DIIS WORKING PAPER 2022: 02

An overview and lessons learnt

THE GREAT GREEN WALL

Marie Ladekjær Gravesen and Mikkel Funder

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THE GREAT GREEN WALL

Marie Ladekjær Gravesen and Mikkel Funder

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ABSTRACT

This DIIS Working Paper provides a broad overview of the Great Green Wall initiative to draw out lessons learnt from the first half of the programme. Overall, the authors find it unrealistic for the Great Green Wall to significantly alter root causes of migration and conflict in the Sahel region and the programme cannot be considered a nature-based solution (NbS) in its entirety. However, the paper recommends wider use of the International Union for Conservation of Nature (IUCN) criteria for NbS in the Great Green Wall's subprojects. This would ensure inclusion of stakeholders and expand consideration to rights and access when changes in tenure are implemented as part of tree planting. Collaboration with national level organisations, who understand contextualised livelihood vulnerabilities, is also recommended. Moreover, overall support to the GGW through the Global Environment Facility, the Green Climate Fund etc. should promote improved coordination of activities and consistent monitoring across partner countries and subprojects. More qualitative analyses of project site contexts should also be included among monitoring tools.

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LIST OF ABBREVIATIONS

ADB	Agence Française de Développement
AFD	African Development Bank
ARR	Afforestation, Reforestation and Revegetation
AU	African Union
BRICKS	Building Resilience through Innovation, Communication and Knowledge Services
COP	Conferences of the Parties
DEFRA	Department for Environment, Food and Rural Affairs
FAO	Food and Agriculture Organisation of the United Nations
FLEUVE	Local Environmental Coalition for a Green Union
GCF	Green Climate Fund
GEF	Global Environment Facility
GGW	Great Green Wall
GGWC	Great Green Wall for Cities
GM	Global Mechanism
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
ISDCU	Integrated Sustainable Development Community Units
IUCN	International Union for Conservation of Nature
MoFA	Ministry of Foreign Affairs
NbS	Nature-based Solutions
NRM	Natural Resource Management
NTFP	Non-timber Forest Product
ODA	Official Development Assistance
PAAGGW	Pan Africa Agency for the Great Green Wall
SAWAP	Sahel and West Africa Programme
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
WADB	West African Development Bank
WB	World Bank

SUMMARY

This DIIS Working Paper forms part of a broader study conducted by DIIS with funding from Denmark's Ministry of Foreign Affairs on selected aspects of Nature-based Solutions (NbS). It accompanies two other DIIS Working Papers, one addressing ecosystem-based adaptation (Gravesen and Funder, 2021) and another focusing on community-based biodiversity conservation (Funder and Gravesen, 2021).

The present paper provides a broad overview of the Great Green Wall initiative—a major greening initiative that has set out to restore 100 million hectares of degraded land across the conflict-ridden regions of Sahel, North Africa and the Horn of Africa. Based on the overview, the working paper draws out the following initial lessons learnt and recommendations for further Danish support and involvement:

1. Support a wider implementation of the IUCN criteria for Nature-based Solutions. Specifically, Denmark should support country level NbS subprojects under the GGW umbrella that fully live up to the IUCN criteria.

2. Acknowledge that the GGW cannot eliminate the drivers of conflicts and migration in the Sahel region. At best, targeted efforts in subprojects may prevent conflicts from escalating and may also protect people against involuntary migration. However, even those results necessitate further focus on rights, governance and the wider inclusion of stakeholders.

3. Support approaches and organisations that have a strong focus on and understanding of contextualised livelihood vulnerabilities, rather than on generalised assumptions that fit other contexts in the region. Local conditions and socio-ecological contexts can differ fundamentally even between neighbouring communities.

4. Enhance emphasis on supporting natural resource governance mechanisms, including at local levels, to avoid elite capture, competition and unequal benefits. Schemes that seek to compensate for excluded access to resources should be extended and wider understandings of dynamics between user groups should be operationalised. As such, project sites should be understood as the political arenas they are, with multiple interest groups and opposing agendas.

5. Expand the focus on rights and access with wider considerations to land tenure arrangements of land designated for GGW implementation, including awareness of who becomes excluded from access when land with wider systems for access, passage and use is privatised, and at times even fenced, to accommodate tree planting. Specifically, pastoralists and women should be included and considered in project planning and implementation as important local user groups to a much higher degree.

Pastoralists and women are considered among the most vulnerable groups in the GGW region and are easily marginalised in land privatisations.

6. Improve the GGW megaproject's overall coordination, especially with regard to the development of consistent metrics and tools for monitoring and assessing outcomes and outputs related to natural resource management (NRM). These should go beyond technical successes and include qualitative socio-ecological analyses of contexts around project sites. Such metrics should apply to the public sector engagements as well as the private sector. This agenda should be pushed forward via Denmark's GGW support through the large bodies of GEF, GCF etc.

7. Nurture conducive environments for private sector investment by

    a. supporting community groups with market-oriented activities related to non-timber forest products (NTFPs)—following some of the successful, albeit anecdotal, cases (see Box 3)

    b. working to develop markets for NTFPs both on the local, regional and transcontinental levels

    c. improving links between communities in implementation areas and private sector partners who seek to meet the increased demand for natural dryland products, for instance in European wholefoods markets

INTRODUCTION

The UN has declared the years 2021 to 2030 as the Decade for Ecosystem Restoration. The year 2030 has been hailed as an important target point for CO_2 emission cuts in the most recent Intergovernmental Panel on Climate Change (IPCC) report, as well as at the COP26. This same year has also been set as the year of finalisation for the Great Green Wall (GGW).

The GGW is a major greening initiative that has set out to restore 100 million hectares of degraded land across the conflict-ridden regions of Sahel, North Africa and the Horn of Africa. The initiative initially aimed to establish a green barrier, 8000 km long and 15 km wide, stretching from Senegal in the west to Djibouti in the east but has since expanded in scope both geographically and thematically. The aim is to plant 100 million hectares of range and drylands trees and other types of vegetation, sequester 250 million tons of carbon and create 10 million local green jobs and income generating activities among affected communities.

The GGW is, thereby, the most ambitious afforestation, reforestation and revegetation (ARR) programme in sub-Saharan Africa (Turner et al., 2021). It represents an example of recent attempts to initiate 'green megaprojects' that cut across large geographical regions and involve multiple actors. As such it exemplifies a programme which seeks to engage a number of key issues and challenges related to Nature-based Solutions (NbS) on a grand scale. It should be noted that the GGW cannot, as a whole, be said to comprise an NbS initiative—partly because the concept is not officially adopted by the GGW, and partly because it fails to address key criteria in the IUCN's Global Standards for NbS (see Discussion section) (IUCN, 2020 a, 2020 b). However, at an abstract level the GGW is based on similar assumptions to that of NbS; i.e. that ecological resilience is tied to social and economic resilience, and in principle aligns with the overall concept of NbS as *'actions to protect, sustainably manage and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefit'* (Cohen-Shacham et al, 2016: 2).

The progress and lessons learnt from the GGW are of relevance to donors who support NbS both in Sahel and more widely. This includes Denmark, whose strategy for development cooperation highlights the importance of NbS as a means to address *'challenges such as climate change, biodiversity loss, food insecurity, poverty and access to water'.* (MoFA/Danida, 2021: 35). These challenges are highly prevalent in the Sahel region, sometimes in settings characterised by insecurity and armed conflict. This has led to a growing interest in the GGW as a means to address perceived fragility issues, e.g. conflicts between and among pastoralists and farmers over water and land, and tensions emanating from displacement as a result of food insecurity.

Denmark has a long history of bilateral and regional support to NRM and livelihoods in the Sahel, with a growing emphasis on issues related to climate change and fragility. Direct involvement with the GGW has been limited, and the emphasis on NbS in Danish development cooperation is relatively new. However,

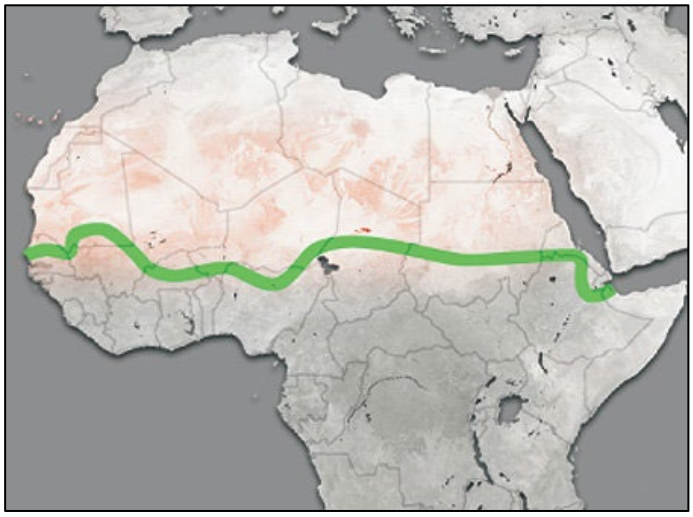
Denmark will support the trust fund for the UN Decade on Ecosystem Restoration in 2022, wherein the GGW is one of the flagship projects. Indirectly, Denmark has also previously supported the GGW through support from the EU, the GEF and the GCF.

Based on a literature review, this paper seeks to provide a general overview of the evolution of the GGW and examines how scholars and experts assess the GGW and its progress at the current stage. The GGW has recently gained attention in international media, and pledges of further financial support have been provided in 2021 by a variety of partners, such as Food and Agriculture Organisation of the United Nations (FAO), IUCN and the World Bank (see Table 1). However, the initiative has also encountered challenges. With its inception in 2007 the GGW is now halfway through to its projected finalisation in 2030 and only 4% of the wall has been completed (4 million hectares). Observers point to a need for more technical support, more funds and better oversight of the multitude of activities.

It should be noted that the aim of this working paper is to provide a broad overview of the GGW and draw out initial lessons learnt. The working paper should not be read as a full contextual analysis of the GGW initiative in its entirety, and does not go into detailed examination of wider approaches to forestation and land regeneration in the Sahel. A substantial body of literature exists on the latter, including on the region's experiences with farmer-managed land restoration (Chomba et al., 2020; Lohbeck et al., 2020; Reij et al., 2020); agroforesty (Hanan, 2018; Sanou et al., 2019); community forestry (Duguma et al., 2018) and adaptation (Abberton et al., 2021; Jellason et al., 2021; Mertz et al., 2011).

This working paper forms part of a broader study conducted by DIIS with funding from Denmark's Ministry of Foreign Affairs on selected aspects of Nature-based Solutions (NbS). It accompanies two other working papers, one addressing ecosystem-based adaptation (Gravesen and Funder, 2021) and another focusing on community-based biodiversity conservation (Funder and Gravesen, 2021).

Figure 1. The Great Green Wall



Source: (The Dong-A Ilbo, 2020)

Box 1. Overview and objectives of the Great Green Wall initiative

The Great Green Wall was first endorsed by African Heads of State in 2007. The original vision of the GGW project was to create a 15-km-wide vegetation barrier over a length of at least 7000 km (later updated to 8000 km) along the Sahel. As the initiative has developed, the aims and approach of the GGW have shifted towards a broader integrated ecosystem management approach, emphasising support to a mosaic of sustainable land use and production systems across the region and involving activities such as dryland management, regeneration of vegetation, water retention and ecosystem conservation.

Due to the multiple countries, partners and programmes involved, a large variety of stated objectives and outcomes exist within activities that support the GGW. These do not always align, and in some cases, there appear to be inconsistencies and ambivalence between the various objectives of different partners (e.g. the expanded geographical scope discussed below does not seem to be shared by all partners).

However, a set of overall common aims have been established. In 2012 a project within the African Union sought to develop a so-called 'harmonised strategy' for the GGW across the region (GGWSSI, no date), with the following overall goal:

To improve resilience to climate change of human and natural systems in Sahel-Saharan zones through sound ecosystem management and sustainable development of resources, safeguarding of material and immaterial rural heritage and enhancement of the quality of life and livelihoods of communities.

Specific objectives of the harmonised strategy are:

• improve the living conditions of people in the arid zones of Africa and reduce their vulnerability to climate change, climate variability and drought

• improve the state and health of ecosystems in the arid zones of Africa and their resilience to climate change, climate variability and drought

• mobilise resources for the implementation of the Great Green Wall initiative through the establishment of efficient partnerships between national and international stakeholders

In 2020, the first overall status report on GGW implementation (UNCDD, 2020) established three specific objectives to be achieved by 2030, namely:

- restore 100 million hectares of currently degraded land;
- sequester 250 million tonnes of carbon;
- create 10 million green jobs and income generating activities in rural areas*.

**By 'green jobs' the GGW refers to employment generated directly through GGW initiatives in agricultural and natural resource sectors. Examples include marketing of NTFPs; establishment of horticultural production and vegetable gardens; incense and gum production. It should be noted that job creation in GGW parlance includes both long- and short-term jobs, the latter including e.g. day labour for tree planting (APGMV, 2018).*

Source: (The Dong-A Ilbo, 2020)

Background: what inspired the Great Green Wall project?

The idea of a Great Green Wall can be traced back to 1927, when French colonial forester Louis Lavauden devised the term desertification to describe how deforestation, overgrazing and land degradation in arid areas were causing deserts to spread. In 1952 the English colonial forester Richard St. Barbe Baker proposed that a 50-km-wide 'green front' of trees be raised to contain desertification. The idea gained recognition in the 1970s and 1980s when severe droughts hit the Sahel and Horn of Africa (Laestadius, 2017). Moreover, Burkina Faso's former president, Thomas Sankara, hailed the idea of a green wall across the Sahel as part of the Pan African ideology.

The idea of a green barrier as a tool to prevent desertification was also prevalent elsewhere on the continent already in the 1970s. In 1977, Wangari Mathai, the first African woman to receive the Nobel Peace Prize in 2004, founded the Green Belt Movement in Kenya. The movement planted and grew 51 million trees in Kenya's three major mountain ecosystems: the Aberdares, Mt. Kenya and the Mau Complex. However, the primary aim was not to prevent desertification, but to respond to the growing food and water insecurity among rural Kenyan women (The Green Belt Movement, 2021). The tree planting was used to promote alternative use of the forest, providing possibilities to diversify the income of a household with different types of forest products. The Green Belt Movement stands today as a success story in terms of reforestation. Studies have placed different emphasis on why it succeeded, but commonly highlight its emphasis on linking tree planting to livelihoods and increasingly also to rights, thereby generating both tangible benefits and a broader cause for social mobilisation (DeLap, 2013; Hunt, 2014; Michaelson, 1994). The movement has sparked considerations of replicability in other vulnerable rural socio-ecological contexts. Supposedly, Fiji and Haiti have also carried out reforestation projects mirroring the Green Belt Movement (Tate, 2019; The Green Belt Movement, 2021).

Other green wall initiatives include the Three-North Shelterbelt project, also known as the great green wall of China. Initiated in 1978, the plan was to raise a 4,480-km-long wall of trees spanning through thirteen provinces of China. The reforestation project was designed to stop the Gobi Desert from advancing and mitigate the sandstorms that send thick sand dust into the streets of Beijing. So far, 35 million hectares of land has been reforested in 20 years. The initiative is set to reach the goal of increasing the world's forest cover by 10% in 2050. In concert with tree planting efforts, the project contains grazing bans and restricted lumber practices in degraded areas and incentives for planting certain crops (Chen Ratilla, 2019). Despite certain successes in areas with high amounts of local ownership, the Three-North Shelterbelt project has so far not been able to decrease the sandstorms. On farms on the fringes, families are experiencing between three and ten sandstorms per month, bringing detrimental consequences to crops and infrastructure. The worsening economic and health-related pressure on these households push many to join the stream of climate refugees who move to the cities. As for the tree planting, the trees have mostly been monocropping with a majority of poplar trees. Poplar trees are water intensive species that are quick to

extract the water from the soil. This meant that the planting of poplar to some extent accelerated the desertification rather than containing it. In addition, the monocropping made the project vulnerable to pests and disease, and in this case the Asian woodworm damaged tens of thousands of hectares of the planted poplar trees (Tischler & Bressa, 2021). With reports in 2016 suggesting a survival rate of only 15% for trees planted in the region, China's Great Green Wall has so far been considered an example of what not to do (Chen Ratilla, 2019; Finke, 2017; Lao, 2016). As a lesson learnt, this project underlines the importance of designing megaprojects of this scale with diversification in mind, in the sense that it is never as simple as tree planting alone. Rather, biodiversity aspects and livelihood impacts should be at the core of the programme, as prescribed by the IUCN's Global Standards for NbS (IUCN, 2020 a, 2020 b).

Figure 2. The projected extent of China's Great Green Wall

Source: (O'Callaghan, 2014)

A SOUTH-INITIATED AND AFRICAN-LED ENDEAVOUR: THE GREAT GREEN WALL PROJECT

The GGW is formally implemented under the leadership of the African Union Commission (the secretariat of the AU) and the 'Pan African Agency of the Great Green Wall' (PAAGGW) established in 2010. The latter coordinates GGW activities at the regional level, while national GGW structures in participating countries are responsible for implementing the harmonised strategy through national action plans. The national plans are contextualised and tailored to each country's preferences and plans. At the local level, some countries have established local sustainable development committees and integrated sustainable development community units (ISDCUs) (PAAGGW, 2018).

Box 2. Phases of the Great Green Wall initiative since 2010

- The period 2011-2015 aimed at conceptualising the GGW, establishing organisational frameworks, developing national GGW plans and initiating pilot activities.
- The period 2014-2020 aimed at accelerating implementation.
- The period 2021-2025 aims to consolidate and scale up activities.
- The period 2026-2030 focuses on 'further upscaling the activities to ensure a substantial contribution of the GGW to the achievement of the Sustainable Development Goals and to international commitments of the member states under the Rio Conventions'.

Source: (UNCCD, 2020: 13)

A considerable range of international and national partners are involved in the implementation of GGW activities. The UN deputy secretary general, Amina Mohammed, has praised the initiative *'a new world wonder in the making'*, and highlighted the programme's uniqueness in that it works with nature rather than against it to produce viable and inclusive solutions to tackle climate change, desertification, poverty, conflict, migration and biodiversity loss. Table 4 in the Annex lists selected major partners. It should be noted that, alongside the formal organisational structures and plans, the GGW is increasingly applied as an umbrella term with which a number of local, national and regional initiatives and programmes associate themselves, without necessarily being jointly coordinated. Some programmes associated with the GGW also work beyond the Sahel.

As seen in Table 1 and 2, the GGW has been supported extensively by the Green Climate Fund (GCF), the Global Environment Facility (GEF) (GEF, 2019), the World Bank (WB, 2021), and the EU (see also Table 4 in the Annex for the list of major donors). Among other partners and donors are Agence Française de Développement (AFD), the African Development Bank (ADB), UNEP, The West African Development Bank (WADB), IUCN, IFAD, the European Investment fund as well as a range of smaller funds, regional institutions and private contributors. As such, the GGW is conceptualised as a partnership between different partner countries to, with support from international donor agencies, reduce desertification and land degradation (Sarr et al., 2021).

Table 1. Funding for multi-country GGW projects for the years 2011-2019 as reported by international donors

Project / Programme	Funding agency	Amount (million USD)
Action Against Desertification	FAO	41
FLEUVE	GM, EU	7.8
BRIDGES	Turkey, FAO	3.6
Large-scale Assessment	GEF, NASA/USAID, IUCN	13.3
Closing gaps in the GGW	GEF, IUCN	14
SAWAP	WB, GEF	786
BRICKS	WB, GEF	4.6
TOTAL		**870.3**

Source: UNCCD 2020: 29

Being a southern initiative led by African institutions, the GGW project has been sparking extensive interest among development partners. For instance, the UK government has been particularly interested in the region that the GGW travels through, having spent well over 100 million USD through GEF and GCF (COP26, 2021; Worley and Alcega, 2021)[1] [2]. Additionally, the UK presidency highlighted the challenge of deforestation by emphasising the protection and restoration of ecosystems during the COP26, as well as the shift to sustainable agriculture that does not lead to deforestation.

At the climate summit in Paris in 2015, donors pledged 4 billion USD in promised funding. However, by 2020, merely 870 million USD of these funds had been received (Benjaminsen et al., 2021; UNCCD, 2020). Following termination of some of the major GGW flagship programmes in recent years (e.g. the FLEUVE and SAWAP programmes), the Great Green Wall Accelerator programme was announced in early 2021. The Accelerator aims to facilitate and leverage donor funding, enhance stakeholder coordination and improve results monitoring. It will be coordinated by the PAAGGW, with initial support from the UNCCD. The Accelerator has five key pillars for investments (see Table 5 in the Annex). In addition, the GGW is highlighted by the agenda for the UN Convention on Desertification and the 2022 marking of the UN Decade on Ecosystem Restoration initiates a range of flagship programmes, out of which one of the first one is targeted directly towards the GGW.

[1] According to Andrea Ledward, International Biodiversity and Climate Director at UK Government's Department for Environment, Food and Rural Affairs (DEFRA) in speech at COP26 (COP26, 2021).

[2] Notably, at the G7 Summit in 2019, the UK government pledged to double their contribution to the GCF and allocate 1.44 billion GBP (GCF, 2019). Bilaterally, the UK government has also spent 360 million USD over the last 4 years in ten of the GGW partner countries, although all but three of the GGW countries (Nigeria, Sudan and Ethiopia) have been excluded from bilateral aid in the UK government's 2021-22 budget cuts reducing their national aid contribution from 0.7% to 0.5% of GDP. See list of countries not receiving UK ODA allocations in 2021-2022 (Worley and Alcega, 2021).

In extension of this, new announcements for funding have been forthcoming in 2021. According to a GGW technical brief, by January 2021 a total of 19 billion USD were pledged for the Accelerator for the period 2021-2025 (GGW/UNCDD, 2021). Table 4 (in the Annex) provides an overview of the thematic allocation of these funds, while Tables 2 and 3 below summarise some major pledges that were made by January 2021 as well as specific GGW projects that have been approved by the GCF Board in 2021. Private funding has included a commitment of 1 billion USD from Amazon founder Jeff Bezos, although it remains to be seen whether this is intended exclusively for the GGW (Felix, 2021).

Table 2. Major new pledges for the GGW

African Development Bank	Has pledged to mobilise 6.5 billion USD for the GGW over the period 2021-2025. This will draw on internal funding as well as external sources including the Sustainable Energy Fund for Africa and the Green Climate Fund.
The European Investment Bank	Has pledged 1 billion EUR over the period 2021-2025, including financing that can involve governments, the private sector and microfinance institutions further in the GGW initiative.
EU	Has pledged to raise 700+ million EUR annually until 2025, including support to environment, climate change and sustainable agriculture under the GGW initiative.
Green Climate Fund	Aims to leverage '1 billion USD in multi-partner resources for the GGW in 2021 and 2022' through projects and programmes submitted to the GCF board by accredited entities.
The French Development Agency	Has pledged 600 million EUR over the period 2021-2025.
World Bank	Has committed 5.6 billion USD to 60 projects in the 11 original countries of the Great Green Wall over the period 2020-2025.
GEF support	Pledges continued support, though no exact amount could be found.
IFAD	Pledges support, though no exact amount identified. At the recent COP 26, IFAD and the GCF committed funding for a 143 million USD investment programme named the Africa Integrated Climate Risk Management Programme.

Source: (GGW/UNCDD, 2021)

Table 3. Funding for GGW projects that were approved by the GCF Board in 2021

Project / Programme	Funding agency	Amount contributed by GCF (USD million)
Climate Risk Management Programme	GCF, IFAD	82.8
Desert to Power Programme	GCF, ADB	150
FP176	GCF, WADB	35
TOTAL		**267.8**

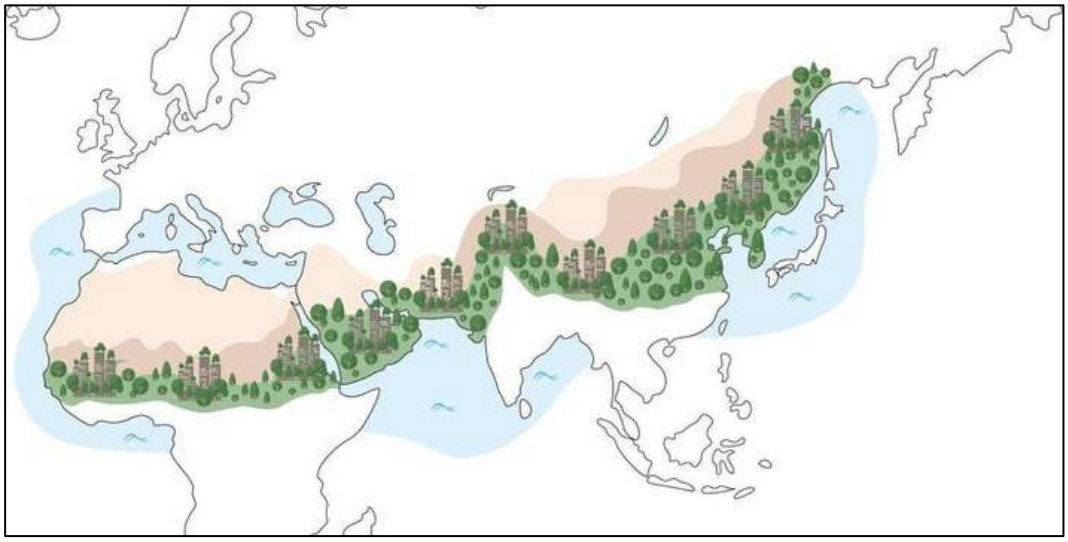
Source: (GCF, 2021)

A COMPELLING NARRATIVE

The GGW has inspired other large-scale transnational and even trans-continental initiatives, including FAO's 2019 launch of the Great Green Wall for Cities (GGWC) (see Figure 3 below). As an extension to the GGW, the GGWC is conceptualised as a Nature-based Solution for cities with the aim to create 500,000 hectares of new urban forest and restore 300,000 hectares of degraded urban forests in a belt stretching from the Sahel across the Arabian Peninsula to West and East Asia (FAO, 2019). Similar to the GGW, the GGWC is set to be finalised by 2030.

Whether a belt, a barrier or a wall, the idea of a fence line barricading advancing desert and degradation presents a compelling narrative. The examples in this and the previous section showcase an array of megaprojects that cross states and even continents, and all are founded on the narrative of a barricade. It seems to have been so widely used that it can be argued to be an approach to reforestation and regeneration in itself—a narrative for megaprojects that is arguably only more convincing when targeted towards the global need for action to tackle climate change.

Figure 3. The projected extent of the Great Green Wall for Cities



Source: (FAO, 2019)

CRITIQUE OF THE GGW NARRATIVE

A number of the narratives surrounding the GGW have been subject to debate and critique. There is a widespread narrative of the Sahara as a creeping disaster that develops slowly but steadily. Some reports point to an 11%-18% expansion of the Sahara in the 20th Century (Sacande et al., 2021). Indeed, there are striking examples in the Sahara Desert region of what looks to be expanding desertification. One example that is often used to illustrate the desert expansion narrative is the once third largest water body on the African continent, Lake Chad, that has reduced in size by 90% over the past 60 years (Risen Africa, 2021)[3]. This understanding of desert expansion is at the core of the GGW narrative, to which a barrier or wall is seen as a solution. This understanding builds on a definition of desertification that runs along UN's official definition, that desertification is land degradation in dryland areas that takes place based on a variety of factors, including people's mismanagement and climate change. It has, however, been argued that this definition is too absolute in its determination of the phenomenon as irreversible and does not take into consideration shifts in potential uses of the land and soil productivity (UN, 2021). Therefore, how desertification is occurring in the Sahel and what is curbing or enhancing its effects has been subject to extensive scholarly scrutinisation.

Universal spread or mosaic

In the academic literature, the idea that the desert as a whole is universally marching south and that people's poor land management practices is accelerating it has been subject to long-standing debate and critique (Turner et al., 2021;

[3] The surface extended 26,000 km² in the 1960s against less than 1,500 km² in 2021 (Risen Africa, 2021).

Hiernaux, 2016; Swift, 1996). Instead, many point out that the idea of the Sahara as a homogenous and consistent component is misunderstood. Many argue as Turner et al. that the *'geography of human-induced land degradation is more heterogeneous and localised to areas of significant year-round land-use pressures within the region"* (Turner et al., 2021: 2), meaning that the desert may indeed be expanding due to poor land management in some areas, whereas in others, a regreening has already been taking place, at times even initiated by the local farmers (Scoones and Toulmin, 2021). Nevertheless, the signs of climate change are undeniable and manyfold in the whole GGW region, particularly with increasing temperatures, growing variation in rainfall patterns and increasing episodes of extreme weather events.

A rigid solution for a shifting condition

The foundation for the GGW narrative, that the Sahara is expanding and that expansive tree planting would be able to stop it, has thus been challenged widely by scholars. Scoones and Toulmin argue that the degradation of dryland takes place through a highly complex interchange of different processes, and that dryland regions, including the Sahel, have had periods of greening and drying when looking at the landscapes through a long-term perspective of archaeological evidence. For that reason, an inflexible wall of trees may be an entirely ill-fitted and inadequate solution for the manifold challenges at hand. As Scoones and Toulmin point out: *'These are highly variable settings, where attempts at stability and control are futile, and livelihoods are best served through diversification, risk spreading and mobility'* (Scoones and Toulmin, 2021).

Local management practices and trees in the Sahel

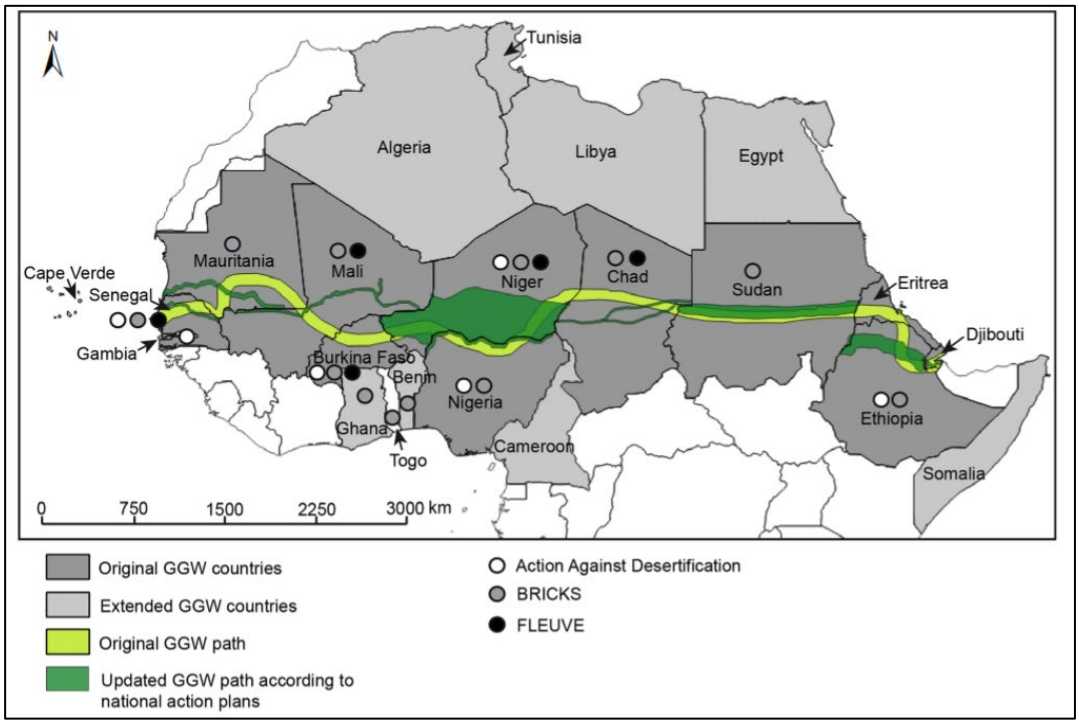
For these reasons, farming practices in the Sahelian landscape have typically also included trees to provide fruits and shade. They serve as a resting place for livestock when the sun is high midday and in turn the dung help sustain soil fertility and crop yields. Yet, such trees are typically not included in measurements of tree cover, since they are not positioned densely enough to be measured as forest. A new study indicates that there are indeed 1.8 billion more trees in the Sahara and the wider West African Sahelian region than previously assessed (Brandt et al., 2020). These trees merge with grasslands and farmlands as 'trees outside of forests'. It is therefore argued that since a natural regeneration of shrubs and trees is already taking place (see, for instance, Pye-Smith, 2013 for an example from Niger), regreening should include a wider set-up that ensures a reciprocal support system between the trees that are planted and the people whose livelihoods they are intended to support—a conceptualisation that is wider and more complex than tree planting alone (Scoones and Toulmin, 2021; Morrison, 2016).

CHANGING SCOPE AND EMPHASIS IN THE GREAT GREEN WALL

The geographical shift

The geographical coverage of the initiative has developed significantly since the project was initiated. Firstly, the path of the original 'wall' has changed as national plans developed (see Figure 4).

Figure 4. Evolving path of the original Green Wall and expansion of partner countries

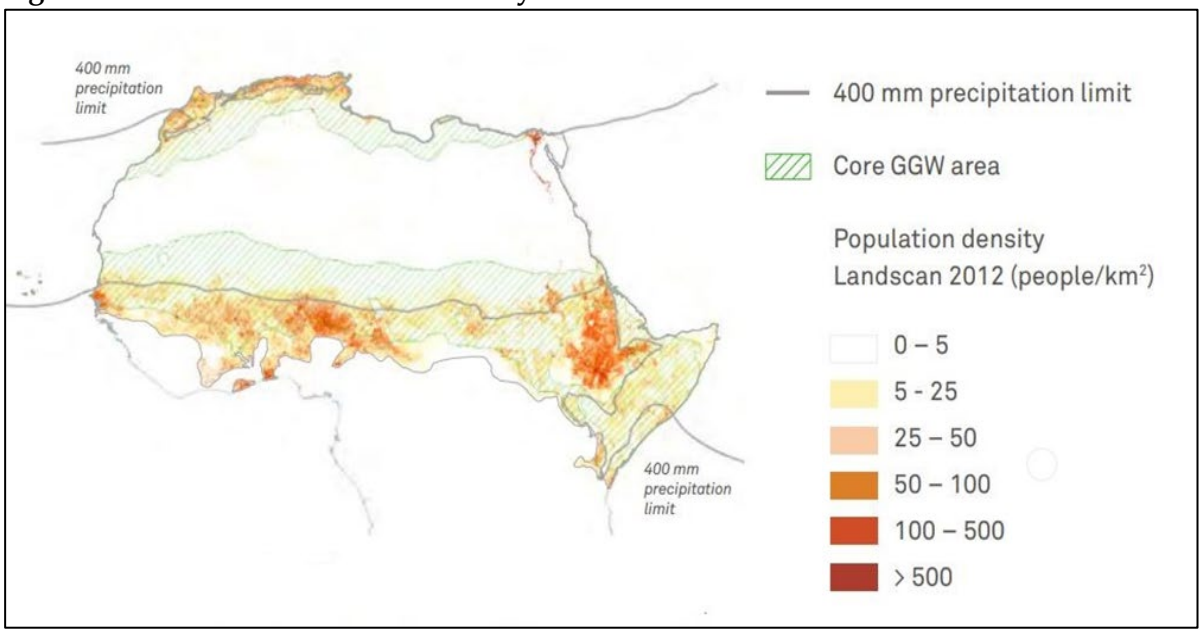


Source: (Goffner et al., 2019). The map shows selected past flagship programmes associated with the GGW in recent years, namely Action Against Desertification (EU/FAO); BRICKS, GEF/World Bank; and FLEUVE (EU/FAO)

Secondly, the spatial extent and number of countries have expanded considerably. Originally, 11 countries were selected as intervention zones for the GGW, namely: Burkina Faso, Chad, Djibouti, Eritrea, Ethiopia, Mali, Mauritania, Niger, Nigeria, Senegal and Sudan. At the time of writing, the GGW initiative has expanded to involve 21 countries, including North Africa and the Horn of Africa.

This expanded scope builds on the GGW harmonised strategy which established that GGW interventions would take place in a belt along the 400 mm isohyet on *both* sides of the Sahara, which are deemed to be the zones where opportunities and needs for land restoration are highest (see Figure 5).

Figure. 5. Core GGW area as defined by FAO



Source: (FAO, 2016)

While many GGW activities remain focused on the original 11 countries, the broader vision of the GGW has thus moved beyond the notion of a narrow 'wall' through the Sahel towards a far more expansive effort aimed at ecosystem restoration, land use management and development on both sides of the Sahara. The total number of people living within the expanded core area of GGW interventions is 232 million. Within this area, 166 million hectares have been identified as offering opportunities for restoration interventions (FAO, 2016).

Shift in theories of change

Also, the emphasis of the GGW narrative and theories of change have shifted, especially in relation to (i) a greater emphasis on supporting mosaics of land use, and (ii) a greater emphasis on migration.

(i) From wall to mosaic:

'We moved the vision of the Great Green Wall from one that was impractical to one that was practical, not necessarily a physical wall, but rather a mosaic of land use practices. It has been transformed into a metaphorical thing'.

- Mohamed Bakarr, lead environmental specialist for GEF (Bilski, 2018)

The GGW concept expanded from the NRM target with the idea of a wall of trees to a more varied target with a myriad of initiatives. In the WB's SAWAP[4] initiative under the GGW, the obvious NRM outputs include ecological restoration, farmer managed natural regeneration (FMNR), conflict management around access to land and water, drought assistance, climate smart agriculture and capacity

[4] The World Bank's Sahel and West Africa Programme (SAWAP) implemented in the GGW partner countries.

building training. But the programme now also includes building of roads; construction of schools; promotion of ecotourism; establishment of marketplaces; promotion of sustainable tree harvesting; provision of seed and fodder; weather forecasting initiatives; training of local government officials; building of grain banks, wells and canals; afforestation activities; restoration of degraded lands; mapping of livestock markets and corridors; and titling of land (Turner et al., 2021). This rather wide range of included outputs speaks to a discussion of how the GGW contributed to livelihood benefits. We will discuss this further in the final discussion.

The extension to involve 21 countries showcases on the one hand the political will to combat land degradation. But this shift is also symptomatic for the move from the somewhat simplistic focus on trees to a wider NbS approach, if you will, where the focus now extends beyond trees to vegetation in general. Some of the first seeds used in the GGW came from the botanical gardens in Kew, from the Millennium Seed Bank in a partnership with FAO. In the initial choice of plant types, priority was given to trees and crop varieties that were drought resistant as well as indigenous species. In recent years, albeit the idea of the wall of trees has lived on in the rhetoric of the endeavour, in practice the challenge of undertaking a mass tree planting in an area with less than 400 mm of annual rainfall has been recognised and there is now more of a striving for a mosaic of green landscapes that have a strong productivity component (Watts, 2020). Thus, the wall-of-trees idea has been expanded to include the wider Sahel region. As such, the localities along the 'wall' are approached in a more inclusive way where attention is paid to whole food systems rather than planting and harvesting, demanding wider institutional involvement that goes beyond the local communities and cuts across multiple sectors (Lovei et al., 2017; Laestadius, 2017). Yet, perhaps due to the compelling aspects of the narrative, the promotional material for the GGW continues to build on the idea of a wall as a dominating narrative (Benjaminsen et al., 2021).

(ii) Increased emphasis on co-benefits for security and migration

Growing emphasis on security issues

The Sahel region has historically been a largely peaceful region where mobile pastoralist and sedentary smallholders have cooperated on the use of the natural resources. Economic interdependencies between sedentary and mobile communities have secured successful adaptation to environmental fluctuations for the past centuries. While much of this persists, parts of the region are now also exposed to food insecurity, fragile governments and insecurity. In extension of this, there have been concerns over linkages between climate change, security and mobility, not least in the Sahel region. These concerns centre on potential escalation of conflicts as a result of increased competition over water, pasture and fertile soils among and between pastoralists and smallholder crop farmers, and tensions emanating from associated displacement and perceived linkages to terrorism (CSEN, 2020; Nett and Rüttinger, 2016). In some areas of the Sahel, the combination of conflict insecurity and climatic factors have limited pastoralists

from certain grazing grounds and forced them into conflicts over resources with smallholders, and some terrorist groups have allegedly sought to benefit from the food-stressed communities and expand territories by co-opting pastoralists (Cold-Ravnkilde and Shouten, 2020).

Most studies acknowledge that climate change may worsen existing conflicts or trigger underlying conflicts (Abrahams, 2020; Bavinck et al., 2014; Funder et al., 2012; Koubi, 2019). It is, however, important to emphasise that the linkages between climate change, security and mobility remain debated and are not firmly established by research, with varying results of studies so far. What may appear as climate-induced conflicts are often long-standing political and economic conflicts that become narrated as climate conflicts—sometimes including by conflicting parties themselves (Benjaminsen, 2016; Gravesen, 2020). The potential of the GGW to halt long-standing conflicts is therefore limited, but it may contribute to reducing the deepening of conflicts, especially if it is accompanied by attention to issues of land rights and governance.

Growing emphasis on migration issues

The lack of local opportunities and sources of income has been widely presented in narrative among EU countries to be among the root causes of migration—local, national as well as intercontinental with, for instance, the migration stream to Europe (Vammen et al., 2021). Nonetheless, it is the migration part of the equation that the objectives of the GGW is said to target by improving livelihoods in the region, and by implication, reasons *not* to migrate. As such, the GGW has been promoted as a remedy to root causes of migration in the Sahel countries (Benjaminsen et al., 2021). If successful, the GGW could stimulate self-reliance in areas that have previously seen many of their young people migrate for better opportunities.

According to Elvis Paul Tangem, Coordinator of Great Green Wall for the Sahara and Sahel Initiative at the African Union Commission, it was factors to do with migration that affected the changing discourse around the GGW to become more inclusive in terms of employment challenges, social security initiatives and security around access and rights to natural resources. The logic behind this shift is that the failure to make a sustainable living from the land is seen as a major push factor for migration. In Tangem's words: *'Either you leave or you join the next employer – which is either the traffickers or an extremist group, the leading favourite being Boko Haram'* (Filipovic, 2017:4).

That said, there is evidence that while there may be links between out-migration, violent conflict and land degradation, scholars widely agree that the idea that tree planting and regreening can significantly encourage people not to migrate lacks considerable evidence (see for instance Benjaminsen et al., 2021; Vammen et al., 2021). Expectations to this end should, therefore, be low.

THE GREAT GREEN WALL'S PROGRESS: HOW IS IT GOING?

Overall, progress has been slow. **More than 200 million USD has been invested and only 4 million hectares have been planted**. Results have varied greatly between the countries involved. Ethiopia initiated their reforestation activities earlier and continues to stand as the frontrunner with a reported 5.5. billion seedlings planted on 151,000 hectares of new terraced forest. In terms of job creation, as of 2021, an estimated 350,000 people have gained green jobs. Although an impressive number, we are still far from the target of 10 million local green jobs (APGMV, 2018; UNCCD, 2020).

Size and time

The high variation in the GGW region with challenges related to governance, economic development and socio-ecological contexts have slowed down implementation in some countries and by implication reduced the overall progress (UNCCD, 2020). At the same time, in the local contexts, the lengthy time span of the project means that the returns are not immediately felt. This makes the project vulnerable in the gap years between planting and reaping returns if people's basic needs are not being met in other ways. As possible outcomes, there is not necessarily any preventative measures that protects the planted trees from being cut and sold prematurely by the same local communities who planted them.

Indications of impact

Some studies of GGW initiatives report significant improvements. For instance, comparing beneficiaries to control groups before and after implementation of GGW initiatives, Sacande et al. found that in Niger, Senegal and Nigeria, the percentage of households responding that they worried about food availability dropped significantly by 7%, 12% and 13%, respectively, while the percentage for household not eating for a full day within the past 12 months dropped from 46% to 15% for Senegal and from 69% to 58% for Niger (2021). Sacande et al. also found positive results spanning from the GGW activities. These results related to economic assets of households with the percentage of households reporting improvements in income increased from 13% to 30% in Niger, from 8% to 35% in Senegal, and from 19% to 46% in Nigeria.

Interestingly, for Niger and Nigeria, Sacande et al. found that the percentage of households whose economic activities were related to non-timber forest products (NTFPs) increased by 10% between 2018 and 2020 (Sacande et al., 2021). In the literature consulted there seems to be variation across the different areas as to whether women have been positively impacted and included in activities (Sacande et al., 2021) or whether women in particular have been disenfranchised in terms of land privatisations (Turner et al., 2021). Overall, the literature seems to point towards positive impacts for women if they maintain access to land resources as common resources wherein they are able to increase their income through private sector engagements from NTFPs. Contrastingly, particularly women are negatively impacted if the designated land is privatised. The impact

on women is an important one given the strong migration link in the GGW programme. In the Sahel region it is often men from a household who migrate while the women are left behind to care for the family. Therefore, the women must be a principal target group for the GGW initiatives.

Support for trees

Some scientists have been sceptical of the dominant focus on trees when some regions hold a higher potential as grasslands than as forested areas—some ecosystems/environments are more suited for grass. Indeed, in some regions, there is more political support for soil restoration and water management than on planting trees, especially in sparsely populated areas (Sarr et al., 2021). Such criticism has affected the enthusiasm, objectives and potential for the GGW in some areas/regions. According to Scoones and Toulmin: This calls for governance-related changes with more inclusive solutions and decisions that involve more stakeholders on the local levels: *'giving agency to local voices, strengthening rights over land and water, emphasising grounded practices, and ensuring accountability will be more likely to create the sustainable mosaic of green patches across the Sahel that one day may be seen from space'* (2021: 4).

To be fair, although the GGW initiative does have a primary focus on trees in their promotional material, with the recent shift, the initiative now includes much more and is framed towards the holistic NbS—especially so in recent years after criticism and lacking results encouraged a wider approach. However, the GGW cannot in itself be determined as an NbS. We go more into detail with this in the final discussion. For instance, IFAD's involvement in the GGW has inspired a shift towards focusing on support for small-scale farming and local community initiatives that target all aspects of food systems, from growing and harvesting, to processing and marketing. Although some GGW contexts are more challenging to develop such systems in, there have been successful results. An example of such a GGW initiative can be seen in Box 3 below. Importantly, although showing promise in terms of scalability and private sector involvement, many of these cases of success remain anecdotal and general applicability across the GGW region cannot be assumed.

Box 3. Accessing a global market for the baobab fruit: supporting livelihoods and the regeneration of baobab trees in Northern Ghana

In addition to historically being one of Ghana's most vulnerable regions with the highest poverty rates, Northern Ghana's Upper East Region has in recent years been hit by environmental stress related to climate change. Here, migration of different kinds has been the most effective adaptation strategy. However, while men can leave their families behind to take up seasonal work in the cities, in the agricultural hubs of the country, or even go abroad, women have often had to stay behind to care for the family. While the women rarely own land, they traditionally hold ownership rights to trees and their produce, supplying an important source for firewood and supplements for the subsistence farmer diet. One tree that grows very well in the drylands of Northern Ghana is the baobab tree. However, its fruits have not been used widely and the area is far from a market in which a demand would be found. As one of the initiatives in the GGW, a food system around the baobab fruit has been created that connects the women to the global supply chain through the superfood company Aduna. This has created income security for the women and created incentives for planting more baobab trees.

Source: (Aduna, 2021; Aduna, 2020)

WHAT ARE THE CHALLENGES INHIBITING THE SUCCESS OF THE GREAT GREEN WALL?

Monitoring

The conceptualisation of a singular ecological system—the largest living organism on the planet—sets a high demand for overall streamlining and clarity of goals, effective systems for measuring goals, and clear coordination of targets between the various institutions and donors involved. Yet, research analyses of the GGW activities indicate that **one of the biggest challenges when scaling and expanding the GGW efforts is insufficient and inconsistent monitoring of the already implemented initiatives**. As it is, each partner country must self-report their progress based on their own estimates. Notwithstanding the importance of alignment and consistency between donors, funders and stakeholders in an endeavour of this size and scale, what happens in practice is that 'each stakeholder and funder brings different targets that the GGW must achieve' (2021: 1), as Sarr et al. point out. This implies that different theories of change and systems for monitoring and evaluating are in operation as a fragmented web underneath what

is stated and promoted by the GGW initiative as a whole (Sarr et al., 2021). This fragmentation of the GGW as a megaproject is debated further in the final discussion.

With wide variation in how and what is reported, the existing GGW system for monitoring and evaluation is flawed. Consequently, there is not enough available knowledge about where exactly the money goes and how it is spent. For instance, it is not clear how many of the 12 million trees planted in Senegal have survived (UNCCD, 2020). It is also unclear from project documents how the target of the 10 million green jobs is determined and met overall.

In addition, scholars found that the metrics designed for monitoring progress placed **inadequate attention on assessments of impacts on social vulnerability and insecurity**. Specifically, the scholarly reviews point to a general lack of comprehension of the specific socio-ecological contexts and the basis of vulnerability for the target community in question. For instance, there is very little mention of security and the role of transhumance practices on either regional or local community levels. Without comprehensive monitoring, there is a risk that initiatives could have adverse effects on the communities as well as on the GGW programme as a whole (Turner et al., 2021; Cold-Ravnkilde and Shouten, 2020).

Instead, the existing monitoring system has an emphasis on technical successes, including amounts of hectares rehabilitated, number of trees planted, and at times improvements in tree density and crop productivity (Turner et al., 2021; UNCCD, 2020). Yet, even the **technical reporting has been found to be inaccurate**. For some of the hectares counted as rehabilitated, reviews of programme documents revealed that large parts of trees planted in some initiatives were counted as new and thus added to previously planted hectares, although the plantings were in fact replantings of trees that had not survived the previous phase of the project in question (Turner et al., 2021). When scaled up to the larger targets of the GGW, such faulty monitoring can have widespread impacts.

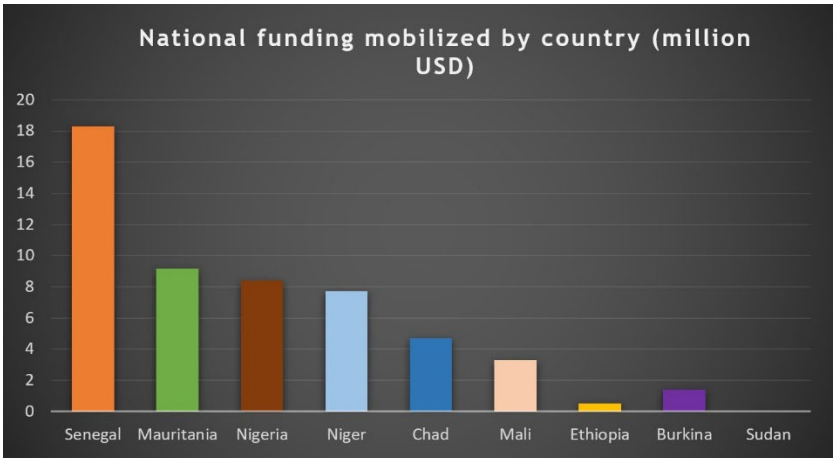
In addition, there has been misalignment between the public sector institutions and the private sector interests (Sarr et al., 2021). Generally, the size and fragmentation of the GGW programme, with multiple national departments, donors, socio-ecological contexts and initiatives, **a full overview of progress is challenging**. Instead, the highlighted successes of the GGW promotional material are anecdotal and challenges are quantified and generalised, with for instance the highlighted 15% completion and little explanation for this result. This has been pointed to as a critical point where more transparency is needed (Turner et al., 2021).

Finance

As the progress stands now, in order to reach the target of planting trees on 100 million hectares of land by 2030, the countries need to plant 8.2 million hectares per year with an added investment of 4.3 billion USD per year. This means that **between 36 and 43 billion USD is needed in additional funding**. At the One Planet Summit for Biodiversity in Paris in January 2021, an additional 14 billion USD was pledged to the GGW (Scoones and Toulmin 2021) and throughout 2021 more pledges have followed (see Table 2)—not least in relation to the COP26 in Glasgow (Felix, 2021).

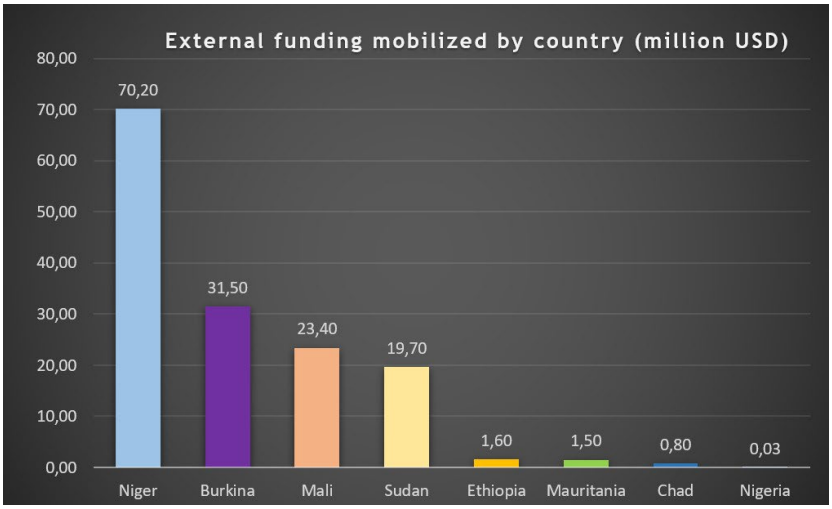
The imbalance between where the funds are channelled from is another issue. As seen in Figures 6 and 7 below, the vast majority of funding has come from donors with very little contribution from the partner countries themselves. This creates concerns about dependency on external funds as well as ownership among national and regional institutions.

Figure 6. Domestic/National (state) finance allocated to the GGW per country (in million USD)



(Source: UNCCD, 2020: 28)

Figure 7. External/International finance allocated to the GGW per country (in million USD)



(Source: UNCCD, 2020: 28)

Need for a socio-ecological perspective

The scale of the GGW and, by default, its **top-down management and replicability has been criticised** with the argument that there are plenty of examples of top-down governed initiatives that are not adapted to the particular social-ecological setting specific for each local context (Benjaminsen et al., 2021; Scoones and Toulmin, 2021).

Specifically, tree planting projects in Africa have historically struggled with being too simplistic and lacking understanding of the impact of socio-ecological environments. On the one hand, such programmes have had an overemphasis on the planting of trees and less focus on maintaining the health of the trees because communities are not adequately included in the project and the plans for managing the trees long term. And on the other hand, the importance of planting trees to fit the socio-ecological context has been downplayed. Together, this means that the survival rate of trees in tree planting projects has been very low. **The lack of consideration for holistic and inclusive plans for restoration through tree planting is considered one of the biggest threats to the investment** (**Benjaminsen et al., 2021**). Indeed, in the very context of the GGW, there are examples where entire farming systems have been jeopardised due to large-scale initiatives that have been ill-fitted, as seen in the example of Mali (Toulmin, 2020). Rather than indicating a somewhat elementary design failure, where tree planting activities are not adequately adapted to social-ecological contexts, this challenge points to a scale-related issue. Connected to the misconception of the Sahel as a single ecosystem rather than a more dynamic understanding of the region as a mosaic, it is a somewhat expected outcome that the same positive results (see section on 'Indications of Impacts' above) cannot be expected in all implementation areas and for all donor and subprojects across the GGW zone. That said, there are countless lessons learnt from other large-scale programmes that have highlighted the importance of adapting interventions and approaches to specific socio-economic contexts, acknowledging differences even between two neighbouring districts. These principles were underlined in the previous two working papers (Gravesen and Funder, 2021; Funder and Gravesen, 2021). With these lessons learnt from previous programmes, it would have been reasonable to expect a higher degree of localised targeting in more of the GGW's subprojects.

Contrastingly, previous bottom-up initiatives in the GGW region have in fact led to regeneration, not as forests but as farmer-managed natural regeneration, a method where farmers clear land for farming while letting it go wild at the same time to protect crops and where rather than introducing top-down generalised initiatives, grassroots initiatives have essentially supported farmers to do what they are already doing[5] (Pye-Smith, 2013; Brandt, 2014; Reji and Winterbottom, 2009). Importantly, this bottom-up regreening has taken place in spite of increasing climate change related rainfall variability and human pressure from conflicts and poverty. This approach, conceptualised as smart agricultural

[5] For an example from Niger see Pye-Smith, 2013; for Senegal see Brandt, 2014; for Niger and Burkina Faso see Reij et al., 2009; and for the wider Sahel region and Malawi see Reij and Winterbottom, 2015.

practices, has been the new adapted model for the GGW as part of a NbS-like perspective with wide inclusion and anchors in local socio-ecological contexts (Morrison, 2016). However, despite this conceptual change, scholarly reviews point to continuing issues with narrow top-down management in project planning and implementation (Turner et al., 2021).

Securitisation and targeting

Importantly**, securitisation and terrorism threats** have impaired progress in parts of the implementation regions, as **political and securitisation climates are unpredictable and hence make investors reluctant to invest**. Specifically, Ethiopia's early progress has been hailed in the programme material. However, as the GGW implementation area in Ethiopia is primarily in the country's northern regions, which is the centre point of the current conflict in the country, the potential implications for GGW progress in the region are not yet known. Other partner countries, such as Mali and parts of Nigeria, have seen **conflict and terrorism inhibit implementation of GGW initiatives** on a fundamental level, so much so that results are limited or highly uncertain (Laestadius, 2017; Benjaminsen et al., 2021). It is undeniable that the GGW region has seen an upsurge in trans-Saharan emigration, exacerbated struggles among subsistence livelihoods as well as insurgency and recruitment to extremist groups (Turner et al., 2021). To some extent, there is a link between hopelessness and poverty in degraded dryland areas and increasing conflict (Benjaminsen and Ba, 2021). So as to battle the increased insurgency, protect the European borders to the north and curtail the migration stream in the Sahel, international investments and development aid have in turn shifted towards military aid—a shift that has been coinciding with support for the GGW programme (Moretti, 2020; Turner et al., 2021). As argued in the section on co-benefits above, it is important to note that issues related to pastoralism, climate change and conflict are entangled in these areas. Therefore, interventions that target only a part of the equation 'risk producing regressive effects', as Cold-Ravnkilde and Shouten argue (Cold-Ravnkilde and Shouten, 2020).

Land rights and land governance

As several scholars argue, the GGW initiatives have increased the potential value of degraded land. While this is beneficial in a wide variety of cases, it has increased vulnerability in others. In areas that lack good land governance, the increased value has **led external elite farmers to grab the land and displace the former farmers and community members.** This was the case in areas of Niger that had effectively been restored by the GGW subprojects (World Bank, 2021a; Turner et al., 2021). In addition, there have been problems of predation and land grabbing in areas where crop farming was introduced alongside tree planting (intercropping) on land under customary land management. Crop farming enabled some to claim land as de facto private, with the implication that other community members who had previously had access rights to these lands given their status as common resources were excluded and deprived of the ability to make use of the landed resources. **This has especially disenfranchised women,**

youth and pastoralists, who in many places already have limited holding and access rights to land in the Sahel region, while local elites and external land speculators have gained rights to the land (Turner et al., 2021; Kelly et al., 2021). As pointed out by the conclusion from the recent evaluation of the World Bank's evaluations of their NRM efforts, limited inclusion of vulnerable groups constitutes extensive lost opportunities for the implemented activities (see World Bank, 2021b). In their review of GGW programme documents, Turner et al. found that the privatisation of land was acknowledged and even approached as a benefit in some programme documents (2021). They also found extensive misconceptions of tenure relations, where reference to 'landowners' were consistently made, which by implication wrongly assumes privatisation in areas with centuries-long histories of pastoral use (Turner et al., 2021).

Scholarly reviews of GGW initiatives found that in the cases where customary land would become privatised to enable tree planting and intercropping, women or youth representatives were rarely consulted on their impending exclusion or offered any type of compensation. The same neglect was the case in situations where the privatised land coincided with a transhumance corridor, which would inevitably force pastoralists to trespass onto land they had previously accessed in order to follow their mobility patterns (Benjaminsen et al., 2021). For areas where pastoralist practices are widespread, which is the case for a large part of the GGW region, such land-use disruptions often further exacerbate vulnerabilities and increase conflicts (Sarr et al., 2021). As Scoones and Toulin point out: *'Conflicts may emerge, when land is constrained—for example by huge blocks of irrigated agriculture, tree planting or soil conservation investments. Pastoral herders may be unable to move their animals to the dry season grazing they could formerly negotiate with settled villagers, in exchange for manure, milk and other livestock products. A green wall risks becoming a further barrier to people's livelihoods, not just a symbolic wall against a mythical advancing desert'* (Scoones and Toulmin, 2021: 3). Several scholars criticise the **limited understanding of local stakeholders and report a weak engagement, partaking and inclusion in decision-making among local communities as well as local decision-makers and politicians** (Sarr et al., 2021; Benjaminsen et al., 2021). There is widespread evidence that transhumance practices are the most resilient form of livelihood for fragile and climate change affected dryland areas, such as those prevalent in the Sahel region. The seasonal movement of livestock allows for regreening and preservation of damaged ecosystems (Cold-Ravnkilde and Shouten, 2020). Therefore, solutions such as the GGW initiatives that aim to circumvent environmental degradation should have support for pastoral livelihoods and conflict stabilisation measures at its core.

As we pointed to in previous working papers in this series (Gravesen and Funder 2021; Funder and Gravesen 2021), attention to the context around tenure is important regardless of whether the implemented project is labelled as ecosystem-based adaptation or community-based conservation (Funder and Gravesen, 2021; Gravesen and Funder, 2021). It is, therefore, concerning that Turner et al. found ***'a major lack of attention to or understanding of local land tenure systems'*** in their expansive review of GGW programme documents (Turner et al., 2021: 9). It is especially concerning where, in some GGW initiatives in Niger and Senegal, elite

capture and the exclusion of vulnerable groups spanning from privatisation was known, and initiatives were taken to become more inclusive. Yet, too little has been done to apprehend the negative effects of the changing tenure relations. According to Benjaminsen et al. such misrecognition of affected people not only constitutes a clear case for climate injustice, it also holds severe potential consequences for the GGW project as a whole: *'When there is such straightforward misrecognition of the local population… there is a clear risk that climate mitigation may lead not only to a failed climate project, but also to adverse results such as increased local natural resource scarcity and increased resistance to the state, which might ultimately exacerbate conflict levels'* (Benjaminsen et al., 2021: 10).

DISCUSSION

Green megaprojects

Since its inception in 2007, the GGW programme as a whole has developed into a fragmented mosaic of smaller projects each supported by different donors. In contrast to the GGW of China, the GGW subprojects hold a certain degree of autonomy and variation. For instance, the issue of monocropping has not been incorporated on a grand scale to the same extent as with the GGW of China. Rather, a variety of plant and tree species are used in different subprojects that, at least to a certain extent, are adapted to the local social, economic and environmental context. Although a full overview of species variation is difficult to get, anecdotal evidence shows that, baobab trees have been used in subprojects in Northern Ghana as a way to nurture an alternative source of income from non-timber forest products, while gum trees and acacia trees have been prioritised in other areas according to what the specific livelihood potentials, social needs and environmental conditions have prescribed.

The move from a coherent megaproject towards fragmentation is arguably a natural development given the criticism that has met the GGW since its initial and somewhat generalised modes of implementations. The move can be seen as a lesson learnt in itself: that regions quickly become too complex for upscaled efforts. There are now examples of success from subprojects in some areas, where solutions have managed to strike the balance of benefitting livelihoods while avoiding cutting off certain user groups. However, it is concerning that even after restructuring the larger programme, studies continue to document inadequate consideration to issues spanning from the privatisation of land that in many areas has been undertaken to enable tree planting, including cuts of pastoralist corridors with fence lines and changes in user rights to resources where certain groups are excluded (see section on challenges above). It is highly important that such issues of rights and governance are addressed in each subproject by the donors, project designers, implementers and evaluators, not least for the subprojects to be able to get closer to the IUCN's Global Standards for NbS if that indeed is the aim (IUCN, 2020 a, 2020 b).

At a more overall level, the move towards a mosaic has arguably reduced the original GGW to an idea or a narrative of large-scale change that primarily lives on in PR for donors and in the general public. Critique of the somewhat hollow shell aside, it is worth acknowledging that there is also a certain strength in the narrative as such, i.e. the GGW stands as a metaphor for something to believe in that can create connections and gather support across and beyond the Sahel region as well as within donor circles. This way, enthusiasm around the programme holds a symbolic value encouraging a hope that conditions *can* change for the better—a positive message that is arguably needed as a tool to encourage increased global support for common efforts to tackle climate change. This may be the reason for the popularity of the GGW at global events like the COP and the UN Convention on Desertification.

In terms of climate change adaptation, there is a direct need for expansion and upscaling of efforts. However, there is a dilemma here in that many studies point to the importance of tailoring solutions to very local contexts, where what works in one local context may fail in the neighbouring district (see for instance Funder and Gravesen, 2021 and Gravesen and Funder, 2021). In some regards, a regional approach may, therefore, entail compromised and potentially faulty solutions unless extensive differentiation and tailoring is done to fit each implementation area, essentially moving away from upscaling. In this sense, the challenges met by the GGW implementers and critiques speaks to when a regional approach becomes too problematic. Therefore, the question remains whether the need for upscaling green efforts is best done through the overall coordinating role of megaprojects such as the GGW, given its reduction to an umbrella term for the wide variety of distinct subprojects, or whether separate and potentially less coordinated NbS activities on smaller scales are preferable. Given the widespread experience that climate change adaptation requires a contextualised approach to work, the latter seems preferable for actual implementation, with the GGW then serving as an overall facility for regional coordination and dialogue.

The GGW and NbS

The GGW's move towards fragmentation into a mosaic of independent subprojects has in some areas entailed an array of efforts that cannot in themselves be determined 'green'. This includes the building of roads, schools, marketplaces and grain banks, as well as training local governments, promotion of ecotourism and mapping livestock corridors and markets (Turner et al., 2021). Although such activities may cause challenges in terms of whether to account for an activity as green, their inclusion shows that some GGW subprojects have, in fact, moved closer to incorporating NbS in practice as opposed to simply relating to NbS as a rhetorical exercise. This has produced a general shift in the GGW, wherein livelihood benefits are approached more holistically. For example, if restoration of forest ecosystems is to benefit communities it may involve development of markets and roads to facilitate incomes from agroforestry products. Therefore, in principle, most of the activities mentioned above can be regarded as green if they link up to and support a wider green transition and resilience in the given community contexts.

However, even if the further shift towards holistic approaches must be acknowledged, the fact that the GGW programme is inspired by and closely links up to the NbS narrative does not make the GGW an NbS if judged by the IUCN's Global Standards for NbS (IUCN, 2020 a, 2020 b). For example, given a continuing criticism that some interventions have not been sufficiently inclusive of local stakeholders, the GGW as a whole would struggle to meet Criteria 5 of the IUCN's Global Standards for NbS, namely that 'NbS are based on inclusive, transparent and empowering governance processes.' (IUCN, 2020 b: 14).

At this point, and given the scale of the GGW, it is not likely that the GGW will be able to live up to all of the NbS criteria. With the geographical extension and wide diversity of actors and socio-ecological contexts at play, it is simply not realistic to implement and monitor all of IUCN's indicators at such a large scale. Doing so would be highly labour intensive and complex, given the methodological diversity of the GGW. A one-off or occasional review of the GGW vis-a-vis the IUCN NbS indicators at an aggregate level would arguably be feasible, but the question is what it would accomplish in practice. A more national emphasis in such an exercise would be easier for implementing agencies in each country to act on. In extension of this, nothing hinders a donor from fully implementing the IUCN standards on a smaller scale in a GGW subproject. Such targeted and inclusive efforts would comply with the recommendations for both the studies on community-based conservation and ecosystem-based adaptation (See Gravesen and Funder, 2021 and Funder and Gravesen, 2021).

Meeting targets for co-benefits

Another challenge related to NbS has to do with the proclaimed co-benefits of the GGW. Carbon capture, food security, green jobs, disaster risk reduction and regenerated ecosystems and biodiversity benefits are among the stipulated returns in the GGW programme. Indeed, if an activity is NbS, it must solve societal challenges that go beyond improvements for either conservation, livelihoods of climate change adaptation or mitigation. However, to protect against add-on approaches and watered-down initiatives, the IUCN NbS standards prescribe specific measures for designing, implementing and measuring all assumed benefits. This means that in order to measure carbon capture results from tree planting activities, measures for monitoring would have to be done accurately and alike throughout the whole programme. For a megaproject like the GGW, this has already proven deeply challenging with diversified subprojects and different monitoring standards between the donors and the self-reporting partner countries. Examples include the general unclarity about the survival rate of the 12 million trees planted in Senegal (UNCCD, 2020), as well as inconsistency in whether to count replantings as additional plantings or not. Irrespective of being an NbS activity or not, the inadequate and diverging methods for monitoring progress in tree plantings is deeply problematic for quantifying carbon capture results to any degree of precision. For a megaproject of this scale, one could have reasonably expected programme designers to have learnt from evaluations of past tree planting projects in which inadequate consideration to the survival rates of seedlings constituted a substantial problem for estimating actual results.

On top of the inconsistent data set to base estimations of mitigation effects, the delay and complexity of expected results from carbon capture must also be taken into account. This offers another challenge in that carbon capture results would only start to materialise after the planted seedlings have grown into production units. In this regard, the age, variety and environmental context of each tree constitute yet other variables that affect the quantification of carbon captured.

Similar challenges pertaining to unclear and inconsistent monitoring and definitions of what the estimated results entail apply to other co-benefits as well, for instance it is difficult to find consistent information on how the co-benefit of the 10 million green jobs are measured and whether there is agreement among the donors and partner countries about what counts as a green job to begin with. This unclarity makes it challenging to evaluate whether such a goal is realistic and well-founded or not.

Other co-benefits that are problematic to deliver on are the trade-offs of conflict and migration reduction. As described in the sections on challenges and co-benefits above, conflicts and security concerns in the region are highly complex and multifaceted and can only partly be related to resource scarcity and climate change. The potential of the GGW to halt long-standing drivers of conflicts is, therefore, limited. That said, for some areas and subprojects, activities may contribute to reducing the deepening of conflicts, especially if it is accompanied by attention to issues of governance and land rights for all affected stakeholders. Similarly for migration, it is highly unlikely that the GGW interventions will be able to alleviate migration in the region in general. However, it is possible that involuntary migration may be reduced due to the livelihood benefits that help protect people's livelihoods against impacts from drought and other climate change related stressors.

Overall

The GGW initiative is a bold, challenging and somewhat problematic idea, carrying multiple drawbacks, not least with regards to its scale with 21 countries, numerous donors and stakeholder groups and massive amounts pledged, invested and contributed; the varied and at times deeply flawed implementation that overlook vulnerable groups, rights and tenure relations; and the fragmented and inconsistent systems for monitoring and measuring progress. But notwithstanding all these complications, the GGW does have some merit in terms of curbing the climate change impacts that are estimated to hit the African continent with extensive and intensifying force. Since 2007, the GGW programme has changed its characteristics extensively and become less generalised and more holistic in diversified subprojects fitted to different contexts. This allows for contextualised interventions at national and local levels. This is a positive development that makes it more feasible for Denmark to support an autonomous GGW subproject in a way that fully acknowledges IUCN's principles for NbS in a context specific intervention in one of the partner countries. This can be done even if the GGW as a whole cannot comply with IUCN's principles. Moreover, through the support of the wider GGW initiative via the large bodies of GEF, GCF etc.,

there is potential for Denmark to push for further development of the holistic approach, as well as how the megaproject's role as coordinator can be improved, for instance with implementing more consistent methods for monitoring.

LESSONS LEARNT AND DONOR RECOMMENDATIONS FOR FURTHER INVOLVEMENT IN THE GGW

Now halfway through the GGW programme, scholarly reviews point towards the following issues as areas that need more attention in order to achieve the anticipated goals of large-scale ecological restoration and reduction of livelihood vulnerability for the poor. Further involvement in the GGW should:

1. Support a wider implementation of the IUCN criteria for Nature-based Solutions. Specifically, Denmark should support country-level NbS subprojects under the GGW umbrella that fully live up to IUCN's criteria.

2. Acknowledge that the GGW cannot eliminate the drivers of conflicts and migration in the Sahel region. At best, targeted efforts in subprojects may prevent conflicts from escalating and may also protect people against involuntary migration. However, even those results necessitate further focus on rights, governance and the wider inclusion of stakeholders.

3. Support approaches and organisations that have a strong focus on and understanding of contextualised livelihood vulnerabilities, rather than on generalised assumptions that fit other contexts in the region. Local conditions and socio-ecological contexts can differ fundamentally even between neighbouring communities.

4. Enhance emphasis on supporting natural resource governance mechanisms, including at local levels, to avoid elite capture, competition and unequal benefits. Schemes that seek to compensate for excluded access to resources should be extended and wider understandings of dynamics between user groups should be operationalised. As such, project sites should be understood as the political arenas they are, with multiple interest groups and opposing agendas.

5. Expand the focus on rights and access with wider considerations to land tenure arrangements of land designated for GGW implementation, including awareness of who becomes excluded from access when land with wider systems for access, passage and use is privatised, and at times even fenced, to accommodate tree planting. Specifically, pastoralists and women should be included and considered in project planning and implementation as important local user groups to a much higher degree. Pastoralists and women are considered among the most vulnerable groups in the GGW region and are easily marginalised in land privatisations.

6. Improve the GGW megaproject's overall coordination, especially with regards to the development of consistent metrics and tools for monitoring and assessing outcomes and outputs related to NRM. These should go beyond technical successes and include qualitative socio-ecological analyses of contexts around project sites. Such metrics should apply to the public sector engagements as well as the private sector. This agenda should be pushed forward via Denmark's GGW support through the large bodies of GEF, GCF etc.

7. Nurture conducive environments for private sector investment by

    a. supporting community groups with market-oriented activities related to NTFPs—following some of the successful, albeit anecdotal, cases (see Box 3)

    b. working to develop markets for NTFPs both on the local, regional and transcontinental levels

    c. improving links between communities in implementation areas and private sector partners who seek to meet the increased demand for natural dryland products for instance in European wholefoods markets

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ANNEX

Table 4. Selected major implementing partners (2007-2021)

FAO	Major implementing partner, including multi-country flagship projects Action Against Desertification and the FLEUVE (Local Environmental Coalition for a Green Union).
UNCCD	Major implementing partner, including global communication and awareness.
UNDP	Misc. support to institutional and technical capacity development.
UNEP	Support to development of the regional harmonised strategy, national strategies and action plans.
WB	Coordinates implementation of the region-wide SAWAP programme (Sahel and West Africa Programme) and the associated BRICKs project Building Resilience through Innovation, Communication and Knowledge Services).
IUCN	Technical support and execution of the project 'Closing the gaps in the Great Green Wall' in the original 11 Sahel countries.
Birdlife International	Support to wetland conservation, including transboundary activities.
Kew Botanical Gardens	Coordinates and provides technical assistance to GGW partners in Mali, Burkina Faso and Niger.
Sahara and Sahel Observatory (OSS)	Technical support to the BRICKS project (Building Resilience through Innovation, Communication and Knowledge Services).
Permanent Interstate Committee for Drought Control in the Sahel (CILSS)	Invests in research on food security and effects of desertification.

Source: Adapted from (GGW/UNCDD, 2021)

Table 5. GGW accelerator pillars and funding committed

GGW Accelerator Pillars	New funding commitments for period 2021-20251 (in billion USD)
1) Investment in small and medium-sized farms and strengthening of value chains, local markets; organisation of exports.	5.825
2) Land restoration and sustainable management of ecosystems.	3.235
3) Climate resilient infrastructures and access to renewable energy.	7.123
4) Favourable economic and institutional framework for effective governance, sustainability, stability and security.	2.027
5) Capacity building	1.471

Source: Adapted from (GGW/UNCDD, 2021)