



Food and Agriculture Organization
of the United Nations

BUILDING AFRICA'S GREAT GREEN WALL

RESTORING DEGRADED DRYLANDS FOR STRONGER AND
MORE RESILIENT COMMUNITIES

Restoration needs and opportunities in Africa's Great Green Wall have been mapped and quantified for the first time with the aim of catalysing action to increase the resilience of people and landscapes to climate change



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THE GREAT GREEN WALL FOR THE SAHARA AND THE SAHEL INITIATIVE (GGWSSI or GGW as referred to hereafter) is Africa's flagship initiative to build **prosperity and resilience** in over 20 countries around the Sahara. It was built to **combat the effects of climate change and desertification** and address food insecurity and poverty. Endorsed by the African Union in 2007 as a game-changer in Africa's drylands, the initiative aims to transform the lives of millions of people by creating a **great mosaic of green and productive landscapes across North Africa, Sahel and the Horn**. A wide range of actors and stakeholders in African countries north and south of the Sahara are involved, and many international organizations are lending their support.

Countries have made **land restoration a priority** in the GGW regional harmonized strategy, as well as in their national strategies and action plans. Early results show that degraded lands can be restored, but these achievements pale in comparison with what is needed.

This brochure contributes to the understanding of what is needed in terms of restoration in the GGW area, considering primarily tree-based systems. **It charts the size and provides a regional overview of the restoration challenge and opportunities**, drawing on data collected on trees, forests and land use in the context of the Global Drylands Assessment conducted by FAO and partners in 2015–2016.

GREAT GREEN WALL IN NUMBERS

780 MILLION The size, in hectares, of the GGW core area – **more than 2 times bigger than India**. The GGW core area comprises the arid and semiarid zones that surround the Sahara and on either side of the isohyet marking an average annual rainfall of 400 mm.

232 MILLION The number of people living in the GGW core area. In total, the drylands of North Africa, Sahel and the Horn (including all four aridity zones) are home to half a billion people. Almost half the drylands population lives in the GGW core area (the arid and semiarid zones).

21 % The proportion of land in the GGW core area in need of restoration. The 166 million hectares with inadequate tree cover include croplands, forests, wetlands and settlements. The estimate does not include grasslands or other lands (i.e. rocks) for which tree cover is a poor indicator of restoration opportunity.

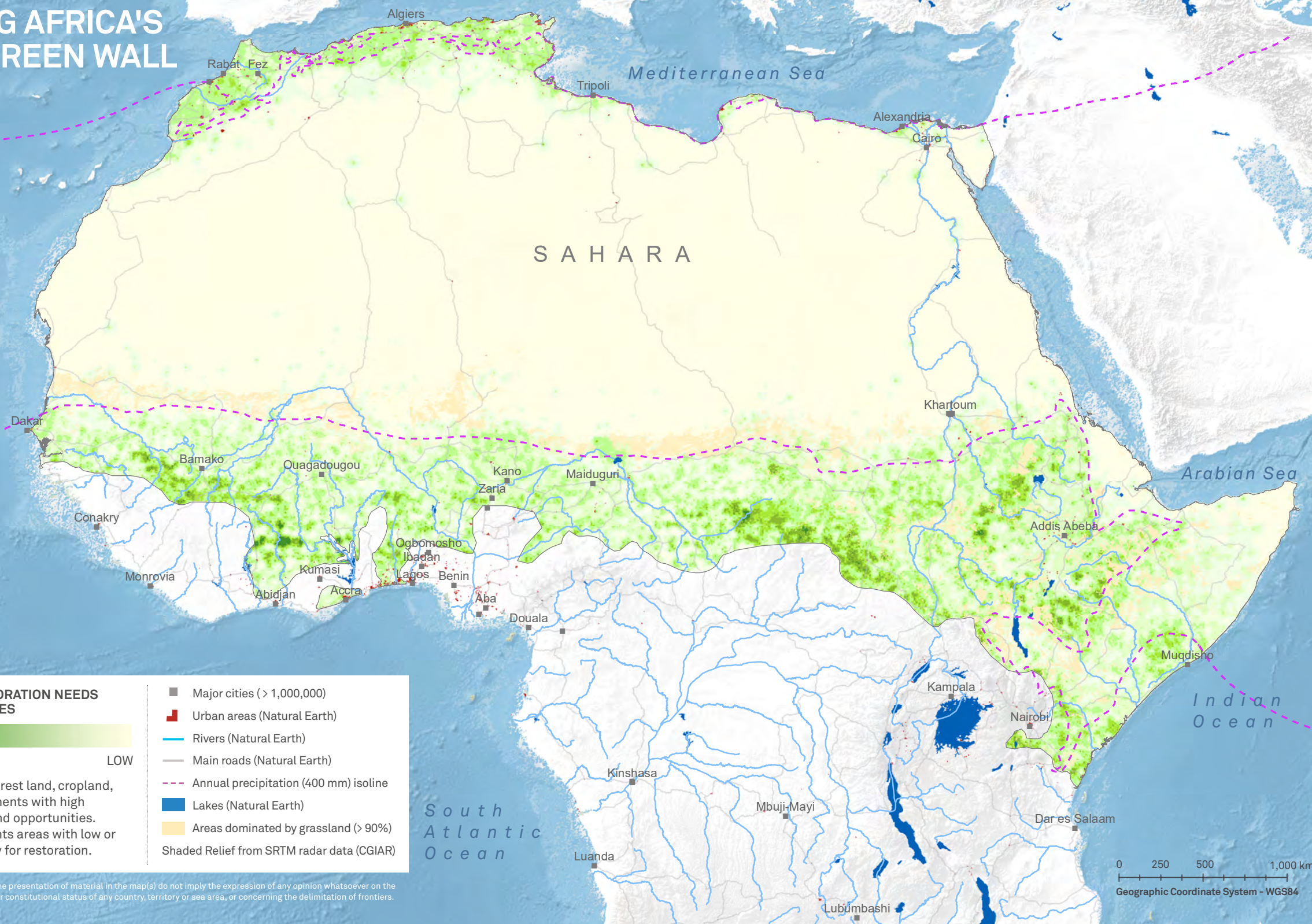
10 MILLION The average number of hectares that need to be restored each year in the GGW core area to meet SDG 15.3 by 2030. **One-quarter** of this area is in the arid zone and **three-quarters** is in the semiarid zone.

2012 The year in which concerned countries and partners adopted the GGW harmonized regional strategy. The African Union endorsed the strategy in 2013.



BUILDING AFRICA'S GREAT GREEN WALL

North Atlantic Ocean



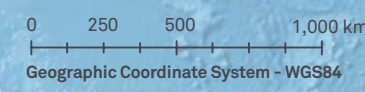
LANDSCAPE RESTORATION NEEDS AND OPPORTUNITIES

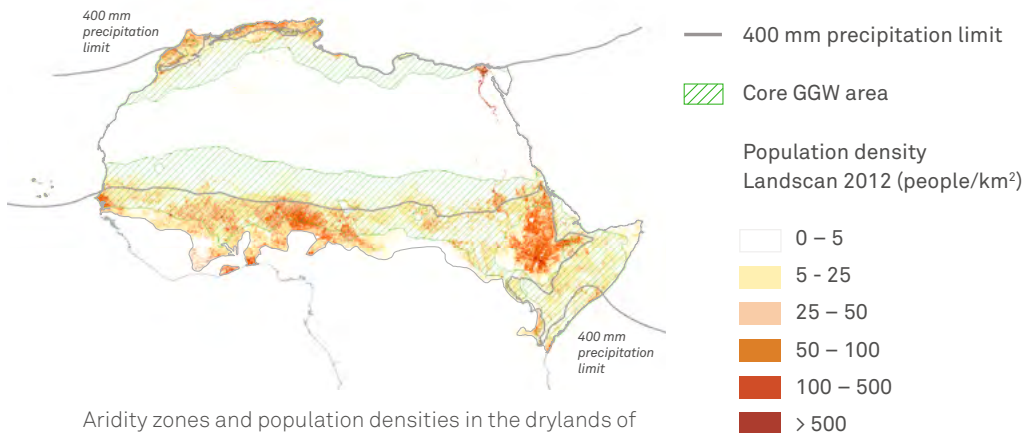


Dark green shows forest land, cropland, wetland and settlements with high restoration needs and opportunities. Light green represents areas with low or no need/opportunity for restoration.

- Major cities (> 1,000,000)
- Urban areas (Natural Earth)
- Rivers (Natural Earth)
- Main roads (Natural Earth)
- Annual precipitation (400 mm) isohet
- Lakes (Natural Earth)
- Areas dominated by grassland (> 90%)
- Shaded Relief from SRTM radar data (CGIAR)

The designations employed and the presentation of material in the map(s) do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers. Source: FAO (2016).





Aridity zones and population densities in the drylands of North Africa, Sahel and the Horn. The total population in the region is about 500 million people.

Source: LandScan (2012)TM High Resolution Global Population Data Set (adjusted by the United Nations).

EXTENT OF RESTORATION

The drylands of North Africa, Sahel and the Horn (including hyperarid, arid, semiarid and dry subhumid zones¹) cover an estimated **1679 million hectares** and are home to approximately **500 million people**.

In their GGW regional harmonized strategy, countries take the line of 400 millimetres rainfall as their reference for interventions. The area within this line amounts to **1176 million hectares** (70 percent of drylands in the region), of which the hyperarid zone, or desert, comprises more than half, or 665 million hectares.

This brochure presents a map of restoration opportunities across the drylands of North Africa, Sahel and the Horn and an analysis for the arid and semiarid zones around the Sahara, called the GGW core area, covering **780 million hectares** and home to **232 million people**.

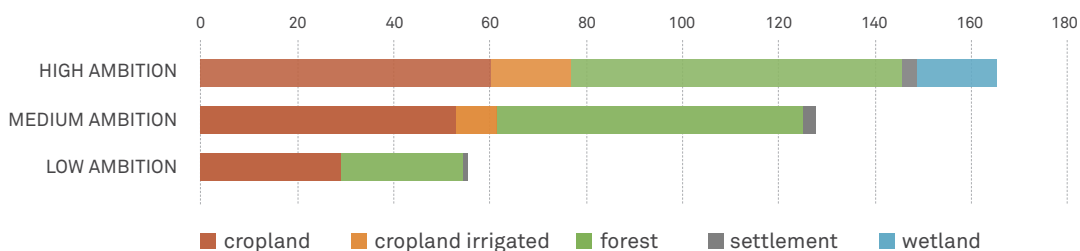
The assessment shows that **166 million hectares** of the GGW core area provide opportunities for restoration. Therefore, if Sustainable Development

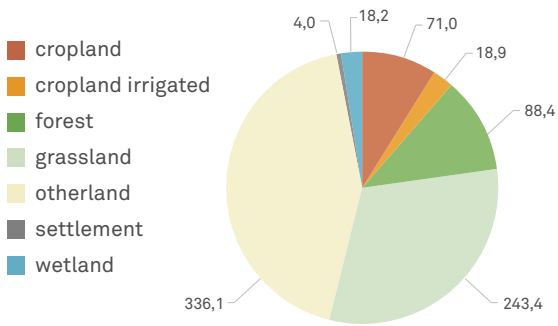
Goal (SDG) 15.3² is to be achieved by 2030, some **10 million hectares** will need to be restored each year across the GGW core area alone.

RESTORATION AMBITIONS

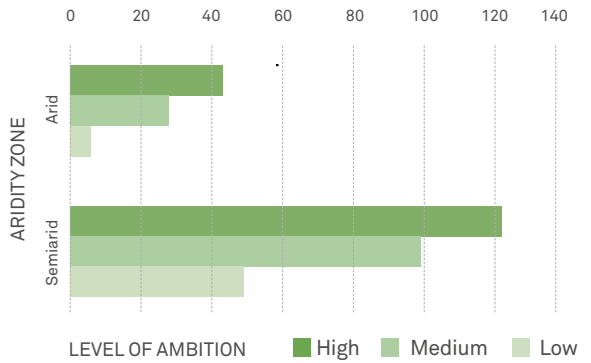
Drylands with more trees generally perform better in terms of productivity, ecological function and resilience than landscapes with fewer trees (with grasslands a notable exception). Landscapes where tree-cover density is below that of landscapes with the same aridity³ and land use⁴, or comparable landscapes, can be taken as having opportunities for restoration.

Three scenarios were formulated, representing levels of desirable tree-cover density: 1) High ambition – restore up to the average tree-cover density across the better half of comparable landscapes⁵: 166 million hectares. 2) Medium ambition – restore up to the average tree cover density across all comparable landscapes⁶: 128 million hectares. 3) Low ambition – restore up to the average tree-cover density of the less good half of comparable landscapes⁷: 56 million hectares.





Land use (million hectares) in the core GGW area (arid and semiarid zones). The total area is 780 million hectares. Source: FAO (2016).



Restoration scenarios for the GGW core area (million hectares). Scenarios show the area of land with tree cover below the level of ambition.

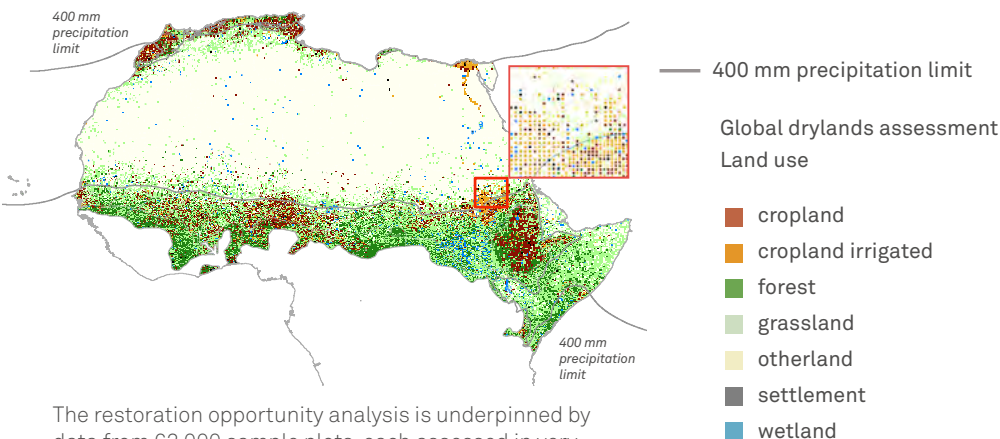
HOW THE MAP OF RESTORATION OPPORTUNITIES WAS MADE

Data on tree-cover density were obtained from about 63 000 half-hectare sample plots spread across the drylands around the Sahara (North Africa, Sahel and the Horn). Local experts used the Open Foris Collect Earth tool to assess tree-cover density and land use by manually interpreting the mostly very-high-resolution satellite images available in Google Earth Engine and Bing Maps. The data were collected as part of the Global Drylands Assessment (FAO, 2016). Mathematical interpolation was used to generalize measurements made at specific points into wider estimates of area.

Tree-cover density is a poor indicator of restoration opportunities in landscapes where grasslands and other lands (i.e. desert) dominate, and no suitable data were available on the locations of oases. These land-use types, therefore, were not assessed for restoration opportunity.

HOW TO INTERPRET THE MAP

The results are preliminary. The map indicates potential for restoration and is intended to catalyse commitment and action among implementers and investors. The accuracy and precision of the map are insufficient for operational planning or project-level decision-making. These preliminary results should be developed further at the country level.



The restoration opportunity analysis is underpinned by data from 63 000 sample plots, each assessed in very-high-resolution satellite images by local experts using the Open Foris Collect Earth tool.



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RESTORATION INTERVENTIONS

Restoration in the GGW is implemented at the landscape scale and across land uses and production systems (e.g. forests, agroforestry, croplands, grasslands, and pastoral and fishery systems). It involves many sectors and groups, and it puts communities – and their livelihoods – at the centre. Restoration must be understood, planned and tackled along the entire value chain, from land and seed to end products and markets. Restoration success requires the following conditions: supportive policies; good governance; sufficient technical, operational and financial capacities; incentives for communities to sustain their actions; and continuous monitoring and learning. Actions required include:

- **Promoting natural regeneration**, in which farmers protect and manage the natural regeneration of native species in forests, croplands and grasslands (most likely to be effective in the dry subhumid and semiarid zones).
- **Investing in large-scale land preparation and enrichment planting** where degradation is so severe that natural vegetation will not regenerate on its own; communities select the native woody and grass species to be used (most likely to be required in the arid and semi-arid zones).
- **Fighting sand encroachment by establishing and protecting** native woody and grassy vegetation adapted to sandy and arid environments (most likely to be required in the hyperarid zone).

- **Mobilizing high-quality seeds and planting materials** of well-adapted native species to build ecological and social resilience.
- **Developing comprehensive value chains** that benefit local communities and countries and enable the flourishing of green economies and enterprises.
- **Building inexpensive, participatory information systems** to support baseline assessments, identify interventions, track progress, inform stakeholders and investors, and aid learning and adaptive management.

For a more complete menu of interventions see:

- **WOCAT database** (www.wocat.net/en/knowledge-base.html)
- **TerrAfrica's "Sustainable Land Management in Practice – Guidelines and Best Practice for Sub-Saharan Africa"** (www.fao.org/docrep/014/i1861e/i1861e.pdf)

NEXT STEPS

- Assess oasis systems and grasslands for restoration opportunities.
- Invite countries to publicly commit to restoring quantified areas.
- Ensure that investors are ready to respond to country commitments.
- Ensure that expert organizations are standing by to support countries.

AUTHORS

Nora Berrahmouni, Lars Laestadius, Antonio Martucci, Danilo Mollicone, Chiara Patriarca and Moctar Sacande.

Experts from countries and regional and international partner organizations involved in the implementation and monitoring of the GGW initiative provided comments and inputs on a draft version of the map at the third Africa Drylands Week in Windhoek, Namibia, in August 2016 and at the TerrAfrica meeting in Nairobi, Kenya, in October 2016. Dennis Garrity (ICRAF), Philippe Dardel and Steve Danyo (World Bank) and Jonathan Davies (IUCN) encouraged the work and provided additional comments. Antonio Martucci produced the maps, Alastair Sarre edited the text, and Maria Cappadozzi designed the brochure.

CONTACT

Maarten Roest | maarten.roest@fao.org
Communications expert

MORE INFORMATION

Action Against Desertification

www.fao.org/in-action/action-against-desertification/en

Dryland forestry

www.fao.org/dryland-forestry/en

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The data collection and map development for the GGW area is a collaborative effort of the African Union, the CILSS/AGRHYMET Regional Centre, the Directorate General of Forests (Tunisia), Addis Ababa University (Ethiopia), FAO, Google and the World Resources Institute.

- 1 As defined by UNEP, drylands are lands where the ratio of annual precipitation and mean annual potential evapotranspiration, also known as the aridity index (AI), is less than 0.65. Drylands are divided into four zones based on the aridity index: hyperarid ($AI < 0.05$); arid ($0.05 \leq AI < 0.2$); semiarid ($0.2 \leq AI < 0.5$) and dry subhumid ($0.5 \leq AI < 0.65$).
- 2 SDG 15.3: "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world."
- 3 The median value of all plots with above-average tree cover.
- 4 The third quartile of all plots.
- 5 The third quartile of all plots with below-average tree cover.
- 6 As defined by UNEP-WCMC (2007). Aridity is the relationship between annual rainfall and potential evapotranspiration.
- 7 As defined by IPCC (2006).

