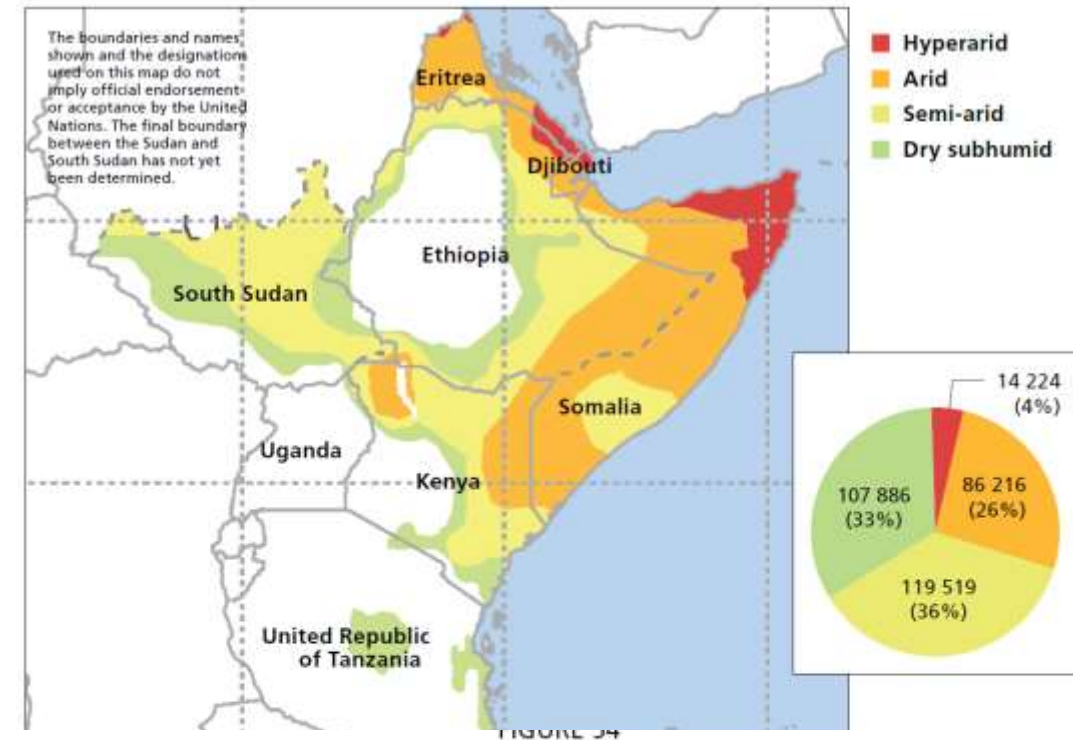
Global dryland forest extent and types

- The drylands contain **1.1 billion hectares** of forest globally, corresponding to 27 percent of the world's forest area (4 billion ha).
- Forest accounts for **18 percent** of dryland areas mostly located in sub-humid and semi-arid zones.
- Barren land accounts for 28 percent, grassland 25 percent and cropland 14 percent in drylands.
- Dryland forests are predominantly natural broadleaved forests (66 percent) .
- Only about 15 and 10 percent are natural coniferous and mixed broadleaved and coniferous, respectively.
- Broadleaved forests are most dominant in South America (95 percent), Oceania (89 percent) and Eastern Africa (82 percent)
- Two-thirds of dryland forest area has a closed tree canopy with cover of more than **40 percent**.



Extent of dry forests of Eastern Africa

Distribution of drylands in Eastern Africa by aridity zone ('000 ha)

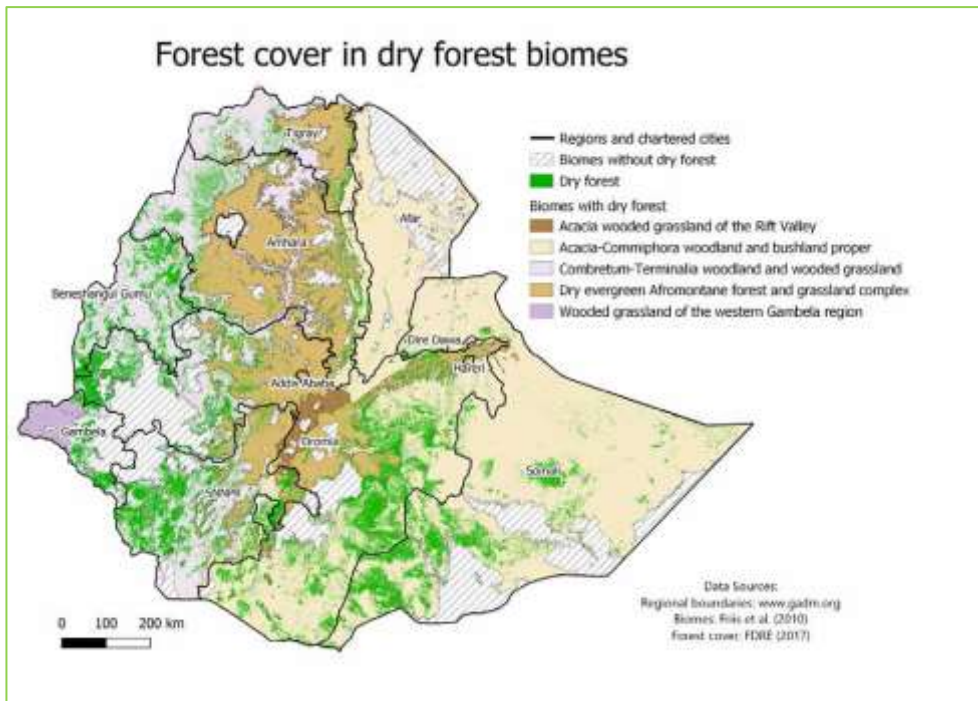


Distribution of land uses in Eastern Africa's drylands ('000 ha)

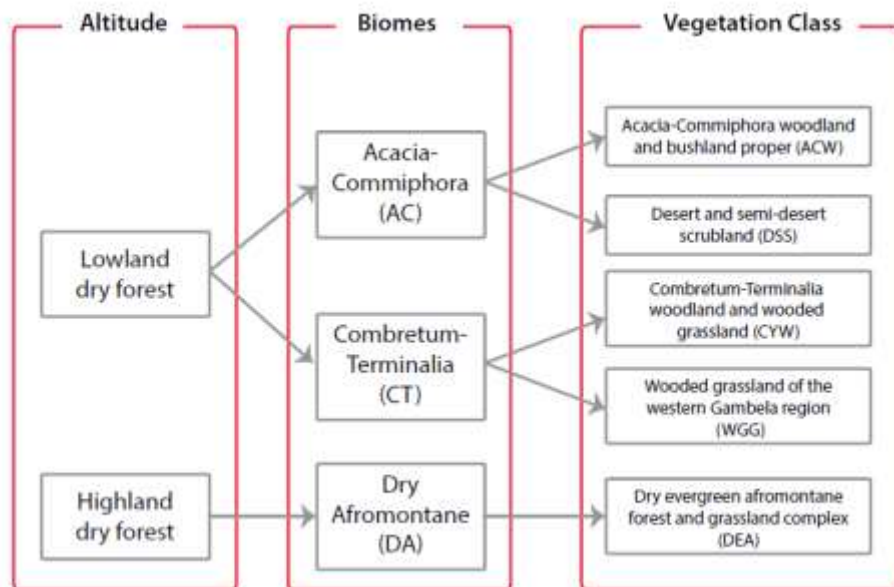


- Drylands cover 47 percent of the land in **Eastern Africa**, or 328 million hectares.
- Most of the drylands are semi-arid (36 percent) or dry sub-humid (33 percent).
- **Forests cover 35 percent** of the drylands of Eastern Africa (116 million hectares) followed by **grasslands (25 percent)**. Crops cover **only 6 percent** (almost 20 million hectares).
- Forests are mainly broadleaved; few areas of conifers exist in cool highland areas. Riparian forests represent only 2 percent of forest, but are important for **pastoralism and grazing**, especially during the dry season.
- The forests in Eastern Africa have a predominantly **open tree canopy**, with more than half (52%) having tree cover of **10 to 40 percent (degradation pressure)**.
- Trees outside forest are found on 33 percent of other land (52 million hectares).

Extent and types of drylands in Ethiopia



- Dry forest occupies 80% of all forests in Ethiopia.
- Dry forests in Ethiopia cover a range of forest vegetation types including:
 - The Acacia and Commiphora (small-leaved) deciduous woodlands and shrublands in the deserts of Afar and Ogaden
 - The Combretum-Terminalia (broadleaved) deciduous woodlands in the western lowlands
 - Dry Afromontane forests in the dry subhumid Afromontane ecosystems in the central highlands.
- Area estimates range from 12 million ha (EFCCC 2018) to 17.3 million ha (Stibniati Atmadja et al. 2109) and 54 million ha (WBISPP, 2004) depending on definition of what a forest is!



Ecological and economic benefits

FOREST CATEGORY ²	FREE-BOLE BIOMASS (TONS HA ⁻¹) (A)	BEF (TONS HA ⁻¹) (B)	AGB C (TONS HA ⁻¹) (A*B*0.5*)	AREA (MILLION HA)	TOTAL C STOCK (MILLION TONS)
High forest	131.5	2.74	106.68	4.07	434.19
Woodland	21.0	6.9	42.75	29.55	1,263.13
Plantation	178.8	2.33	123.0	0.50	61.52
Lowland bamboo	26.0	6.19	47.5	1.07	50.80
Highland bamboo	83.0	3.44	84.23	0.03	2.53
Shrubland	14.9	8.20	36.04	26.40	951.54
Total C					2,763.70

and services; play economic roles.

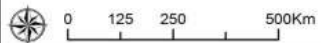
aboring unique and adapted to extreme

goods (e.g., fodder, medicines and tradable products),

e.g., soil formation, erosion prevention and quality improvement, water regimes and microclimate regulation, wind velocity, control of water and carbon sequestration).

Large game animals are lactated

in the dryland forest areas.



(1) Trabucco and Zomer 2009
(2) World Database on Protected Areas (IUCN/UNEP-WCM 2010)



Protected area in

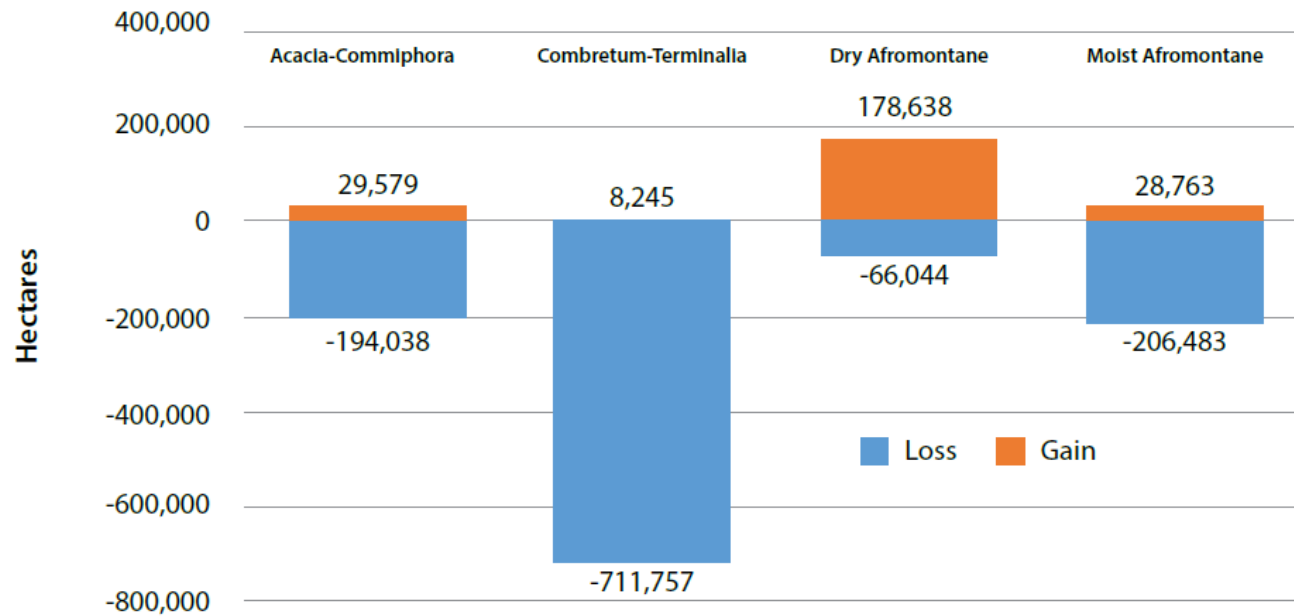
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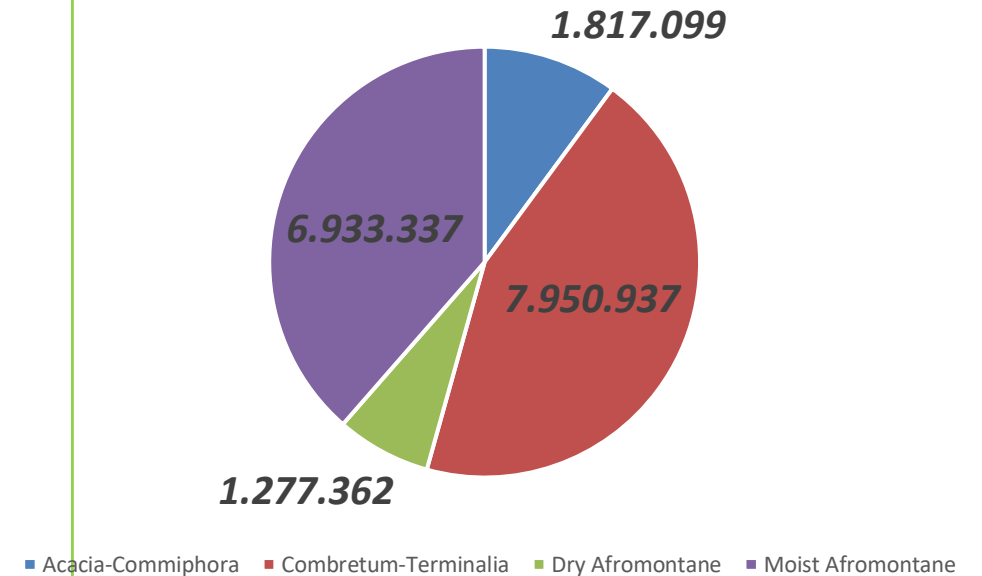
Threats and Challenges of drylands and dryland forests

- **Deforestation, land degradation and desertification:** Increasing population with growing needs for resources with unsustainable exploitation of NRs (needing more land a fuel) coupled with bad agricultural and livestock husbandry leads to further degradation and desertification
- **Climate change:** Drylands are vulnerable to climate change. Drylands have expanded significantly over the past 60 years and continue to do so, owing to changes in aridity index.
- **Social conflict and migration:** Land degradation and desertification, combined with drought, hunger and violence, lead to forced migration in dryland regions (Africa and Est Asia)
- **Invisibility of drylands to public policy making:** Dryland forests and other ecosystems have not attracted the same level of interest and investment as other ecosystems, such as humid tropical forests
- **Insufficient knowledge of resources and low institutional capabilities of the forestry sector**

Threats and Challenges- deforestation and forest degradation (DD)



National Annual Forest Emissions (tCO₂/yr (2000-2013))



Total forest loss (92,000 ha/yr) and gain (19,000 ha) and by biomes in Ethiopia (2000-2013); Half of the national forest emissions (55%) originate from dry forests

Dryland forests are deforestation hot spots – In particular Combretum Terminalia due to agricultural expansion (2000-2013): Main drivers of DD: (1) commercial agriculture; (2) charcoal and fuelwood collection; (3) fire, (4) overgrazing; (5) refugees; and (6) invasive species

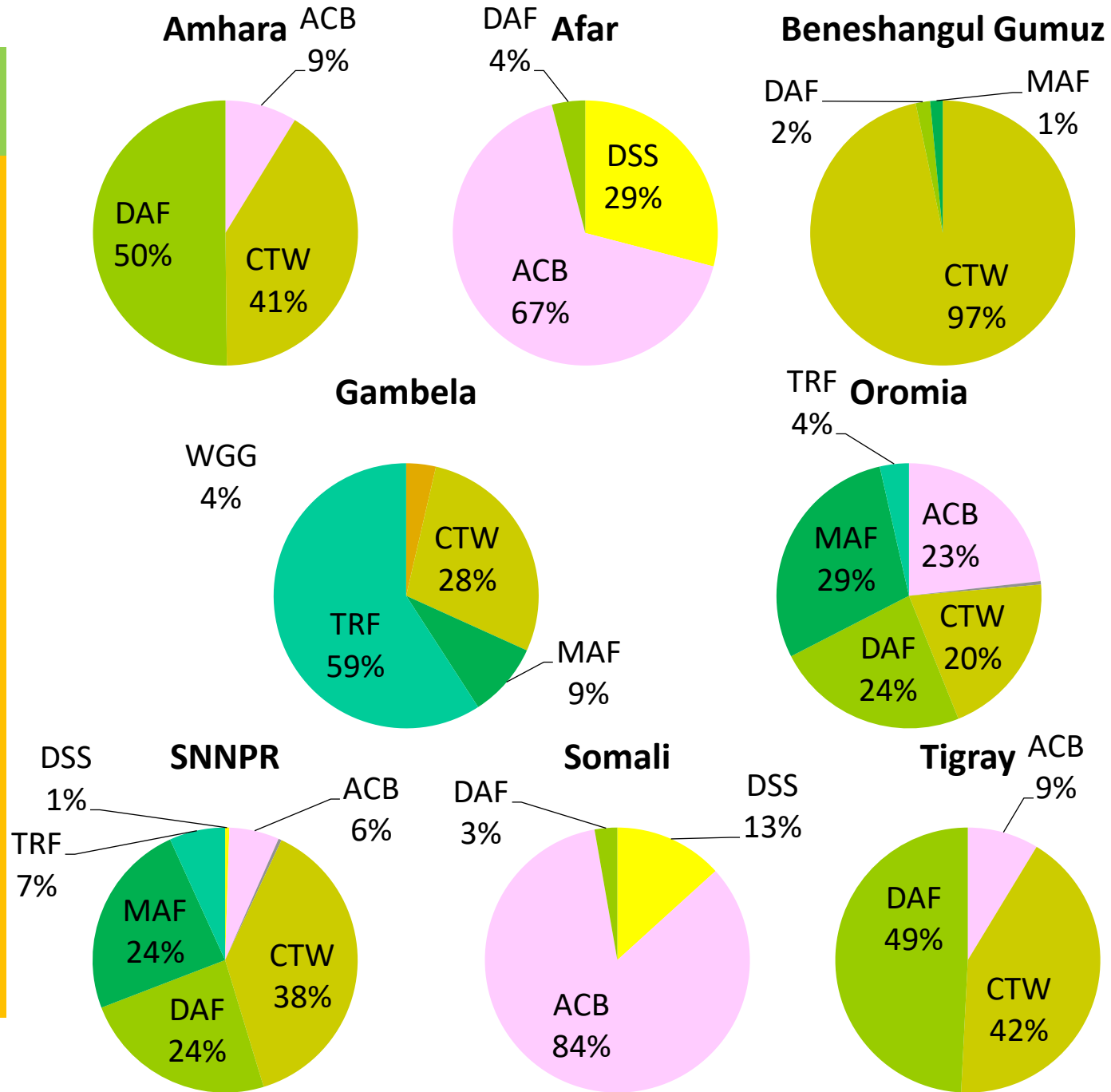
National measures to address challenges of dryland forests

- There is strong political will in sustainably managing forests, including dry forests in Ethiopia.
- The government has integrated forests in key national documents that guide policies, regulations, and actions in Ethiopia.
 - (1) Climate Resilient Green Economy (CRGE) strategy/Nationally Determined Contributions (NDC); (2) Growth and Transformation Plan2 (GTP2); (3) National REDD+ strategy; (4) Forest Sector Development Program; (5) 10 Years Perspective Plan; and (6) National Adaptation Plan, and many more
- Ethiopia as UNFCCC/UNCCCD/UNCBD signatory attempts to draw technical capacity and finances from the international community; Addressing deforestation and forest degradation in Ethiopia's remaining forests (REDD+ under UNFCCC); Prompting forest restoration (Bonn Challenge – assisted natural regeneration (area Enclosures), tree planting (Green Legacy Initiatives) – sub-humid climates)
- Institutional and legal measures domestically (EFCCC, forest proclamation and regulation); Mobilization of people and resources in soil and water conservation across the country
- Public awareness on significance of forests and woodlands
- Research results, manuals and guidelines for addressing knowledge gaps in dryland forests



REDD+

REDD+:
Jurisdictional
al REDD+
Programs to
be
implemente
d in a step-
wise
manner!



REDD+ stands for **R**educing **E**missions from **D**eforestation and **F**orest **D**egradation, and was created under the United Nations Framework Convention on Climate Change in 2007. It is climate change mitigation policy that values the carbon storage services of the world's remaining tropical forests in developing countries.

1 billion ha forest restoration needed to address CC by 2050 cent

The latest special report by the Intergovernmental Panel on Climate Change (IPCC) suggests that an increase of 1 billion ha of forest will be necessary to limit global warming to 1.5°C by 2050.

A number of international initiatives [such as the Bonn Challenge, the New York Declaration on Forests] have established ambitious targets to promote afforestation, and restoration at a global scale- Ethiopia has set an ambitious



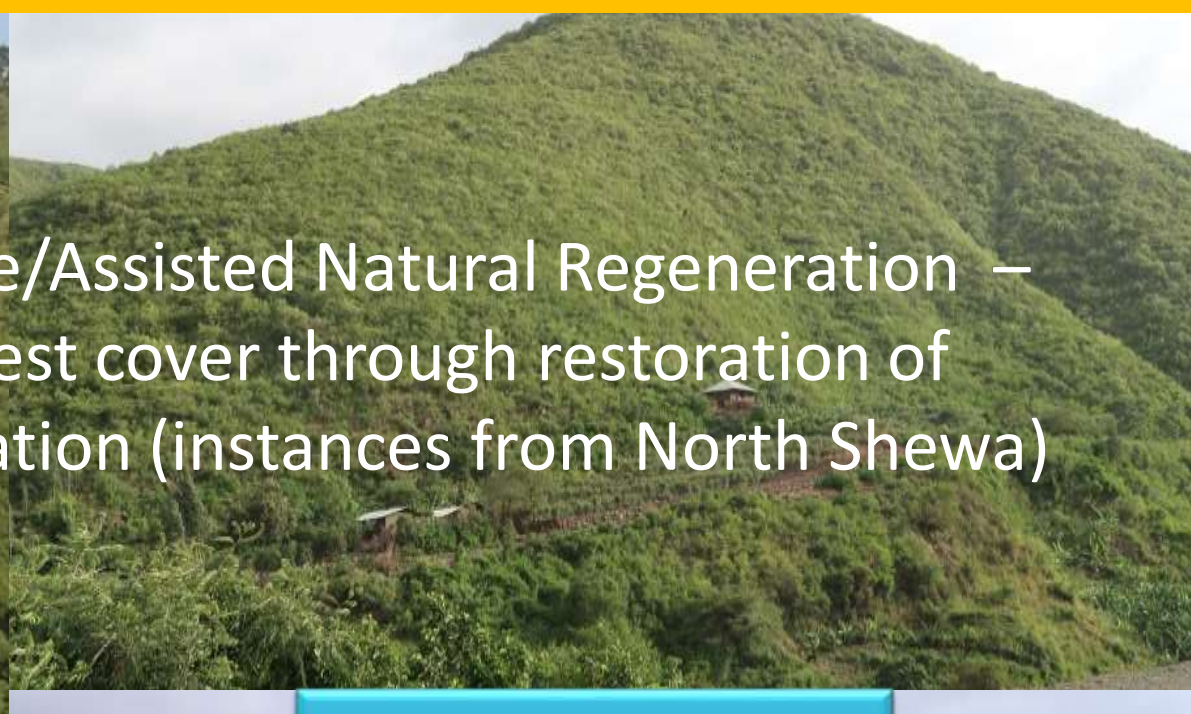
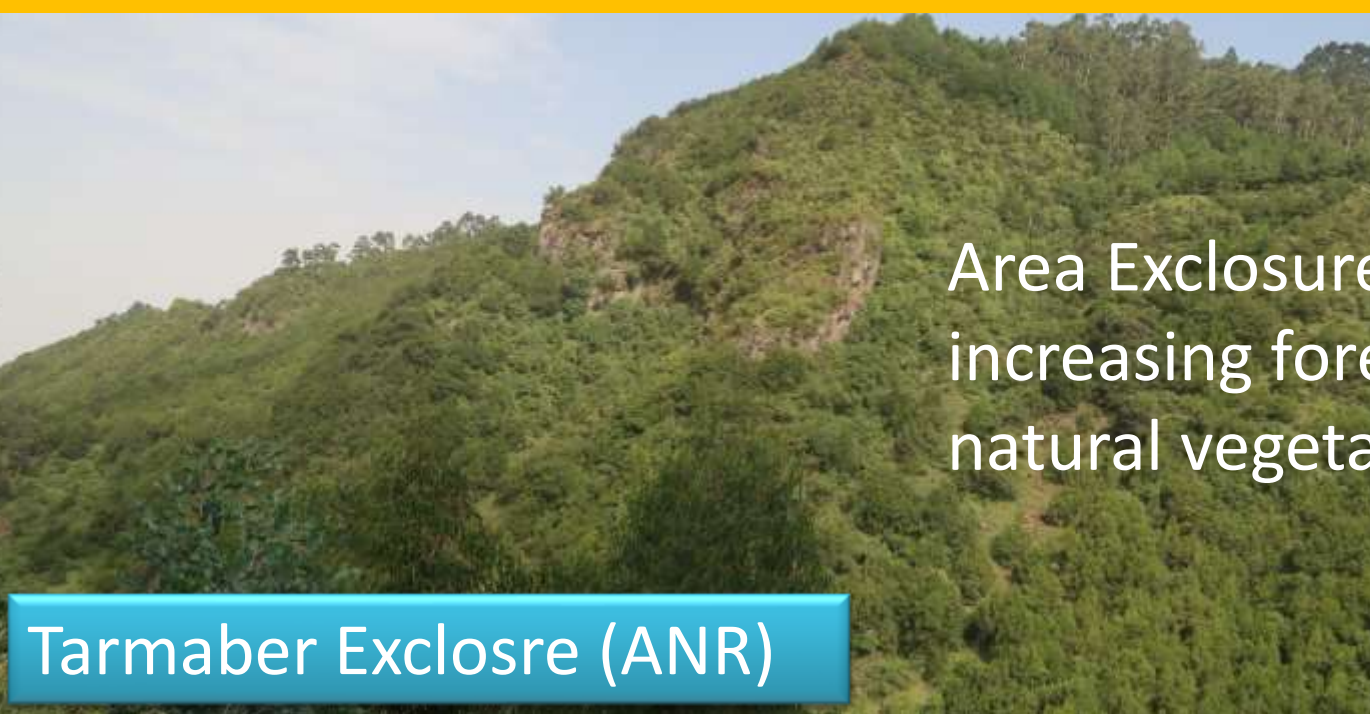
Political commitment to scale up restoration successes is growing!

22 countries have made commitments including:

Niger	1 million hectares
Ghana	2 million hectares
Ethiopia	15 million hectares
Kenya	5 million hectares
Uganda	2.5 million hectares
Rwanda	2 million hectares

Total commitments are now over **59 m hectares** by countries in West, Central, East and Southern Africa.

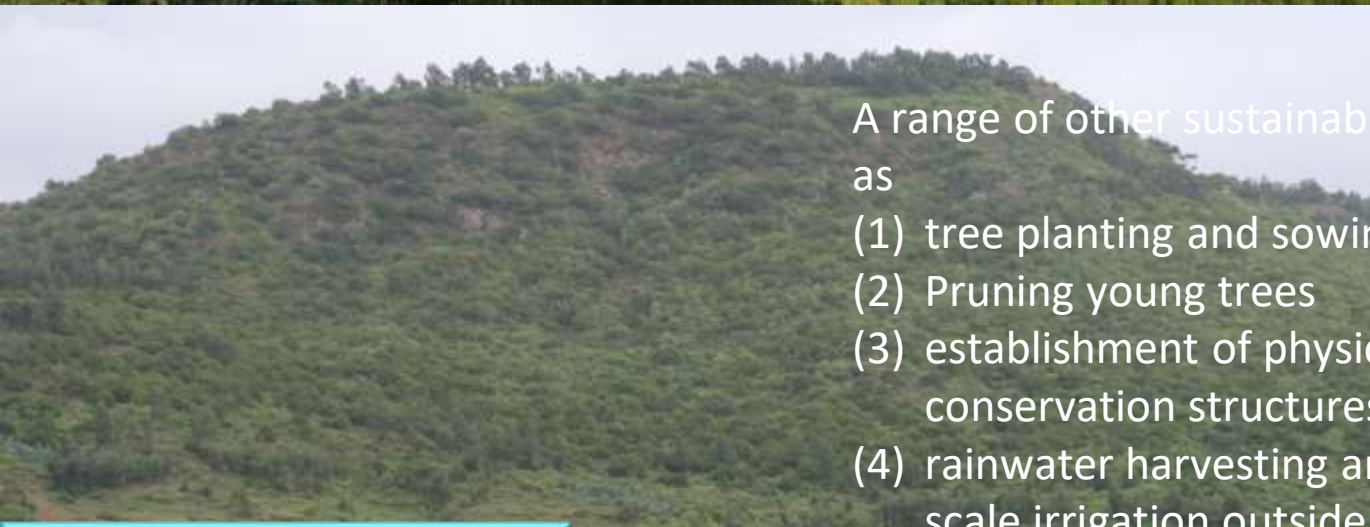
The aim of Area Enclosures is to prevent further degradation of the ecosystems, advance re-vegetation / forest regeneration, and restore the overall ecological conditions of the area.



Area Enclosure/Assisted Natural Regeneration – increasing forest cover through restoration of natural vegetation (instances from North Shewa)

Tarmaber Enclosure (ANR)

Efrata ANR

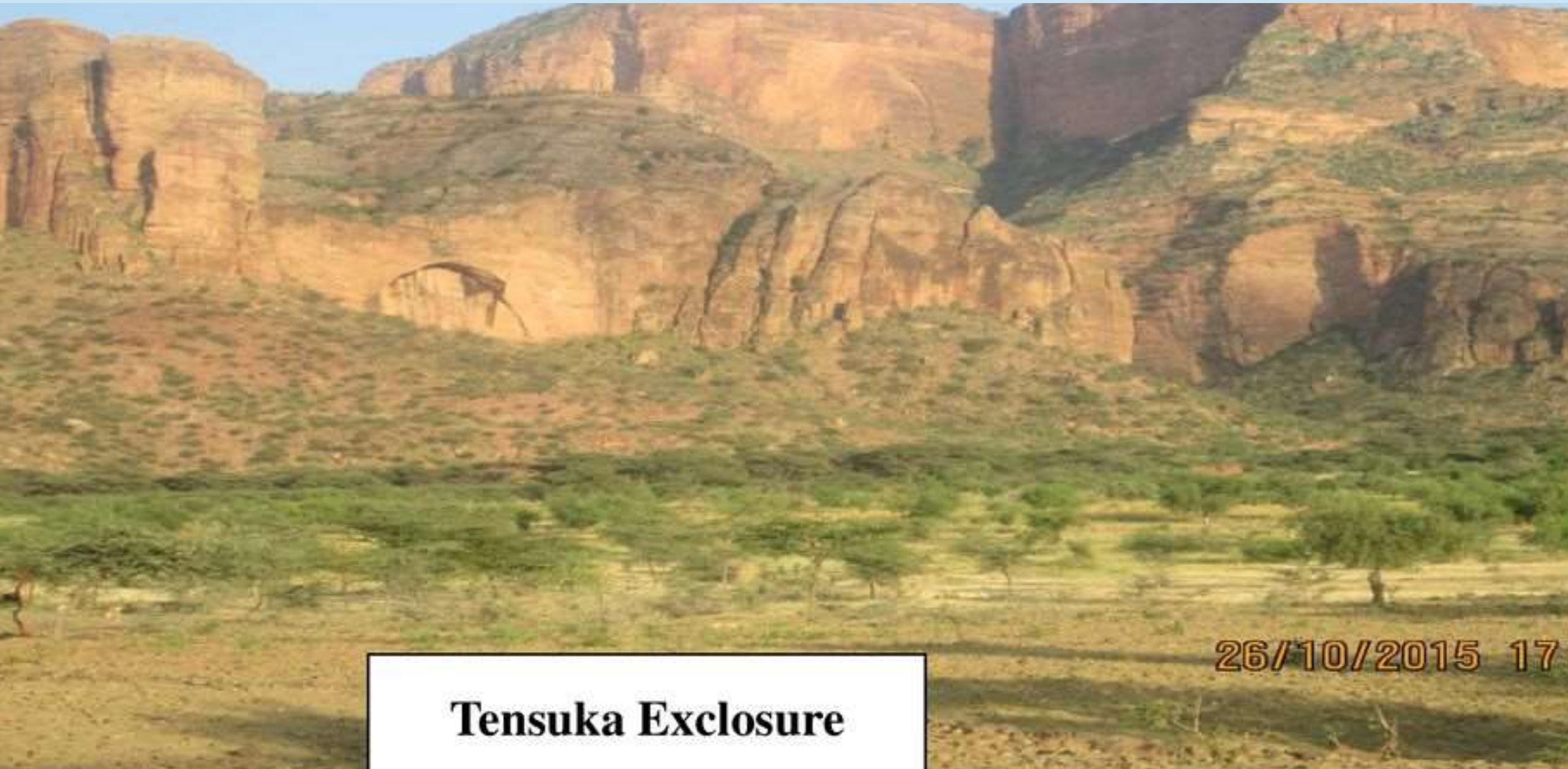


A range of other sustainable land management activities such as

- (1) tree planting and sowing grass seeds,
- (2) Pruning young trees
- (3) establishment of physical structures for soil and water conservation structures
- (4) rainwater harvesting and even support to conduct small-scale irrigation outside of the area closure are all included as part of a package approach

Ankober ANR

Reversing degradation is possible even under such poor condition



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Tensuka Exclosure

Agroforestry development



Conclusions and way forward

- Dry forests support livelihoods of over 2 billion people globally. They are also uniquely rich in floral and faunal diversity, and suitable for game reserves and national parks.
- The regenerative potential of dry forest through natural succession is high given lowered pressure from human and livestock population
- The dry forests, despite their important socio-economic and ecological benefits, but receive little attention and thus are poorly managed.
- As a way forward the following are recommended:
 - Update legal and institutional frameworks for forest management and practices in drylands (appropriate policies, updating legal framework, strong and sustainable institutions, etc)
 - Expand forest cover through restoration and optimize forest landscape conservation (reserves and parks as strategies)
 - Improve enabling conditions for actors in forestry, and make interventions to reduce degradation and loss of drylands such as alternative energy to fuelwood, charcoal, efficient biomass burning technologies, use of efficient charcoal kilns, etc

Conclusions and way forward

- Regularly assess and improve the economic environment for forest production (assess and monitor the demand for non-wood forest products, and encouraging measures to adjust production in line with demand; encouraging the private sector's participation in enhancing production)
- Identify protection forests and plantations, and incorporate them into land-use management and village land planning, etc)
- Implement silviculture and sustainable forest management practices and selecting the most appropriate species (use of natural regeneration, assisted natural regeneration, enrichment planting, vegetative propagation, forestry extension, machinery ploughing for water economy for plantations, regulated use)
- Enhance awareness raising, education and capacity building
- Promote dry forests among the public and policy marketers (the invisibility of dry forests to policy maker)
- Support traditional conservation and management methods and promote benefit sharing from conservation revenues.