SUSTAINABLE LAND MANAGEMENT IN THE SAHEL

Lessons from the Sahel and West Africa Program in Support of the Great Green Wall (SAWAP)

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Lessons from the Sahel and West Africa Program in Support of the Great Green Wall (SAWAP) in 12 countries* (2012-2019)

*The 12 countries are: Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, and Togo. They represent 9 of the 11 members countries of the Pan African Agency.

WORLD BANK GROUP

ACRONYMS

ARLI	African Resilient Landscapes Initiative
AU	African Union
BRICKS	Building Resilient, Information, Communication, and Knowledge Services Interstate
CILSS	Comité permanent inter-Etats de lutte contre la sécheresse dans le Sahel, Interstate Committee for Desertification Control in the Sahel
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
CREMA	Resource Management Committees
DRM	Disaster Risk Management
FAO	Food and Agricultural Organization
FCS	Fragile and Conflict States
FMNR	Farmer-Managed Natural Regeneration
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GGW	The Great Green Wall
HDI	Human Development Index
ICR	Implementation Completion Report
IDA	International Development Association
IDP	Internally Displaced Persons
IEG	Independent Evaluation Group
INRM	Integrated Natural Resources Management
ISR	Implementation Status and Results
IUCN	International Union for Conservation of Nature
KPI	Key Performance Indicators
LULC	Land use/Land cover
M&E	Monitoring and Evaluation
NDVI	Normalized Difference Vegetative Index
NEWMAP	Nigeria's Erosion and Watershed Management Project
NGO	Non-Governmental Organizations
NRM	Natural Resources Management
OSS	Observatoire du Sahara et du Sahel, Sahara and Sahel Observatory
PA	Protected Area
PDO	Project Development Objective
PRAPS	Regional Sahel Pastoralism Support Program
SAWAP	Sahel and West Africa Program
SLMP	Sustainable Land Management Project
SLWM	Sustainable Land and Water Management
UNCCD	United Nations Convention to Combat Desertification
WACA	West African Coastal Areas Program
WAAP	West African Productivity Project

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This is not a comprehensive review of the SAWAP experience. The research for this report was conducted within a few months period and no travel were completed due to COVID-19. The report is based largely on project documentation (e.g., Independent Evaluation Group (IEG) Reports, Implementation Completion Reports (ICR), Implementation Status and Results reports (ISR), Aide Memoires) and interviews with Task Team members.

Photo credit: Page 10, Chris Reij: Cropland and Regenerated Agroforestry Parkland with *Faidherbia albida* (gao) Trees, Badaguichiri Valley, Tahoua, Niger. All other photos: Andrea Borgarello for World Bank/TerrAfrica.

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EXECUTIVE SUMMARY

This report documents the key outcomes and lessons learned from the Sahel and West Africa Program in support of the Great Green Wall (SAWAP) from 2012 to 2019. The SAWAP was a programmatic approach developed by the World Bank using $100 million of GEF resources on the top of $1.2 billion IDA resources for twelve countries: Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, and Togo. A regional project named "BRICKS" for Building Resilient, Information, Communication, and Knowledge Services project ($4.6 million) was included focusing on coordination and knowledge. SAWAP was approved in 2012 "to expand sustainable land and water management (SLWM) in targeted landscapes and in climate vulnerable areas in West African and Sahelian countries". The following review takes into account outcomes from six national projects already closed and six national projects that will be closing by 2022.

In terms of outcomes, the SAWAP projects have surpassed their initial cumulative targets establishing 1.6 million hectares (ha) of SLWM practices across the twelve countries (an area larger than Lebanon), with success stories particularly in Ethiopia, Niger, Nigeria, and Sudan. The number of project beneficiaries has been far exceeded with more than **19.4 million of beneficiaries.** At the macro level, the SAWAP program has demonstrated success in some difficult country contexts. While two of its outcomes were largely surpassed, two outcomes (Normalized Difference Vegetative Index and carbon accumulation rates in biomass and soil) faced methodological problems. Overall, the positive effect of the SAWAP was demonstrated for a variety of land categories (rangelands in Chad, Senegal, and Sudan; tree cover in Burkina Faso, Ethiopia, and Ghana), and SAWAP also contributed to convene institutions, vet and share information, improve incentives and understand how to scale up investment.

In terms of success stories, the Ethiopian Sustainable Land Management Project 2 (SLMP2) appears as a transformative landscape project to scale up SLWM investments. This project applied a highly decentralized and participatory process to mobilize SLWM investments in more than 550,000 ha. The Ethiopia SLMP2 was fully SLWM focused with more than $30 million in financing, addressing root-causes of land degradation, including tenure insecurity with the issuance of land certificates to more than 360,200 households. Development partners can learn much from the achievements of the Ethiopia SLMP2, one of the main lessons being that this project benefitted from many prior years of investment in SLM In Nigeria, NEWMAP too has been a success; although the entry point, peri urban gullies mostly, is different from other projects that focus on restoring productive agricultural lands, this entry point was and is the priority in Nigeria's UNCCD National Action Programme. As the urban-peri-urban areas increase across Africa, the NEWMAP experience should provide valuable insights.

There are lessons to take from SAWAP in designing future programmatic approaches. The SAWAP showed a wide array of differences in project size, technical focus, cost-effectiveness, and implementation approaches across the program. Projects range in financing from around $6 million (Mauritania) to $908 million (Nigeria). The baseline situations and cofinancing also showed diversity, including focused SLWM projects (Ethiopia, Ghana, Mali, Mauritania, Sudan), broader agriculture projects (Chad, Senegal), decentralized rural development (Burkina Faso, Niger), disaster risk management (Togo), forestry (Benin), and urban/suburban gully treatment (Nigeria). The vast majority of financing was not solely focused on SLWM, possibly reducing the cost effectiveness of the SAWAP approach on SLM as such. The numbers and types of beneficiaries have shown large differences between countries: less than 50,000 for projects in Benin, Mali, Senegal, and Sudan, and several million beneficiaries often for projects including infrastructures and micro-projects (Burkina Faso, Niger, and Nigeria).

This wide array of differences in the SAWAP portfolio may be thought of as diluting somewhat the focus of the SAWAP on SLWM and the development of specific scaling strategies; however, each of these countries was at a different starting level with some having had years of investment compared with others.

The twelve country projects were complemented by the BRICKS project ($4.6 million), a regional learning and Monitoring and Evaluation (M&E) structure to support the SAWAP. It contributed significantly to regional dialogue, with 95% of SAWAP national project team members satisfied with the regional services in 2018. BRICKS funded and convened the partners of the Great Green Wall Initiative (GGW) and the Annual SAWAP Conference. Building this community had a transformative effect; conferences sponsored by BRICKS were part TED talk, part project operational brown bags, part investment planning, part communications and part network building among client countries and partners across Anglo and Francophone Africa. Although the M&E framework adopted by BRICKS had its short-comings, it was considered to be well structured at the time of its creation. **It was later adopted by USAID and was used by the African Union to inform the indicators for the entire Great Green Wall.** Although BRICKS had a relatively low budget and there was a wide array of SAWAP projects which made it difficult to tailor assistance relevant to all, it provides excellent experiences and is a model that should be replicated.

There is still an urgent need for SLWM at-scale in the Sahel. Countries and development partners should remain focused on investing in large-scale SLWM in the Sahel region for the benefit to the large proportion of the Sahelian population that is extremely poor and the many who live in conditions of Fragility, Violence, and Conflict. For example, both Mali and Niger have extreme poverty rates of around 40% [1]. SLWM is both a social, economic, and environmental response, combining climate change adaptation and mitigation, with potential benefits for biodiversity. It should be effective as a post-COVID recovery response. Multiple effective SLWM approaches have been proven over long-term time periods. In a region grappling with the challenges of food insecurity, climate change, persistent violent conflict, landscape degradation and rural poverty, SLWM investments offer a path forward. The Sahel poses the challenges of immense scale with approximately 300 million ha of fragile land highly susceptible to degradation. With some of the fastest growing populations (3% growth per year) and some of the lowest Human Development Index rankings in the world, there are around 30 million people that are already food insecure and around 10 million people likely experiencing extreme food deficits [2]. Given these underlying challenges, Sahelian people have some of the highest climate vulnerability scores in the world.

These immense challenges and associated land use pressures have contributed to extreme changes in the Sahelian environment. **Since 1975, farmland has doubled in West Africa (to 100 million ha), while savannas and grazing lands have been halved, trees have been reduced by 40% and wildlife have largely disappeared in most areas [3].** With this reduction of natural assets, the productivity of rainfed agriculture and grazing pastures have noticeably declined, contributing to the widespread food insecurity and conflicts. However, many local farmers have proven that they are readily able to improve their local environments if provided the opportunity and certain enabling conditions (e.g., increased tenure security, resolution mechanisms for land-use conflicts). One of the most widely known examples comes from Niger where farmers from Maradi, Zinder, and Tahoua have widely adopted SLWM practices, notably “farmer-managed natural regeneration” to restore the tree cover on croplands, increase cereal yields, and improve water capture. Instead of deforestation, these areas have added approximately 10 million trees (1985-2005) with limited donor support since 1980s. As a result of these SLWM practices, these areas of Niger are producing an additional 500,000 tons of cereal crops, enough to feed an additional 2.5 million people [4].

[1] World Bank 2019
[2] Food and Agriculture Organization of the United Nations. 2019. *Sahel – Regional Overview - July 2019*
[3] CILSS. 2016. *Landscapes of West Africa: A Window on a Changing World*
[4] UN Sustainable Development Goals. https://sustainabledevelopment.un.org/partnership/?p=30735

SLWM and agroforestry approaches offer a cost-effective solution to widely distribute significant benefits to smallholder farmers across the Sahel, including in fragile and conflict states (in contrast to the more concentrated benefits offered by large-scale irrigation and other infrastructure). Ecological intensification and climate smart agriculture based on SLWM and agroforestry are a serious and sustainable alternative to more classic agricultural development. Although trees require long-term protection to maximize investment returns, they can start delivering benefits to farmers within 2-3 years.

Using small-scale water capture structures (e.g., stone bunds, zaï pits) have increased cereal yields by 40% to 100% in Nigerien rainfed agriculture. Improving the capacities of smallholder farmers to use and share SLWM and agroforestry practices will provide a stronger basis for the development of the agricultural sector under increasingly difficult environmental and social conditions. Several tables in the main report summarize the financing, project categories, program focus, areas impacted, beneficiaries, IEG ratings and follow-up operations for the SAWAP portfolio of projects. The report also provides a brief summary of tested and proven pathways to scale up SLWM with the potential to be further deployed across Great Green Wall countries and beyond.

Key recommendations for future SLWM investments are summarized in the concluding section.

INTRODUCTION

The Sahel and West Africa Program in support of the Great Green Wall (SAWAP) was approved in 2012 "to expand sustainable land and water management (SLWM) in targeted landscapes and in climate vulnerable areas in West African and Sahelian countries". The Global Environmental Facility (GEF) mobilized $100 million in grants for SLWM that was to be co-financing to an expected $1.8 billion of World Bank funded projects in agriculture, food security, disaster risk management, rural development, and watershed management [5]. SAWAP included 12 countries: Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, and Togo. They represent 9 of the 11 members countries of the Pan African Agency of the Great Green Wall [6].

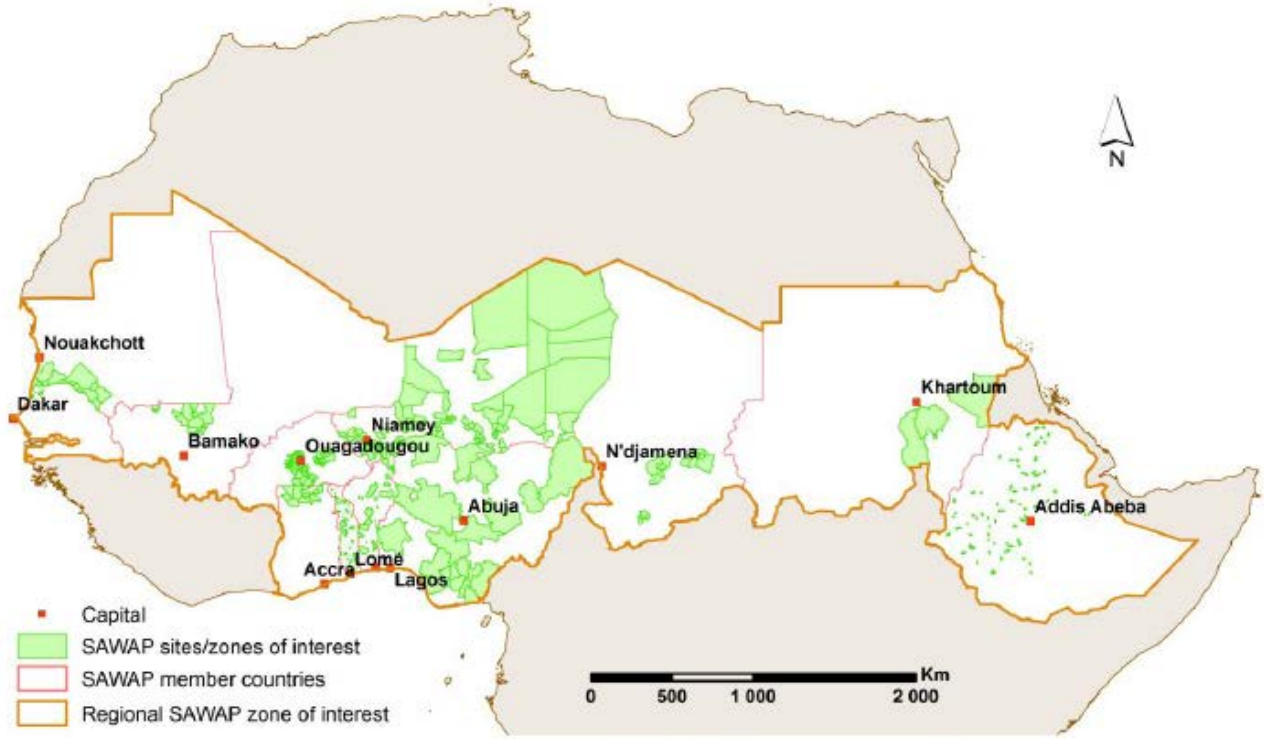


Figure 1: SAWAP Countries and original "Zones of Interest" *(doesn't include all additional financing sites)*

In addition to the 12 national projects, a regional project known as BRICKS (Building Resilience through Innovation, Communication and Knowledge Management) was also delivered by World Bank with CILSS (Interstate Committee for Desertification Control in the Sahel), Sahara and Sahel Observatory (OSS) and IUCN (International Union for Conservation of Nature) as implementation agencies. The objective of BRICKS was to improve accessibility of best practices and monitoring information within the SAWAP portfolio on sustainable land use and management. This was funded from 2013-2018, along with most of the projects in the SAWAP portfolio.

[5] World Bank / GEF. 2011. Sahel and West African Program in Support of the Great Green Wall Initiative. Page 1.
[6] Countries that form part of the Pan-African Great Green Wall include Burkina Faso, Chad, Djibouti, Ethiopia, Eritrea, Mali, Mauritania, Niger, Nigeria, Senegal, and Sudan.

Utilizing a desk review of project documents and interviews with World Bank staff from Task Teams, this report documents the combined technical outcomes of SAWAP investments up to 2019 and provides a perspective on the overall achievements of the SAWAP projects and relative success of efforts to scale up sustainable land and water management.

This report is not a comprehensive evaluation of the SAWAP program. The research for this report was conducted largely in the months of October 2019 and April 2020 in Washington, DC and given the limited resources and the COVID pandemic, no international trips or field missions were undertaken.

With those qualifications in mind, the authors believe this report offers valuable cumulative outcome reporting, portfolio-level lessons learned and guidance at a time when most SAWAP projects have closed or will close soon – and the next generation of programs are being identified and designed to restore degraded lands, scale-up climate smart agriculture, increase resilience to climate change and contribute to sustainable development goals across the Sahel and West Africa region.

The Great Green Wall

and Sustainable Land Management across the Sahel and West Africa Region

The Great Green Wall (GGW) Initiative for the Sahara and the Sahel led by the African Union (AU) and United Nations Convention to Combat Desertification (UNCCD) was launched in 2007 and became operational in 2009. It originally envisioned a 15 kilometre-wide green "wall" that stretched across almost 8,000 kilometres (km) of the Sahel from the Atlantic Ocean to the Red Sea. In total area, the Great Green Wall (GGW) would equal around 12 million ha located mostly in the 300 million ha Sahel region (mostly between 300 to 400 mm of rainfall annually). The GGW originally had a strong emphasis on planting trees across this entire area, but has since evolved into a much broader programme for sustainably improving livelihoods and degraded lands across the entire Sahelian landscape (not just within a 15 km wide wall).

The Great Green Wall stretches across a highly insecure region that has a plethora of political, socio-economic and biophysical challenges. SAWAP countries, with the exception of Ghana, have some of the lowest Human Development Index (HDI) rankings in the world (out of 189 countries): Niger (189), Chad (187), Mali (184), Burkina Faso (182), Ethiopia (173), Sudan (168), Togo (167), Senegal (166), Cote D'Ivoire (165), Benin (163) and Nigeria (158). In the Sahel region [7] the GDP per capita in purchasing power parity ranges from $900 to $3,000 per capita, being highly dependent on minerals and oil in many countries. The current population of the region is around 140 million people, which is anticipated to grow to 330 million by 2050.

Unfortunately, many people in this region also suffer from persistent hunger and malnutrition that stymies development. The FAO (2019) estimates that approximately 30 million people in the Sahel are food insecure despite decades of donor aid programs. Furthermore, there is estimated to be 10 million people suffering from severe food insecurity. In Northern Nigeria (Katsina State), a recent study found that 80% of farming families produce just 3-6 months of food, highlighting their dependence on off-farm labor and their vulnerability to climate change [8]. The current conflicts and insecurity currently increasing across many parts of the Sahel are only further exacerbating food insecurity.

[7] Defined here as 10 countries: Eritrea, Sudan, Chad, Niger, Burkina Faso, Mali, Mauritania, Senegal, The Gambia, Guinea-Bissau.

[8] Saulawa et al. 2018. Impact of Desertification on Livelihoods in Katsina State, Nigeria. *Journal of Agriculture and Life Sciences* 5(1) 34-52.

A significant part of the region continues to experience a decline in soil fertility and a degradation of vegetation, which leads to erosion by water or wind. The degradation of natural resources reduces the resilience of smallholder land users to climate change. The rates of demographic growth in many Sahel countries are over 3% annually - the highest in the world and they make it difficult to achieve household food security and reduce rural poverty. Although the growth rates of urban centers are higher than in rural areas, in absolute numbers the rural population continues to increase in many areas, and this leads to an expansion of areas under cultivation.

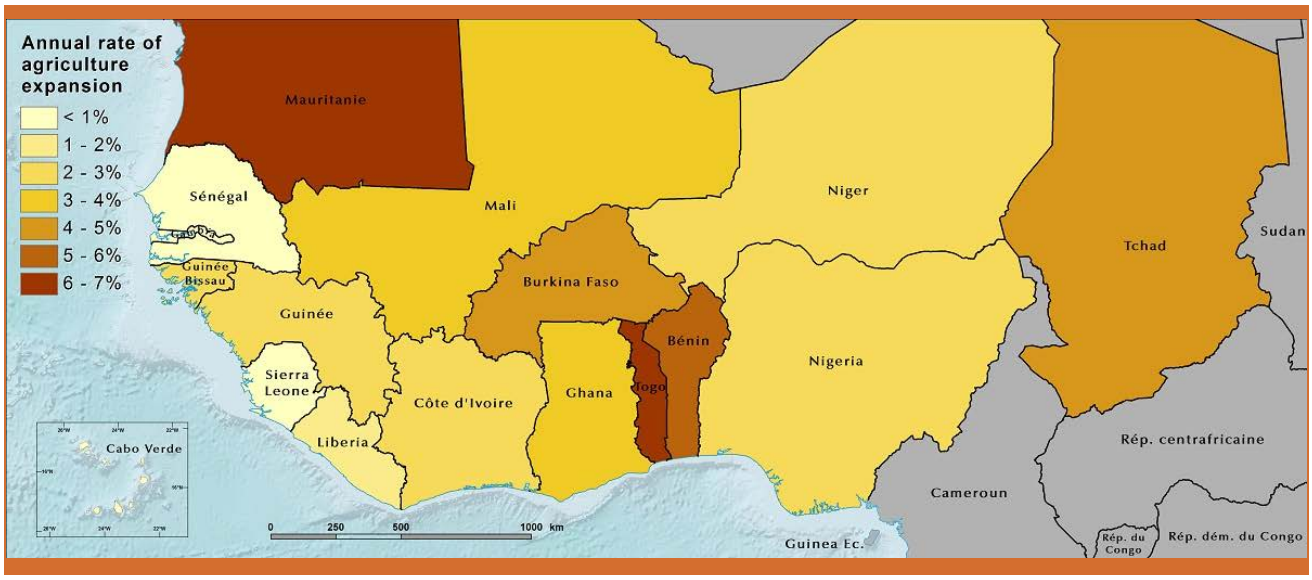


Figure 2: Increase in Agriculture in the West African Sahel 1975-2013 (*Source: USAID/US Geological Service*)

West African areas have experienced a doubling of agricultural areas since 1975, while the areas of savannas and forests have plummeted. In 2016, the CILSS with support from the U.S. Geological Survey and United States Agency for International Development (USAID) published an atlas of the Landscapes of West Africa: A Window on a Changing World. The Atlas produced 17 West African country profiles, with time series analysis of land use and land cover trends based on an analysis of satellite imagery from 1975-2014. This dataset illustrates how landscapes across the region have been fragmented by agricultural expansion, degraded by livestock grazing and wood harvesting and otherwise subject to rapid environmental changes. The areas of savanna, woodland and forests all declined significantly, while the area of agricultural land and settlements increased sharply. Between 1975-2013, the area in West Africa covered by crops doubled from around 50 million ha to more than 100 million ha or 22.4% of the land surface. During the same period, forest cover was reduced by 37%, and the natural vegetation in many areas of savannas and steppes were removed or degraded, resulting in an increase of 47% in sandy areas [9].

However, despite the general negative regional trends, there are also some significant positive developments in some landscapes. The larger-scale transformative environmental changes that have been documented on millions of hectares across the Maradi, Zinder and Tahoua regions of Niger, on the Seno plains of Mali, and in the Yatenga region and central plateau of Burkina Faso are largely the result of community-level action led by pioneering, innovative smallholder farmers.

[9] CILSS, 2016. Landscapes of West Africa – a Window on a Changing World. U.S. Geological Survey EROS, p. 43.

Faced with growing population pressure, suppression of fallows, declining soil fertility, growing scarcity of fodder and fuelwood on common lands and changes in rainfall regimes linked to climate change, these communities have experimented with and adapted practices like improved planting pits (zaï) and other techniques for water harvesting and soil fertility management. Farmer-Managed Natural Regeneration (FMNR) has led to the reconstruction of agroforestry parklands. The collective efforts of village communities have helped to reclaim and regenerate degraded cropland, pastures and forests, while intensifying and diversifying rural production systems and generating a range of economically important benefits for rural households.

Sustainable land and water management (SLWM) was defined by TerrAfrica as: the adoption of land-use systems that, through appropriate management practices, enable land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources. Hence, SLWM can encompass other approaches such as integrated natural resources management, integrated water resource management, integrated ecosystem management, eco-agriculture and sustainable forest management, and many facets of sustainable agriculture, agriculture water management, biodiversity conservation and climate change adaptation, such as agroforestry. Some specific examples of SLWM are shown below.

Land/water management approaches		**Land/water management technologies**
Land use regimes	**Agronomic and vegetative measures**	**Structural measures**
• Landscape plans • Community land use plans • Grazing agreements, closures, etc. • Biodiversity corridors • Protected Area management • Conservation zones • Other	• Inter-cropping • Agro-forestry in crop or grazing systems • Afforestation and reforestation • Mulching and crop residue • Crop rotation • Fallowing • Low till • Composting/green manure • Integrated pest management • Vegetative strip cover • Contour planting • Re-vegetation of rangelands • Integrated crop-livestock systems • Woodlots • Alternatives to wood fuel • Sand dune stabilization • Other	• Terraces and other physical measures (e.g. soil bunds, bench terraces, etc.) • Flood control and drainage measures (e.g. rock catchments' water harvesting, cut-off drains, vegetative waterways, stone-paved waterways, flood water diversion, etc. • Water harvesting, runoff management, and small-scale irrigation (shallow wells/boreholes, micro ponds, underground cisterns, percolation pits, ponds, spring development, roof water harvesting, riverbed dams, stream diversion weir, farm dam, tie ridges, inter-row water harvesting, half-moon structures, etc.) • Gully control measures (e.g. stone check dams, brushwood check dams, gully cut/reshaping and filling, gully, revegetation, etc.) • Other

There is now an established, long-term technical body of knowledge and experience on successful, sustainable SLWM approaches. On either side of the Sahel, there have been different histories of SLWM (up to 2004):

- **West African Sahel**. Until 1980, agriculture in the West African Sahel was in crisis. Crop yields were low and declining, and there wasn't accepted knowledge on how to reverse the process of natural resource degradation. But that changed as a result of such technical breakthroughs as the improvement of traditional planting pits (zaï), the development of contour stone bunds and the introduction of half-moons. These are all water harvesting techniques which collect and concentrate runoff on cultivated areas and multiply the quantity of water available to plants. From the perspective of smallholder farmers and herders, they are mainly investing in practices that provide a short-term economic benefit, principally in terms of higher cereal yields and improved crop production, and associated increases in the supply of fodder, fuelwood and other economically valuable products. They also recognize the benefits of investing in agricultural intensification, and more diversified and resilient production systems that incorporate sustainable land management practices and contribute to the overall restoration of degraded land.

- **Ethiopia**. The Derg Regime in Ethiopia (1974–1991) invested in terracing and other techniques to reverse land degradation in the Highlands. Their approach was strongly top-down and after they were removed from ower, much of what had been constructed was not maintained or even destroyed. However, a new government in 1991, quickly made restoration of natural resources a key pillar of their development strategy. In particular, starting in the mid-1990s government and donor-supported restoration of small watersheds became more prominent. One technique, applied at scale in Northern Ethiopia, is to set aside degraded land to allow its natural vegetation to restore. This so-called exclosure technique closes the land for livestock grazing and collection of firewood, but allows the cut and carry of grass. Enrichment planting was introduced in these exclosures to increase the diversity of trees.

Starting in 2004, the protection and management of natural regeneration of woody species on-farm began to draw attention, when the scale at which this technique was successfully applied by smallholder farmers in Niger gradually became clear. This also led to uncovering examples of natural regeneration in other Sahel countries, although not at the scale found in Niger. This contrasted sharply with past approaches that attempted to increase tree numbers. Since the large drought of 1968–73 across the Sahel, tree planting had been one of the main reactions to the environmental crisis. As soon as an area was declared to be suffering from 'desertification', the reaction often was, "let's plant trees". This led to generations of forestry service-led tree planting projects, which often produced poor results as survival rates of trees were low. It also led to village forestry projects in the 1980s, many of which failed because of poor soils selected for tree planting, as well as ill-defined ownership of the trees.

Despite the demonstrated successes of SLWM interventions, degradation trends outside those areas are still worsening and conflicts are increasing across many parts of the Sahel. Desertification and land degradation do not inevitably lead to conflict. However, by causing poverty, marginalization, and migration, they create the conditions that make violence a more attractive option – particularly for disenfranchised young men. For example, marginalized pastoralist groups have been more easily recruited for militias, where they are able to raid cattle or destroy farmland. It is already one of the most insecure regions of the world, with 6 of the 12 SAWAP countries (Burkina Faso, Chad, Mali, Niger, Nigeria, Sudan) categorized as Fragile and Conflict States (FCS) by the World Bank (2019) and Togo previously considered a FCS during the implementation of SAWAP.

These persistent medium-intensity conflicts have produced approximately 3.1 million refugees, Internally Displaced Persons (IDP), returnees, and people at risk of statelessness in the Sahel– most of whom receive little international support [10].

The increasingly dire situation in many Sahel countries have mobilized high-level, international attention and recognition that better (and more) investments are needed. The G5 countries (Burkina Faso, Chad, Mali, Mauritania, and Niger) established in 2014 fosters regional cooperation for both development policies and security matters – making SLWM an ideal fit to contribute positively to both objectives. The Sahel Alliance [11] is currently implementing €600 billion of development projects from 2018 to 2022 with "agriculture, rural development and food security" a key pillar of action.

[10] United Nations Refugee Agency (UNHCR). 2020.
[11] Members: France, Germany, the EU, the World Bank, the African Development Bank, UNDP, Italy, Spain and the UK.

SAWAP PORTFOLIO REVIEW

SCOPE AND FOCUS OF THE SAWAP ROJECTS

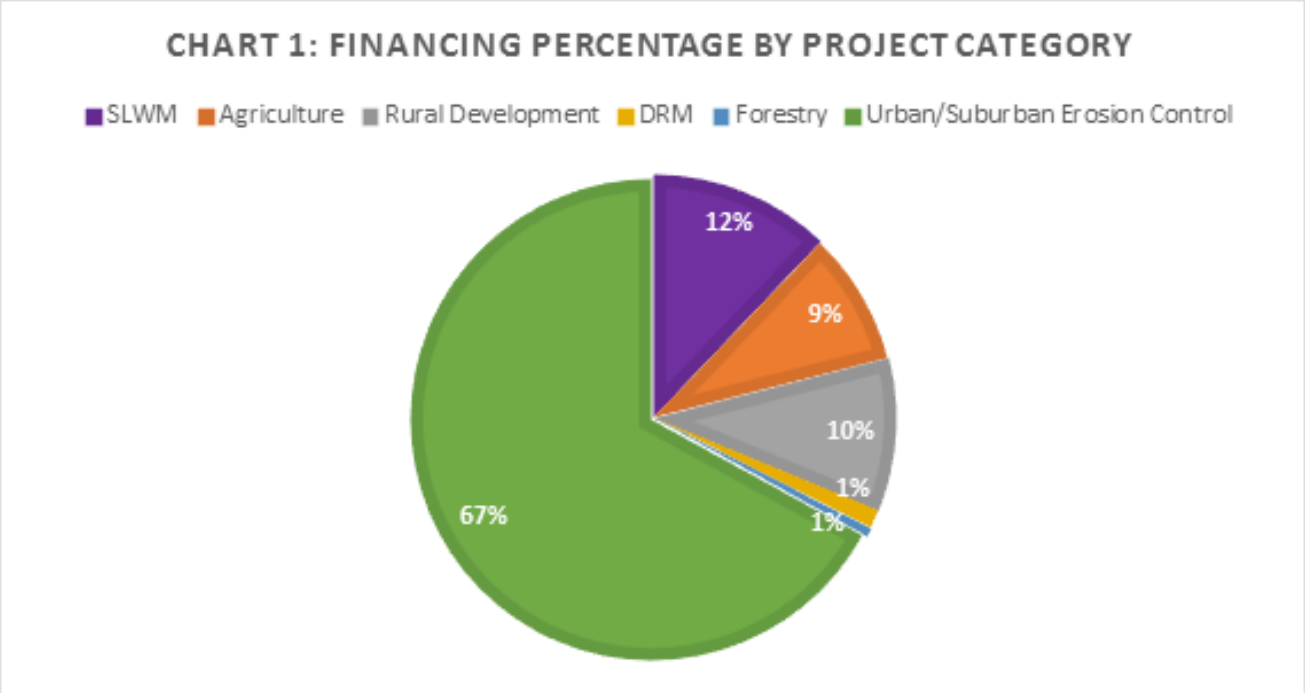
As originally envisioned, all 12 country projects and 1 regional project were eventually implemented through the SAWAP.

Table 1	SAWAP Project Basic Information					
Country	**Project**	**Project Code**	**Implementation Period**	**Total Financing ($ M)**	**Lead Global Practice**	**IEG Outcome Rating**
Benin	Forests and Adjacent and Management AF	P132431	2013-2018	$7.6	Environment	Satisfactory
Burkina Faso	Community Development Mgmt. Project – Phase 3	P129688	2013-2018	$93.4	Agriculture	Moderately Satisfactory
Chad	Agriculture Production Support Project	P126576	2012-2017	$34.7	Agriculture	Unsatisfactory
Ethiopia	Sustainable Land Mgmt.– Phase 2	P133133	2014-2018	$96	Environment	Satisfactory
Ghana	Sustainable Land and Water Management	P098538/ P132100	2010-2020 (AF)	$29.6	Environment	Moderately Satisfactory (ISR Rating)
Mali	Natural Resource Mgmt. in a Changing Climate	P145799	2014-2019	$21.4	Environment	Moderately Satisfactory
Mauritania	Sustainable Landscape Management	P144183	2015-2021	$6.1	Environment	Satisfactory (ISR Rating)
Niger	Community Action Program – Phase 3	P132306/ P163144	2013-2018 (AF)	$67.6	Agriculture	Satisfactory (ISR Rating)
Nigeria	Erosion and Watershed Mgmt.	P124905	2012-2021 (AF)	$908	Environment	Satisfactory (ISR Rating)
Senegal	Sustainable and Inclusive Agribusiness	P124018	2014-2020	$86	Agriculture	Moderately Satisfactory (ISR Rating)
Sudan	Sustainable Natural Resources Mgmt.	P129156/ P161304	2014-2021 (AF)	$13.6	Environment	Moderately Satisfactory (ISR Rating)
Togo	Integrated Disaster and Land Mgmt. Project	P123922	2012-2017	$16.4	Environment	Satisfactory
Regional	BRICKS	P130888	2013-2018	$4.6	Environment	Moderately Satisfactory (ICR Rating)
Total Financing $1.38 billion						

The $100 million in GEF grants were combined with a substantial amount of World Bank funds as originally envisioned in 2011. Approximately $1.2 billion of World Bank resources were eventually mobilized, primarily from IDA. This represents a considerable amount of financing for the Great Green Wall Initiative and has been widely publicized. All of these projects contributed explicitly to their relevant Country Partnership Frameworks (CPF) or Country Partnership Strategies (CPS). However, it should also be noted that these funds were not distributed evenly across the 12 countries, as there were different entry points, investments and experiences in SLM, across these countries. Around 65% of the SAWAP funds were from one project, Nigeria's Erosion and Watershed Management Project (NEWMAP). Some of the projects, such as in Mauritania ($6.1 million) and Sudan ($7.7 million), were quite small in comparison, despite having just as much semi-arid land area.

Although GEF grants were consistently focused on expanding the SLWM areas, the World Bank projects these grants were co-financing could often have objectives that were much broader than solely focused on expanding SLWM areas. As seen from Table 2, projects can be technically divided into about 6 different categories of focus: SLWM specific (5 projects), Agriculture (2 projects), Decentralized Rural Development (2 projects), disaster risk management (DRM) (1 project), Forestry (1 project), Urban/Suburban Erosion Control (1 project). Although projects not solely focused on SWLM can clearly contribute significantly to the objectives of the SAWAP, there was potential for these projects to not dedicate as much focus on SLWM due to competing priorities (to be analyzed later). In terms of financing per project category, the majority of the funds were focused on urban/suburban erosion control, with SLWM, Agriculture, and Rural Development roughly evenly splitting the remaining funds (See Chart 1).

Table 2		SAWAP Project Descriptions & PDOs	
Country	**Project**	**General Project Categories**	**Project Development Objective**
Benin	Forests and Adjacent Land Management AF	Forestry	To assist the Recipient in its effort to lay down the foundation for a collective integrated ecosystem management system of its forests and adjacent lands
Burkina Faso	Community Development Management Project – Phase 3	Decentralized Rural Development	To enhance the capacity of rural communities and decentralized institutions for the implementation of local development plans that promote sustainable land natural resources management and productive investments at the commune level
Chad	Agriculture Production Support Project	Agriculture	Support communities and producer organizations in increasing the production of selected crops and livestock species in selected areas of the Recipient's territory.
Ethiopia	Sustainable Land Management Project-Phase 2	SLWM	To reduce land degradation and improve land productivity in selected watersheds in targeted regions in Ethiopia.
Ghana	Sustainable Land and Water Management	SLWM	Demonstrate improved sustainable land and water management practices aimed at reducing land degradation and enhancing maintenance of biodiversity in selected micro-catchments, and (b) strengthen spatial planning for identification of linked watershed investments in the Northern Savanna region of Ghana.
Mali	NRM in a Changing Climate Project	SLWM	To expand the adoption of sustainable land and water management practices in the target areas in Mali.
Mauritania	Sustainable Landscape Mgmt. Project	SLWM	To strengthen sustainable landscape management in targeted productive ecosystems in Mauritania.
Niger	Community Action Program – Phase 3	Decentralized Rural Development	To strengthen the Recipient's local development planning and implementation capacities, to support the targeted population in improving agriculture productivity, and to respond promptly and effectively to an eligible crisis or emergency.
Nigeria	Erosion and Watershed Mgmt. Project	Urban/Suburban Erosion Control	To reduce vulnerability to soil erosion in targeted sub-watersheds.
Senegal	Sustainable and Inclusive Agribusiness Project	Agriculture	To develop inclusive commercial agriculture and sustainable land management practices in project areas.
Sudan	Sustainable Natural Resources Mgmt. Project	SLWM	To increase the adoption of sustainable land and water management practices in targeted landscapes
Togo	Integrated Disaster and Land Mgmt. Project	DRM	To strengthen institutional capacity of targeted institutions to manage risk of flooding and land degradation in targeted rural and urban areas.
Regional	BRICKS	SLWM	To improve accessibility of best practices and monitoring information within the Sahel and West Africa Program portfolio on sustainable land use and management.



When SAWAP was approved, it was explicit that it would not only address SLWM in "Sahelian ecosystems that are part of the official Great Green Wall (Burkina Faso, Chad, Ethiopia, Mali, Mauritania, Niger, Nigeria, Senegal and Sudan), but also challenges related to southern states in Nigeria and three additional West African countries (Benin, Togo, and Ghana) with important savannah and forest systems linked to the Sahel" [12]. This was justified based on the numerous connections between these two regions, including river systems crossing both zones (e.g., Niger, Volta), migrating wildlife, and migratory Sahelian herders. SAWAP was also approved based on GEF-5 objectives: "The program will be developed using a multifocal area strategy to help ensure good integrated ecosystem management approaches that can help secure a robust mix of primary and secondary ecosystem services from the landscape mosaic while adapting to climate change and variability".

However, as SAWAP is cited as the World Bank's primary contribution to the GGW, the $1.3 billion figure of financing exaggerates the funds flowing directly to the GGW. When Nigeria (all infrastructure investment funds are in humid southeastern part of country) and 3 other non-Sahelian projects are removed from the SAWAP financing figure of $1.3 billion, the amount dedicated strictly to the Sahelian ecosystems is around $400 million across 8 countries (average $50 million per country).

[12] World Bank / GEF. 2011. Sahel and West African Program in Support of the Great Green Wall Initiative.

Key Performance Indicators of SAWAP

Despite the variety of project development objectives, all projects under SAWAP were united with contributing to the SAWAP's key performance indicators (KPIs):

- Increase in land area with SLWM practices in targeted areas, compared to baseline (hectares; reported by crop, range, forest, wetlands and protected areas);
- Number of direct beneficiaries;
- Change in vegetation cover in targeted areas (hectares; generated from vegetation index data (NDVI));
- Change in carbon accumulation rates in biomass and soil, compared to baseline (RC/ha).

The performance indicators are analyzed in the following sub-sections.
KPI #1: Increase in Land Area of SLWM Practices

The SAWAP projects have surpassed their initial cumulative targets of 1.3 million hectares of increased land area of SLWM practices. As of 2019, SAWAP projects are on track to establish 1.6 million ha of SLWM practices across 12 countries (larger in area than Lebanon). By 2022, there is anticipated to be 821,527 ha of additional farmland under SLWM and an additional 719,385 ha of public lands (forests, rangeland, protected areas, gullies) under SLWM practices. Although this is a large area, it also represents less than 1% of the farmland of West Africa (roughly 100 million ha) and a small fraction of the 300 million-hectare Sahel.

In terms of scale, the Ethiopian SLMP2 stands out clearly as the highest performer in the SAWAP, by itself representing 68% of the total hectares of farmer-based SLWM practices. Only Phase 2 of SLMP was technically included in the SAWAP, but when considering Phase 1, Ethiopia achieved even more hectares (SLMP Phase 1 + Phase 2 = 860,000 ha total). SLMP2 had the advantage on building off a number of years of SLM investments in Ethiopia.

Table 3	**SAWAP Project Hectares of Land Restored**				
Country	**Farming SLWM Adoption (ha)**	**Transhumance Corridor / Rangeland Mgmt. (ha)**	**Improved Forestry Mgmt. (ha)**	**Protected Area Mgmt. (ha)**	**Degraded Gully Erosion Control**
Benin	-	-	8,059	-	-
Burkina Faso	-	568	213,320 *	-	-
Chad	-	235,520	-	-	-
Ethiopia	556,776	-	80,000	-	-
Ghana	10,992	-	72,716	-	-
Mali	3,667	-	-	-	-
Mauritania	3,000	-	-	-	-
Niger	112,911	-	-	-	-
Nigeria	-	-	-	-	20,000
Senegal	10,000	32,507	-	-	-
Sudan	121,800	19,000	23,200	20,688	-
Togo	2,396	-	58,407	-	-
Total	**821,542**	**287,595**	**455,702**	**20,688**	**20,000**

Total Hectares of Land Restored: 1.6 million

*Forestry Management Plans Only

There were considerable differences in types of SLWM practices applied across projects, with vastly different costs. Although counted identically in the 1.6 million ha target, projects applied very different approaches with different levels of investment ratios (See Table 4). Table 4 results should be taken as rough approximations only. Costs of adopting SLWM practices were calculated by taking the SWLM component of each project (excluding other components not including SLWM investments) and a proportional percentage of the project management component to derive a rough cost per hectare for each project. Whereas the Ethiopian project spent approximately $112 per hectare of SLWM practice introduced, the Burkina Faso project spent about $2 per hectare in developing forest management plans and Chad spent $20 per hectare in establishing transhumance corridors. On the other end of the spectrum, Nigeria has spent over $37,000 per hectare on infrastructure required for gully rehabilitation. When excluding outliers (Burkina Faso, Chad, and Nigeria), the total SAWAP cost per hectare of land restored was $277 ($258 million delivering 1,136,103 hectares).

Table 4	**Cost-Effectiveness of SAWAP Project Hectares of Land Restored**		
Country	**Total Financing Dedicated to SLWM ($ Millions)**	**Total Hectares Achieved**	**Cost Per Hectare ($)**
Benin	4.51	8,059	560
Burkina Faso	0.5	213,888	2
Chad	4.79	235,520	20
Ethiopia	71.4	636,776	112
Ghana	28.7	83,708	342
Mali	9.75	3,667	2,700
Mauritania	4.39	3,000	1,463
Niger	53.7	112,911	475
Nigeria	749.2	20,000	37,460
Senegal	68.4	42,506	1,609
Sudan	10.8	184,688	58
Togo	7.42	60,803	122
Average (excluding outliers: Burkina Faso, Chad and Nigeria)			**277**

Generally, SAWAP SLWM interventions per unit costs appear overly expensive when compared to industry benchmarks. Standard unit costs for SLWM interventions are usually costed at around $200/ha to $500/ha depending on the practices adopted (not including capital intensive works such as irrigation, radical terracing, and gully rehabilitation). While excluding some projects where the SLWM activities chosen would not fall under these standard cost ratios (e.g., Nigeria, Burkina Faso, Chad), there are still projects that appear to have inflated costs which need further analysis. Based on their activities, projects such as Mali ($2,700/ha) and Mauritania ($1,463/ha) would be expected to fall within the $200-$500 per hectare benchmarks, but their costs are more than double. On the other hand, the Niger ($475/ha) and Ethiopia ($112/ha) projects appear cost-effective at delivering their project outputs.

KPI #2: Number of Direct Beneficiaries

In terms of the number of direct project beneficiaries, the original SAWAP target of 11.3 million has already been far exceeded; as of 2019 over 19.4 million beneficiaries have been recorded for SAWAP projects. As in the case of SLWM hectares, there are large differences between the numbers and types of beneficiaries. In Benin, Mali, Senegal and Sudan, the number of direct beneficiaries after 5-10 years of investment was less than 50,000 people per project. On the other hand, some projects include very large numbers of beneficiaries, often from the construction and use of infrastructure. The projects in Burkina Faso, Niger and Nigeria reportedly all benefited millions of people, largely as a result of the relatively high level of investment in micro-projects and infrastructure associated with the construction and use of school classrooms, community centers, markets, and rural roads. As another example, the number of beneficiaries in Togo exceeds 2 million people because of the wide geographic area of flood warning systems established.

Table 5	SAWAP Summary of Outcomes and Beneficiaries	
Country	**Numbers of Beneficiaries**	**Types of Beneficiaries**
Benin	4,051	• Assisted with community-based forest management and sustainable wood fuel production and marketing.
Burkina Faso	4,046,760	• Financed 2,501 microprojects to invest in 80 local development plans; beneficiaries include everyone in targeted areas.
Chad	289,680	• 313 sub-projects; increased food production by 956,426 tons. • Distribution of 230 tons of seed and 4,550 tons of livestock feed.
Ethiopia	2,100,000 *reported by* BRICKS	• 421,130 households (HH) benefited from investments to reverse land degradation. • 360,205 HH in the project area received second-level certificates.
Ghana	57,595 (27,011 users adopting SLWM)	• 88 Community Resource Management Committees organized and 36 community watershed plans. • 27,011 land users have adopted SLWM practices
Mali	18,332	• 2,708 households gained access to a variety of alternative livelihoods, including some activities associated with SLWM (6% of HH in 14 targeted communes).
Mauritania	79,980	• Established 52 community development associations to support SLWM in 52 sites; • Infrastructure provided for 30 reforestation sites.
Niger	3,045,496	• 1,931 micro-projects for 500 annual investment plans; • 718 local management committees.
Nigeria	7,300,000 reported by BRICKS	• 21 targeted gullies treated through civil works; • 15 sub-watershed management plans prepared; • Investments in hydrological stations and flood warning systems.
Senegal	10,432	• 200 ha irrigated agriculture pilot operation. • 38% of land conflicts resolved through local institutions.
Sudan	47,210	• Demonstration farms, rangeland rehabilitation and management, water harvesting.
Togo	2,426,000	• Enhanced community capacity to prevent flooding; • Increased knowledge of SLWM practices; 98 sub-projects for income generation.
Total	**Approx. 19.4 million direct beneficiaries**	

Although the beneficiary numbers represent one variable where the projects have been very successful, most of the reported beneficiaries are not implementers of SLWM practices. Rural infrastructure is vitally needed in the SAWAP countries, but the objectives of the program were to expand SLWM practices across targeted areas. In this respect, the number of beneficiaries is likely less than 19.4 million. If only the recipients of SLWM investments are added up, the number of direct beneficiaries is in the order of 1 million people; but the number of indirect beneficiaries may not be as clear to determine. Some projects that solely focused on SLWM can have a limited number of beneficiaries that actually adopt SLWM measures. For example, in Mali, the total number of reported beneficiaries is around 18,000 people (predominately from training), but the number of land users adopting SLWM practices is less than 2,000, and the number of households gaining access to alternative livelihood activities related to SLWM practices is less than 3,000.

KPI #3: Change in Vegetation Cover in Targeted Areas (hectares; generated from vegetation index data (NDVI))

For this indicator, the BRICKS' SAWAP Monitoring Reports (produced by OSS) rely on Normalized Difference Vegetation Index (NDVI) statistics showing annual changes in vegetation cover from 2000 to 2018 [13]. However, the NDVI is an indication of greenness with most of the signal coming from grass and herbaceous cover. It varies from year to year depending on annual rainfall amounts and distribution, and the NDVI is poorly correlated to other indicators for changes in woody vegetation cover, such as percentage tree cover, biomass or carbon content. The area under shrubs/clear forests, meadows and crops shows very little change from the years 2000-2018, but there are annual changes, which can at least to a certain degree be explained by changes in annual rainfall. For instance, 2011 was a year of poor rainfall and the area under vegetation was around 402 million ha. In 2012, there was better rainfall and the area in this category of land cover immediately increased to 420 million ha, because higher rainfall means more grass. This is not, however, an indication of an actual increase in tree cover on 18 million ha [14].

The SAWAP Monitoring Report also provide data for a category of "dense forests", but this indicator fluctuates widely, which illustrates its inaccuracy. The area under dense forests was 51.74 million ha in 2011 and 51.01 million ha in 2012. This represents a loss of 730,000 ha of dense forest in one year. The following year (2013), the area of dense forests is 52.56 million ha or an increase of 1.55 million ha compared to 2011. The annual fluctuations in areas under dense cover are not logical and can certainly not be attributed to good SLWM practices as is suggested by the BRICKS Monitoring and Evaluation Report (e.g., page 28 of June 2019 Report).

The BRICKS Project attempted to apply the NDVI indicator to specific project areas, with limited success. The national projects did not originally make provisions for all project sites to be georeferenced and it was later attempted, with the impetus of BRICKS, to georeference all project sites. However, there was varying success between projects in this exercise. Some projects (e.g., Ethiopia) seem to have been relatively successful in georeferencing project investments, but most projects are only able to map project investments at the commune level. As the amount of land treated with SAWAP SLWM investments is small relative to the large areas of the Sahel, the NDVI is not a reliable way of measuring project successes.

KPI#4: Change in carbon accumulation rates in biomass and soil, compared to baseline (RC/ha).

The BRICKS Progress Reports also present information on carbon accumulation, but implausible data changes undermine the reliability of the data. In reporting the annual MtC by country and year, the annual fluctuations can be significant. For example, it is not possible to go from 3912 MtC in Burkina Faso (2013) to only 2692 MtC (2014), and then back up to 3270 MtC (2015).

[13] CILSS, IUCN, OSS, 2019. BRICKS Monitoring and Evaluation of the SAWAP Program from June to December 2018. Table 6, p. 26.
[14] To address this issue at least partly, BRICKS (and other experts) have promoted the use of rainfall weighted NDVI.

The changes in the land use/land cover (LULC) and the woody vegetation associated with the LULC does not drop so drastically in one year, then somehow recover in the following year. Most of the carbon on the land is tied up in woody vegetation, and in the upper soil profile. Woody vegetation biomass (and carbon) does not fluctuate dramatically from year to year, nor does the carbon in the soil.

INITIAL LESSONS LEARNED FROM THE SAWAP

Based on this rapid review, a number of observations and lessons learned have been drawn to spur reflection and discussion amongst World Bank management and technical staff and development practitioners more broadly.

SLWM Project: Ethiopia Sustainable Land Management Phase 2 – Successful as it built on strong foundations

Countries and development partners can learn much from the achievements of the Ethiopian SLMP 2 in successfully scaling-up SLWM. The results of this exercise highlight the success of Ethiopia in building on strong SLM foundations which enabled scaling up SLWM, and in contributing to the goals and objectives of SAWAP. It is responsible for close to 70% of SAWAP's total farmland hectares treated with SLWM investments, and it did so in a cost-effective manner, while also addressing many of the underlying constraints to SLWM (such as land tenure issues). The World Bank, TerrAfrica and Connect4Climate (C4C)[15] have produced media to highlight the evolution in approaches and the key characteristics of the new approaches which have been proven to be effective in Ethiopia.[16] The documentary films produced by the World Bank, "Regreening Ethiopia's Highlands: A New Hope for Africa" and by "Mark Dodd, "Ethiopia Rising", also provide a visually compelling and informative narrative of what has been accomplished through grass roots mobilization and how, as well as the many positive impacts of widespread adoption of SLWM practices.[17]

The Ethiopian SLMP 2 project represents a transformative project. A vicious cycle of disempowered and unorganized rural communities, resource overuse and degradation, erosion and flooding, vulnerability to drought, deepening poverty and despair has been transformed in targeted micro-watersheds to a virtuous cycle of community empowerment, investments over time building trust and ownership, local organization and commitment to enforce rules governing the use of natural resources, investment in watershed conservation, widespread adoption of SLWM practices to stimulate and manage natural regeneration and restore the vegetative cover, and conservation of soil and water resources. In addition, adoption of practices like cut and carry, and stall feeding of livestock, increased agricultural productivity and development of dry season gardening and diversification of local livelihoods have all been implemented in these project sites. Support for the recognition and enabling of local champions for SLWM, peer-to-peer learning, expanded communication and outreach, improved local governance and increased security of land rights, and increased access to information and markets were also critically important. The result has been large-scale regreening and a transformation of landscapes and lives of people.

Consistent with the Ethiopian SLMP – Phase 2's success, this operation has already been followed by the $100 million Resilience Landscapes and Livelihoods Project approved in 2018 specifically for SLWM and then the $500 million Ethiopian Climate Action through Landscape Management Program for Results (PforR), approved by the World Bank Board in 2019. It continues to innovate, and useful lessons can be drawn from it for other SWLM projects across the Sahel.

[15] Ethiopia: Field visit to Tigray: https://vimeo.com/120534964
[16] The World Bank, 2015. Restoring the Landscapes of Ethiopia's Highlands: Creating Natural Wealth for Improved Livelihoods.
[17] Mark Dodd, 2015. Ethiopia Rising: Red Terror to Green Revolution. https://www.youtube.com/watch?v=b33mFU7htU0

SAWAP Project's Scope and Focus

With the exception of Ethiopia, most SAWAP projects set low targets for SLWM hectares considering the scale of needed investments, as this was driven by funding envelopes available at the time. SAWAP projects exceeded their indicators of "hectares of land under SLWM practices". That said, the scale of need is huge across the Sahel, and it may seem the indicator targets set at appraisal do not seem commensurate with the scale of the challenges. Looking forwards, any program to address SLM in the Sahel need to target SLM practices specifically, that are replicable and can go to scale. In relative terms, the SAWAP's targets in some countries demonstrated lower ambitions than the needs on the ground: Burkina Faso (213,000 ha of forest management plans), Chad (0 ha of farmland; 235,000 ha of transhumance corridors of questionable attribution), Mali (3,600 ha), and Mauritania (3,000 ha).

Available evidence suggests that projects which are focused on broader agricultural and rural development objectives, tend to neglect holistic SWLM activities. While it is important and useful to integrate attention to SLWM and other natural resource management considerations into local development, the evidence from SAWAP indicates SLWM results are disappointing when combined with agribusiness, decentralization and community development issues, particularly with respect to the long-term financing of local government and infrastructure development at the local level. Of the seven projects that did not have only a SLWM focus, most turn out to be fairly inefficient at delivering SLWM across landscapes. The Burkina Faso, Chad, and Senegal projects all have a strong focus on agriculture and rural development, but often SLWM at-scale has not been the priority. Although these projects cost $35 million, $86 million, and $93 million respectively, these three projects produced limited numbers of hectares of SLWM.

SWLM is most successful when a targeted, focused approach is made to address land degradation. More attention could be focused on engaging farmers, herders and community leaders with critical roles in adopting SLWM practices by ensuring that increased economic benefits flow to those adopting these improved SLWM practices. Over time, the increased productivity of restored land, and intensified and diversified rural production systems will help to increase the levels of economic activity and revenue flows to local government. However, using a SLM investment program to directly finance infrastructure aimed at increasing revenues for local government (as was done in the case of Burkina Faso) is not a replicable or sustainable strategy:

- **Burkina Faso**: The Community Development Management Project combined support for decentralization with a focus on enabling communes to generate increased economic activity and tax revenues for their financial sustainability, and support for poverty reduction at the community level. Although the project included an additional focus on SLWM, it lacked clarity about specific strategies and targets to identify needed shifts from unsustainable land and resource use. In addition to updating the area management plans for protected areas covering some 200,000 ha, financing was provided for 34 participatory forest management plans. However, given project delays, relatively poor performance and other obstacles to implementing activities for this component, it was decided to reallocate 75% of the resources budgeted for SLWM to village micro-projects. In the end, this project's contribution to SAWAP's SLWM goals were management plans developed for 235,000 hectares of land (with approximately $2 spent per hectare) despite accounting for $86 million of the financing raised for SAWAP, which were re-directed to agriculture and rural development needs.

Some SAWAP projects justify small project sizes as capacity building and "SLWM pilots", but the methods and their cost ratios likely prohibit scaling-up of the pilots as designed. Since understanding scaling is important, a closer look at this is taken, although it was not part of the original scope of SAWAP. The primary reasons for the lack of scaling in follow on SAWAP projects are: (a) lack of scaling strategies, (b) overly centralized implementation, (c) lack of cost-effectiveness, and (d) unsustainable incentives.

A. Lack of Scaling Strategies: As mentioned earlier, by themselves, SAWAP project's area of land treated with SLWM practices is a small fraction of the overall Sahel areas. However, SAWAP projects generally focus on their specific project areas and are not devising financing or implementation strategies for countries to achieve their broader targets of land restoration and increased productive capacity. Scaling is not a matter of multiplying the amount of funding. Rather, it incorporates targeted policy and institutional reforms designed to empower local communities and enable desired changes in behavior by smallholder farmers and herders. To be transformative, it also identifies strategic priorities and focuses interventions on a set of cost-effective activities designed to trigger impacts at scale with minimal dependence on continued external funding. In many cases, the SAWAP projects provided governments with funds which enabled them to continue "business-as-usual" approaches for agriculture, rural development and investments in infrastructure. It appears that scaling strategies for SLWM and opportunities to leverage the replicability of relatively low-cost best practices have until now not received the attention that they deserve.

B. Lack of Cost-Effectiveness: A key challenge for every government agency and development partner is how to get the biggest bang for each dollar invested in SLWM in terms of the number of hectares under SLWM and their associated biophysical, socio-economic and agronomic impacts. With notable exceptions (Ethiopia, Niger, Sudan), the SLWM costs of World Bank projects are higher than standard sector benchmarks. These high costs are related to the generation of capacity building, as well as the use of purchased fencing, drilled wells, pumping and water storage facilities, and equipment and other infrastructure for tree seedling nurseries, and investments in tree plantations and irrigated agriculture. Given the scale of needs, lower cost pathways need always to be explored to reduce the vulnerability of rainfed agriculture to variable rainfall and to diversify and intensify agriculture production through the widespread use of improved SLWM practices on millions of hectares. Even in the generally cost-effective Niger project there were certain activities that have significantly elevated unit costs that would be prohibitively expensive at scale: for example, the costs of small-scale irrigation projects ranged from 22,000 to 30,000 $/hectare.

C. Overly Centralized Implementation: SAWAP projects generally relied heavily on national implementing agencies and government technical services. Some agencies hired NGOs as service providers for specific interventions. Relying on national implementing agencies and government technical services has some strengths, such as building experience and capacity in government for SLWM that can increase institutional support. However, experience of successful approaches since the 1980's highlights the importance of decentralized approaches and community empowerment. The Ethiopian SLMP Project applied these lessons learned. In contrast, SAWAP countries that relied heavily on government technical agencies were not always successful. In general, the more decentralized a project is in SAWAP countries the more effective it is.

D. Reliance on Unsustainable Incentive Payments: Generally, SAWAP projects that have invested in SLWM use forms of incentives to get land users to adopt specific practices. In some cases, short-term employment and social safety nets needed to be urgently addressed. However, the perception of land-users in most Sahel countries is usually that if the government pays for construction, it should also pay for maintenance. This means that in the post-project phase, land users will not expand what they have realized. For instance, if water harvesting techniques are constructed on a cash-for-work basis, land users may be unlikely to expand these techniques in the post-project phase. Therefore, incentive mechanisms need to be examined carefully as their use in some contexts may reduce replicability. Unless incentives for multiple-benefits are 'owned' by communities, it may be assumed that a large portion of SAWAP investments will not be (adequately) maintained by the beneficiaries after the projects close; but this should be examined at the close of all SAWAP projects.

For example, the Niger project supports Farmer-Managed Natural Regeneration (FMNR). It pays farmers to protect and manage the natural regeneration of on-farm trees. Paying land-users for FMNR may have a negative impact on similar interventions in and outside the intervention areas of SAWAP project. The real reward for the land users has always been the multiple benefits generated by FMNR. The large-scale spreading of FMNR in Southern Niger was a mix of external support for knowledge management (farmer study and exposure visits, local institution building), assistance with local level governance of land and natural resource use, and spontaneous adoption.

Land Tenure and Enabling SLWM Policy

Tenure security is one of the important underlying conditions for sustainable, effective SLWM investments. Investments by land users in soil and water conservation measures will only be undertaken when sufficient returns are expected and can be realized. The returns on local investments in SLWM are enabled with secure rights to land and tree tenure, especially in the case of agroforestry and soil conservation practices that generate increased benefits over a number of years. These practices can even provide some productivity and resilience benefits in the first year after adoption; farmers can harvest some firewood and fodder from protected and regenerated trees in fields within a year or two, and crop yields begin to increase from soil conservation and water harvesting practices adopted during the first cropping season.

Without some degree of tenure security, smallholder farmers and herders are unlikely to devote their precious resources to such efforts, especially if they are not able to protect their land and resources from uncontrolled cutting, grazing and fires. The security of land and tree tenure can be increased not only by land registration and other measures to formalize land ownership, but also by mobilizing and empowering rural communities to adopt and enforce bylaws (or local conventions) governing the use of natural resources. Appropriate changes in forestry regulations and laws governing the protection and use of trees may also help to encourage the adoption of SLWM practices such as FMNR. Regulatory and institutional reforms may also be needed to discourage rent-seeking behavior and reduce corrupt practices by the Forest Service that would otherwise impede the widespread adoption of FMNR and local investments in tree crops and related agroforestry practices.

While several SAWAP projects did include activities designed to strengthen land tenure legislation and secure land rights, most projects did not plan concerted efforts to improve these conditions. In addition to land tenure issues, SAWAP projects also did not include a concerted effort to identify and achieve the necessary policy shifts, institutional and fiscal reforms and other actions required to devolve power and authority and to improve the enabling conditions for scaling-up SLWM. The notable exception was Ethiopian SLMP2, which emphasized “land tenure security of small holders in the project area enhanced”. The Ethiopian project dedicated $7.6 million on the Rural Land Administration, Certification and Land Use component. The project aided 360,205 households in the project area receiving second-level land certificates, while 105,144 women received certificates either individually or jointly. Moreover, 9,661 landless youth were issued land certificates or other legal documentation to use communal landholdings in exchange for restoring 2,737 ha of land. This works continues with the Ethiopian Climate Action through Landscape Management Program for Results.

While focusing on interventions designed to improve tenure security enhances the chances of SLWM success, it adds risk and complexity to project activities that many projects would prefer to avoid. The Senegal SAWAP project provides an example:

- **Senegal:** The project has a very ambitious and complex design, combining reforms and innovations in securing land use rights and allocating land tenure, mobilization of private sector investments in agribusiness and significant infrastructure investments for the development of irrigation agricultural land and agricultural value chains with the protection and management of forests and protected areas, and the adoption of SLWM practices. Due in large part to land tenure allocation delays from government, the project had less than 30% disbursement with one year left in the original implementation period.

Land tenure security and certification activities are likely best suited for combination with focused SLWM operations. While there is a rationale for integrated approaches, given the complexity of land tenure issues, it may have been more efficient in the Senegalese case to address tenure reforms as a separate governance related pilot project rather than combining it with a complex agribusiness and commercialization. On the other hand, the combination of land tenure certification and SLWM have reinforced one another in the Ethiopian case. However, it is important to note that substantial resources need to be devoted to these land administration activities. The Ethiopian SLMP2 spent more on land administration ($9.6 million) than most SAWAP projects spent in total on SLWM activities – highlighting an advantage of larger projects.

Sahel Biodiversity and the Great Green Wall

The biodiversity of the Sahel is one of the most imperiled in the world and the Sahel has one of the lowest rates of protection in the world. During the last century, the increased accessibility of previously remote areas (more roads and desert-capable vehicles) and firearms have dramatically amplified the impact of hunting activities. Along with land degradation, biodiversity that has supported local populations for centuries have largely disappeared. Of the 14 large vertebrate species from the Sahel, 12 have already been declared Extinct in the Wild [18]. Not surprisingly, only 5% of the Sahel has been designated as protected areas, which is far below the 2020 Aichi Target of 17%.

SAWAP has made positive contributions to raising awareness about the importance of biodiversity conservation in SAWAP countries. Under the BRICKS Project, IUCN (2017) produced the "Biodiversity and the Great Green Wall: Managing Nature for Sustainable Development in the Sahel". It is a high quality report that highlights the importance of biodiversity both on-farms (particularly soil biodiversity), and off-farm in community conserved areas that could also provide grazing and hunting areas. The report makes the following recommendations for further improving biodiversity outcomes in the Sahel region:

- *Mainstream sustainable land management in the agricultural sector to achieve Land Degradation Neutrality;*
- *Establish institutional arrangements that enable landscape restoration and sustainable management (including the potential establishment of Indigenous and Community Conserved Areas);*
- *Strengthen governance, tenure, and resource rights at the local level;*
- *Monitor biodiversity and ecosystem function to evaluate Great Green Wall investments and policies.*

Overall, almost all of the SAWAP projects have made reference to improving biodiversity through their SLWM activities, but there is room for improvement in the future. Given the IUCN's recommendations, the biodiversity and SLWM agenda already overlap in the Sahel. In SAWAP, the Sudan, Ghana and Benin projects stand out for actively trying to support protected areas and monitor biodiversity, in addition to increasing on-farm biodiversity. In the future, more attention could be paid to the monitoring of biodiversity and establishing what IUCN refers to as Indigenous and Community Conserved Areas to help support larger species' conservation.

[18] Duncan, C., Kretz, D., Wegmann, M., Rabeil, T., & Pettorelli, N. (2014). Oil in the Sahara: Mapping anthropogenic threats to Saharan biodiversity from space. Philosophical Transactions of the Royal Society B, 369, 20130191.

Regional SAWAP Project - BRICKS

The BRICKS project provided a regional learning and M&E structure to support SAWAP national projects. BRICKS funded and convened the partners of the Great Green Wall Initiative (GGW) and the Annual SAWAP Conference. Building this community had a transformative effect; conferences sponsored by BRICKS were part TED talk, part project operational brown bags, part investment planning, part communications and part network building among client countries and partners across Anglo and Francophone Africa.

At approval, the project had two main outcomes "to improve accessibility of best practices within the SAWAP Portfolio on sustainable land use and management" and "to improve accessibility of monitoring information within the SAWAP Portfolio on sustainable land use and management". In 2018, 95% of the SAWAP national team members reported satisfaction with the effectiveness of the services provided by the BRICKS project. The project produced and disseminated 22 learning products out of 30 initially targeted. External experts evaluating the 22 learning products produced reported that many of these products used outdated methods or lessons not applicable to other countries. On the other hand, through these outputs, Togolese SAWAP project members confirmed that they adopted SLWM practices from Ethiopia after learning about their success from SAWAP events. Furthermore, the harmonized M&E framework adopted by BRICKS, was later adopted by USAID for their projects and used by the African Union to inform the development of the M&E framework for all of the GGW's operations.

Overall regional projects like BRICKS need to be better funded and more technically focused to achieve their goals. During project implementation, BRICKS assessed country's project needs for regional support, but could only implement 30% of the support requested due to limited financing. Since regional services are costly and time consuming, dedicated budgets in support of regional activities should also be included in national projects such as the case with West African Coastal Areas Program (WACA)and the Regional Sahel Pastoralism Support Program (PRAPS). Monitoring the broad scope of the SAWAP projects was inherently difficult given the number of sectors for project interventions and the broad range of project activities (e.g., rural, development, urban soil erosion, disaster risk management, forestry, agriculture). While this reflects the countries' different priorities, it created constraints for regional entities to tailor knowledge management activities and M&E services for each country. A recommendation of the Implementation Completion Report (ICR) was to restrict the thematic scope of regional SLWM projects based on priorities set by the participating countries. Having more targeted and homogeneous intervention areas could also help reduce complexity.

SAWAP's Monitoring and Evaluation

With support provided by the regional BRICKS project through OSS, the SAWAP countries adopted a common monitoring framework and a set of key indicators to measure progress in achieving the program's objectives – with varying success. Unfortunately, after 5 years, many projects were not able to provide conclusive evidence about changes in vegetative cover and carbon stocks. Most projects encountered difficulties in collecting baseline information and relied on the use of NDVI data, which is poorly suited to assess changes in tree cover. Although these monitoring technologies were considered advanced in 2012, the satellite technology has since advanced substantially and these approaches are now outdated. In any future SLWM projects, all sites should be geo-referenced and mapped from the outset, and baseline information should be collected using a coherent M&E framework. Post hoc attempts to geo-reference project sites were not successful.

The next tranche of SLWM projects should insist on geo-referencing, mapping and baseline data collection for all SLWM intervention sites, and include time-series research on actual changes in vegetative cover, soil health and other multiple impacts of investments. This would aid greatly in proving attribution for project activities. In several SAWAP projects, other donor funded SLWM activities in the same regional areas of intervention and Implementation Completion Reports were not able to distinguish between World Bank SLWM investments and those financed by other donors. A second positive impact of geo-referencing and mapping would be the reliability of the data. Accurate data on the location of the project sites is needed to properly assess the benefits and to monitor the sustainability of impacts.

Additionally, greater effort should be made to define the types/categories of beneficiaries and the extent of specific benefits. While the SAWAP partners did focus on producing numbers related to a few selected indicators, this is a minimal form of impact monitoring. Except for Niger and Ghana, the SAWAP projects have not made significant progress in measuring the actual impact of SLWM activities on crop yields, household income, food security, tree cover and carbon stocks.

While the projects did report on the number of forest management plans prepared and the area of land covered by these plans, the status and impacts of the implementation of these management plans is not well documented. It has also proved difficult to assess progress in increased institutional capacity, although the Ghana project has utilized an innovative approach to track changes in the management effectiveness of Community Resource Management Committees (CREMA) that received project assistance. The general assumption is that impacts were minimal for forests with only management plans and no monitoring of management plan implementation.

SAWAP monitoring reports always mention the number of people and institutions trained and which percentage of the trainees are women. It is useful to know the numbers of people and institutions trained, but it does not inform us about how the beneficiaries of the training activities subsequently used their new knowledge and skills. SAWAP projects invested a considerable portion of financing for training, and a more sufficient measurement of the actual impact of training and other capacity building activities could have been developed.

If a new generation of SAWAP projects will be designed, there is a need for M&E systems which consider impacts on food and water security, poverty reduction and sustainable improvements in the productive capacity of the land as well as human well-being, and more accurate and site specific assessments of the impacts of project investments on land use / land cover, forests and carbon stocks and water resources. Demonstrating the impacts of SWLM is ultimately what will keep mobilizing funds for this critical sector.

SLWM and Environmental Peacebuilding

Drivers of conflict and violence have complex origins, but recent analyses have identified land degradation and land use conflict as important drivers of conflict. In 2017, the International Crisis Group identified (a) drought and desertification, (b) loss of grazing reserves, and (c) changes in pastoralism and farming practices as the three leading drivers of farmer-herder conflicts in Northern Nigeria that have killed 6 times more people than the Boko Haram conflict from 2011 to 2016 [19].

Land degradation has also played a role in the emergence of the conflicts in Darfur and Mali. When evaluating the conflict hotspot on the Mali-Niger border region, International Crisis Group recommended reaching marginalized regions (often avoided by international donors for security concerns) with small-scale projects to deliver livelihood benefits, for which SLWM investments are well suited [20].

Desertification and land degradation do not inevitably lead to conflict. However, by causing poverty, marginalization and migration, they create the conditions that make violence an attractive option for disempowered young men. For example, marginalized pastoralist groups have been more easily recruited for militias, where they are able to raid cattle or destroy farmland. Increasing populations and increasing livestock, decreasing land productivity, increasing internally displaced people, and increasing climate variability will only increase future tensions over natural resources without strong community and government actions. In addition to placating the long-standing ethnic and political tensions across the Sahel, durable peace will depend on addressing the underlying competition for water, fertile land and natural resources and inclusively reducing poverty.

With physical, human, and social capital heavily impacted from conflict, instability, and low levels of investment — often over a period of years or even decades—the most readily available asset to kick-start post-conflict stabilization and recovery is often natural capital. Despite the importance for SLWM and conflict, these linkages are not clearly made for SAWAP projects located in FCS countries. There is clearly also room to specifically design projects to be sensitive to on-going rural conflicts and design implementation arrangements that account for the highly-localized causes of conflicts across the Sahel.

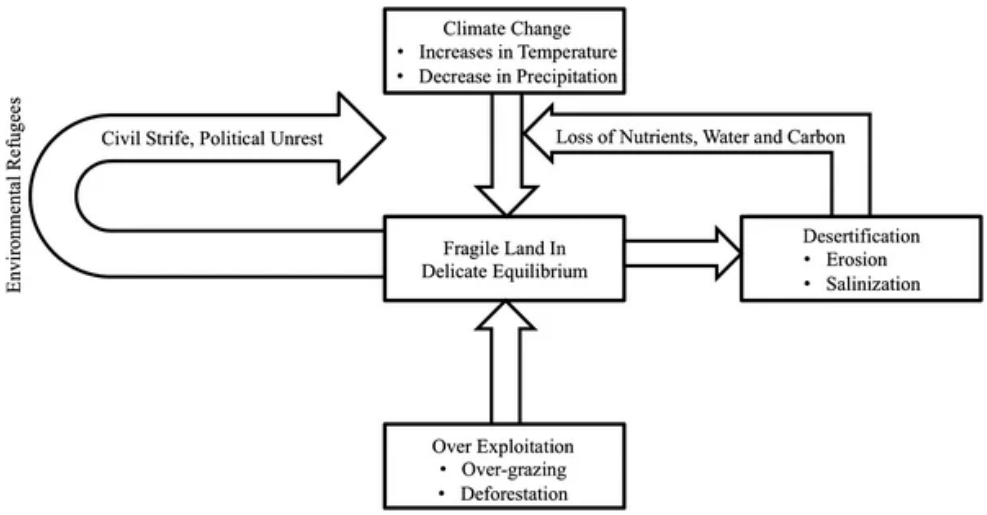


Figure 3: Circular Linkages Between Land Degradation and Conflict
(Diagram from Lal (2012) Agricultural Research Journal)

[19] International Crisis Group. 2017. Herders Against Farmers: Nigeria's Expanding Deadly Conflict
[20] International Crisis Group. 2018. Frontière Niger-Mali: mettre l'outil militaire au service d'une approche politique.

Outlook for the Next Generation of SLWM Financing

As the current phase of funding for SAWAP projects comes to an end, there is a need for the World Bank and development partners to support the next generation of SLWM projects that take advantage of the community of practice developed and capacity improved under SAWAP. The need for sustainable land and water management has only increased since the inception of SAWAP in 2011. The need for Sahel poverty reduction, climate change adaptation and mitigation, and biodiversity conservation has become even more urgent. In addition to the Sahel Alliance mentioned earlier, the AFR100 (African Forest Landscape Restoration Initiative) is a country-led effort to bring 100 million hectares of land in Africa into restoration by 2030. The AFR100 contributes to the Bonn Challenge, the African Resilient Landscapes Initiative (ARLI), Sustainable Development Goals, Great Green Wall, and other targets. All of the SAWAP countries, except Mauritania, have committed targets to AFR100 and all targets are far beyond what was achieved under SAWAP – highlighting the need for scaling-up in future projects:

Table 6	AFR100 Targets and SAWAP Hectares with SLWM	
Country	**SAWAP SLWM (Hectares)**	**AFR100 Targets by 2030 (million Hectares)**
Benin	8,059	0.5
Burkina Faso	213,888	5
Chad	235,520	1.4
Ethiopia	636,776	15
Ghana	83,708	2
Mali	3,652	10
Niger	112,911	3.2
Nigeria	20,000	4
Senegal	42,507	2
Sudan	184,688	14.6
Togo	60,803	1.4
Total	1.6 million	59.1 million

Ethiopia and Nigeria continue to lead the way with new, larger operations, but much remains to be decided for other SAWAP countries. As the many pieces of evidence suggest, there is a need for World Bank and other development partner financing in this sector. Even in Benin, where a large forestry project was recently approved, there is scope of SLWM actions as the new forestry project does not target the most urgent area of land degradation in the Northwest Atakora region. Anecdotally, the land degradation in this area is causing farmers to migrate to the central region of Benin, causing greater pressure on forests.

Furthermore, in addition to the SAWAP countries, there are other countries that are part of the GGW that could benefit from being included in SLWM community of practice and investment programs. Cape Verde, Djibouti, Eritrea, Gambia, and Somalia all face relevant SLWM challenges and are active partners in the Great Green Wall.

CONCLUSIONS AND RECOMMENDATIONS

Under SAWAP, the World Bank along with dedicated GEF resources has shown the capacity to mobilize substantial resources to deal with land degradation across the Sahel, but still much lower than the amount estimated to address related needs in the African drylands (i.e., between $50-200 million per country annually) [21]. Resources allocated to SLWM activities over 8 years ($400 million) were actually significantly lower than what the overall investment ($1.3 billion) may have suggested.

This report analyzes the results of SAWAP based on the program development objective has set forth in 2011: "to expand sustainable land and water management (SLWM) in targeted landscapes and in climate vulnerable areas in West African and Sahelian countries". However, as each national SAWAP project was subsequently being developed, projects often focused on nationally-determined priorities and pre-existing programs in those countries. Although some of these projects produced strong outcomes according to their sectoral focus (e.g., urban/suburban land rehabilitation in Nigeria, disaster risk mitigation in Togo, and forestry management in Benin), the extent and efficiency of SLWM activities as not optimal in projects not largely focused on SLWM. Furthermore, in order to include such a wide variety of projects, the program's key performance indicators had to be broad, but this in turn limited the usefulness of the performance indicators for SLWM.

The major challenge is to find a strategy which will make it possible to reach most smallholder farmers in each country, overcome the main constraints to SLWM and leverage the potential benefits from widespread adoption of proven SLWM practices. That requires an approach which is quite different from the current focus of most conventional projects.

1. Increase SLWM investments in conflict and fragile zones where land degradation is a driver of conflict. There is a critical need for programs that can deliver dispersed benefits to the Sahelian population that is extremely poor and address a driver of violent conflict. The linkages between land degradation and conflict should be better appreciated by development partners and prioritized to increase development impact in FCS. One of the most readily available assets to kick-start post-conflict stabilization and recovery is often natural capital. There is clearly room to specifically design projects to be sensitive to on-going rural conflicts and design implementation arrangements that account for the highly-localized causes of conflicts across the Sahel. The SLWM sector also contributes strongly to both climate change adaptation and mitigation and has the potential to assist in biodiversity conservation.

2. Future SLWM projects should focus on scaling up the adoption of proven cost-effective practices that target small holder farmers and benefit the extremely poor. It appears that scaling strategies for SLWM and opportunities to leverage the replicability of relatively low-cost best practices have until now not received the attention from development partners that they deserve. FMNR is one such practice. Hence, in 2015 World Resources Institute formulated a scaling strategy for FMNR, which is based on experience in the Sahel and can be adapted to the specific socioeconomic and ecological contexts in each country. Each scaling strategy should start with a stocktaking of what has been achieved where, why, how and by whom. It also identifies strategic priorities and focuses interventions on a set of cost-effective activities designed to trigger impacts at scale with minimal dependence on continued external funding. The methodologies are proven but need development partners that can deliver scaled-up financing and results for this long-term development initiative.

[21] Cervigni, Raffaello; Morris, Michael. 2016. Confronting Drought in Africa's Drylands: Opportunities for Enhancing Resilience. Washington, DC: World Bank and Agence Française de Développement.

3. Scaled-up SLWM projects should target policy and institutional reforms designed to empower local communities; particular attention should be paid to incentive structures that maintain good practices beyond the life of the project. Scaling is not a matter of multiplying the amount of funding. Rather, it incorporates targeted policy and institutional reforms designed to empower local communities, enable desired changes in behavior by smallholder farmers and herders. They are the key actors. The role of the government is to create enabling policies and legislation which create incentives to land-users and their communities to invest in their natural resources. Empowerment of communities also increases their problem-solving capacities and it is part of strengthening civil society in a context of weak governance. Experience shows that depending on context, the systematic use of incentives, such as cash-for-work for SLWM practices, can lead to a lack of maintenance even during the period of project implementation. On the other hand, targeting incentives such as increased ownership through tenure reform can be successful, although it is more time-consuming and complex to achieve.

4. Future SLWM projects should, where possible, include measures to strengthen land tenure security and contribute to biodiversity conservation. One lesson of the past and present is that complexity constrains implementation. It means that interventions should be as simple as possible to allow a quick start and rapid spreading. Start simple and gradually build complexity. However, improving tenure security is often a necessary condition for empowered land-users to dedicate resources into long-term SLWM investments. SLWM investments in association with local land use planning and adoption of local conventions or community bylaws governing the use of natural resources can also be managed to contribute to biodiversity conservation. The more focused SLWM national projects would also help with tailoring a more effective regional project.

5. Any future SLWM regional project (follow-up to BRICKS) should be better funded and more focused, with regional activities included in national projects. The BRICKS project covered a fraction of what partner countries requested and had a limited budget for the costly and time-consuming tasks required to organize 12 countries in 2 major languages. Similar to other World Bank regional operations (West African Productivity Project (WAAP), Regional Sahel Pastoralism Support Program (PRAPS)), project designs should consider how to include support for both the regional and national activities. National projects could actually be used to contribute to the budget of the regional project. If there isn't a strongly focused regional SLWM program, then a regional knowledge management project might not be worth the transaction costs.

6. All future SLWM projects should have all project investments geo-referenced from the beginning of project implementation. This will allow more advanced monitoring that SAWAP was unable to do and avoid questions of attribution that some SAWAP projects had.

7. Future SLWM project should be tracking their impacts on crop yields, household food security, poverty reduction, resilience and more. As was the case with SAWAP, projects should not stop at measuring just hectares of SLWM introduced without measuring some of the impacts of those SLWM measures.

8. Programs like SAWAP and BRICKS contribute significant knowledge to understanding how SLM can practices can be replicated and scaled up. A Sahel program dedicated to SLM is called for. The SAWAP program contributed to convene institutions, vet and share information, improve incentives and focus attention on the need to scale up investment. The needs for land restoration in the Sahel remain great; the World Bank and development partners urgently need to consider scaling up activities that address sustainable land management practices, as they pay dividends for some of the world's poorest populations.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