

Stockholm International Water Institute, 2026-09-28

W-FLR ROADMAP FOR THE OGOU SUB- WATERSHED, TOGO

Reviewed by Forests4Future, GIZ



Acronyms

AFOLU - Agriculture Forestry and Other Land Use
ES - Ecosystem Services
FLR - Forest and Landscape Restoration
GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit
MERF - Ministry of Environment and Forest Resources
M&E - Monitoring & Evaluation
NAP - National Adaptation Plan
NbS - Nature-based Solutions
NDCs - Nationally Determined Contributions
NEF - National Environment Fund
NFDF - National Forest Development Fund
NGOs - Non-Governmental Organizations
SIDA - Swedish International Development Cooperation Agency
SIWI - Stockholm International Water Institute
SLM - Sustainable Land Management
SW - Sub-Watershed
WUA - Water User Association
W-FLR - Water-smart Forest and Landscape Restoration

Table of Contents

Acronyms.....	1
Preface	2
Executive summary	3
1. Introduction to the Ogou sub-watershed	5
1.1 Geographic and environmental characteristics.....	5
1.2 Key drivers of forest and landscape degradation	8
1.3 Potential barriers to forest and landscape restoration.....	9
1.4 Enabling opportunities for forest and landscape restoration.....	9
2. Water-related ecosystem services to consider and their current integration into policy and practice	10
2.1 Water-related ecosystem services risk analysis.....	10
3. Entry points for how water-related ecosystem services can be integrated into relevant policies and plans	13
3.1 Mapping entry points and gaps in national/ sub-national policies and plans	13
3.2 The best entry points for water-smart FLR in policies and plans	14
4. Key sectors and stakeholders to involve and influence.....	14
5. W-FLR Roadmap, priority actions and indicators related to policy mainstreaming, capacity development and implementation	16
5.1 Process of identifying water-smart FLR priority actions.....	16
5.2 W-FLR priority actions of local stakeholders in the Ogou sub-watershed.....	16
5.3 W-FLR Roadmap Strategic Actions Plan	18
5.4 Analysis of identified priority actions.....	21
5.5 Ensuring alignment with water-smart FLR	22
5.6 Additional priority action to consider	22

6. Summary of the system readiness for water-smart FLR.....	24
7. References	25
8. Appendix.....	26

Preface

This report is part of the SIWI program on the Water-smart Forest and Landscape Restoration (W-FLR) Tool, supported by GIZ. We acknowledge the invaluable support and collaboration of the GIZ Togo Forests4Future project team, whose commitment and cooperation were essential to the successful execution of the W-FLR Tool in the sub-watershed (SW) of Ogou.

We also express our sincere appreciation to the stakeholders who participated in the W-FLR workshop in Tchébèbé. Their expertise, insights, and feedback were critical in validating and refining the draft preparatory phase of the W-FLR Tool and in developing relevant recommendations for the roadmap, ensuring its relevance, practicality, and ownership.

The W-FLR Roadmap for the Ogou SW has been established to assess water risks and opportunities, and to mainstream water considerations into FLR-relevant plans and initiatives through the W-FLR Tool, developed by SIWI and supported by GIZ. The Tool aims to integrate water-related aspects such as hydrological flows, water availability, and water quality into sectors (e.g. forestry, agriculture, climate, etc.) that are essential for making Forest and Landscape Restoration (FLR) sustainable and resilient.

The Roadmap development process was structured into two main phases: the Preparatory Phase and the Workshop Phase. During the Preparatory Phase, the GIZ Togo technical team, supported by SIWI, conducted an extensive analysis based on publicly available information, focusing on three key modules: identifying the system unit with its key attributes and mapping risks and opportunities for water-related ecosystem services (ES) (Module 1), assessing the need for W-FLR at national and sub-national levels (Module 2), and identifying and engaging key stakeholders (Module 3). The outcomes of this phase were compiled into a draft preparatory phase report, which served as the foundation for the subsequent Workshop Phase.

During the Workshop Phase, the stakeholders were first consulted to validate and adjust, if necessary, the preparatory work. Further, the participants were asked to identify priority actions for water-smart FLR, related to policy mainstreaming, capacity development, and implementation (Module 4).

The final Roadmap incorporates the feedback and recommendations from these consultations, ensuring that it reflects the needs and priorities of the stakeholders involved. It includes priority actions and indicators that were identified during and post-workshop by participants and the W-FLR team, respectively.

The W-FLR Roadmap provides a Strategic Actions Plan for analysis-planning-implementation of water-smart FLR in the Ogou SW. It outlines a clear path forward for enhancing water-related ES, improving livelihoods, and building resilience to climate change. The successful implementation of this Roadmap will depend on continued collaboration among all stakeholders, ensuring that the vision of a sustainable and resilient Ogou SW becomes a reality.

Executive summary

The W-FLR Roadmap provides a strategic response to critical environmental challenges compromising both regional ecosystems and local community welfare. This integrated approach advances sustainable land and water management by prioritizing the restoration of vital water-related ES. The Ogou SW that sustains the prefecture of Tchamba, Est-Mono, and Anié is experiencing increasing pressure on its natural resources, primarily due to unsustainable land, water, and forest use practices, combined with population growth and rural poverty. These pressures result in deforestation, land degradation, especially in gallery forests, and bushfires, causing severe erosion. Consequently, key water-related ES, such as water regulation, soil regeneration, and biodiversity are declining, which risk undermining the resilience of terrestrial and aquatic ecosystems, agricultural output, and climate resilience and adaptation. To address these threats, the roadmap promotes water-smart FLR initiatives that align forest and water management practices through nature-based solutions (NbS).

Components of the W-FLR Roadmap

The W-FLR Roadmap presents priority actions structured around three strategic components. First, policy mainstreaming focuses on incorporating the forest-water nexus, and water-related ES into national and regional policies while aligning with climate initiatives such as National Determined Contributions (NDCs) and National Adaptation Plans (NAPs). Second, capacity development aims to strengthen stakeholders' technical expertise through targeted training and knowledge-sharing platforms. Third, implementation focuses on concrete interventions, including pilot projects for water-smart FLR, and the promotion of participatory approaches.

The Roadmap highlights stakeholder engagement as a critical success factor for implementation of water-smart FLR. Through a systematic stakeholder mapping process, it identifies and categorizes key actors across all levels - from local communities to national authorities, including government agencies, NGOs, private sector representatives, and civil society groups. The W-FLR methodology proposes tailored engagement strategies to promote inclusive participation and maintain long-term stakeholder commitment. This participatory methodology serves as a foundation for achieving sustainable restoration outcomes.

The W-FLR Roadmap's Strategic Actions Plan serves as a diagnostic tool to evaluate system readiness for water-smart FLR implementation. It pinpoints critical actions across three dimensions: policy mainstreaming, capacity development, and field-level implementation. The plan emphasizes the need to harmonize water and landscape governance frameworks, especially for gallery forests, phasing out harmful practices, while fostering cross-sectoral collaboration to maximize restoration outcomes. Furthermore, it recommends effective siltation management, and strengthening monitoring, evaluation, and adaptive management systems to ensure measurable progress and continuous improvement.

The W-FLR Roadmap for the Ogou SW highlights several pathways for advancing water-smart FLR initiatives. Although the SW siltation, socio-economic pressures, deforestation, and climate variability pose significant challenges, these constraints can be addressed through Togo's supportive policy and institutional frameworks.

By strategically addressing these obstacles and leveraging existing resources, capacities, and partnerships, the Roadmap establishes a sustainable framework for restoring critical water-related ES, strengthening

livelihoods, and enhancing the long-term resilience of communities and landscapes throughout the Ogou SW.

Recommendations

The W-FLR Roadmap's successful execution depends on several prioritized recommendations.

- First, it is crucial to drive policy reforms that support water-smart FLR, especially for gallery forests. This involves explicitly integrating the forest-water nexus into relevant national strategies, policies and legislations, environmental restoration programs, and municipal/regional development plans. To build a robust foundation for decision-making, local authorities must actively prioritize gallery forest ecosystems to effectively address the siltation challenge of the Ogou SW.
- Second, capacity development must focus on delivering tailored training programs on systemic forest-water management and agroecological practices specifically designed for local communities, student farmers, teachers, management committees, and eco-guards, to ensure an integrated and sustainable approach, especially in gallery forests.
- Third, initial restoration efforts should prioritize the strategic spatial planning of gallery forests, with particular attention to pastoral mobility. Key practices include negotiating access arrangements to key pastures, supporting pastoral institutions, and planning for livestock mobility corridors, rest areas, and water points to safeguard critical riparian zones and transhumance corridors in gallery forests. In parallel, restoration interventions should adopt a biodiversity-sensitive approach by systematically integrating a diverse mix of native and endemic species to improve species diversity and enhance ecological resilience. The long-term sustainability of these ecosystems could be strengthened through community-based management mechanisms, including the establishment of local forest management committees and the deployment of awareness-raising signs.
- Lastly, is the integration of green economy initiatives as income-generating activities (IGAs) in riparian areas, ensuring that they are firmly grounded in agroecological principles. Aiming at balancing ecological restoration and local livelihoods is an absolute priority to ensure strong community buy-in and long-term engagement.

1. Introduction to the Ogou sub-watershed

The water-smart FLR approach redefines restoration practices by explicitly embedding water considerations into forest and landscape management. This innovative framework recognizes water as essential for both ecosystems and local livelihoods. The Ogou sub-watershed (SW) case study is the fourth case study of the W-FLR Tool, and enabled testing the final version of the Tool.

The GIZ Togo technical team, supported by SIWI, developed a comprehensive assessment of the SW by analysing publicly available datasets, scientific studies, reports and statistical information to evaluate the region's environmental status and identify areas of improvement. The study focused on: (1) the SW's biophysical attributes, (2) the socio-economic value of its ecosystems, and (3) pressing environmental threats. The resulting analysis offers a systematic evaluation of degradation drivers, restoration constraints, and strategic opportunities for implementing water-smart FLR approaches.

1.1 Geographic and environmental characteristics

The hydrological unit of the Ogou SW (tributary of the Mono river) is located between the Centrale and Plateaux regions of Togo (with a very small portion extending into the Republic of Benin). It encompasses a rich, diverse and ecologically significant landscape thanks to its gallery forests (MERF, 2018; IUCN & GIZ, 2025). The SW contains numerous community forests and partially overlaps with protected areas, especially the Abdoulaye wildlife reserve and the Bas-Ogou reserve. The SW extends over 235.14 km along the Ogou River and covers an area of 4,235.48 km² (423,548 ha), representing 7.5% of the national territory and 19.49% of the Mono River basin. It benefits the prefectures of Tchamba, East Mono and Anié (Figure 1).

The SW serves as a daily water source for 241,732 people (2025 estimation). The Ogou SW is characterized by a Guinean–Sudanian climate, with a rainy season from May to October and a dry season from November to April. Annual rainfall ranges from 1,400 to 1,500 mm, average temperatures vary between 24°C and 28°C, and evapotranspiration reaches about 1,540 mm/year, while wind patterns are influenced by the Harmattan and the West African monsoon.

The landscape is dominated by agricultural land, savannas, forests, water bodies and cultivated areas, with tropical ferruginous and hydromorphic soils typical of the central plains of Togo (0–138 m elevation). The SW is drained mainly by the Ogou river and its tributaries, supporting domestic water use, livestock watering and agricultural activities. However, it faces increasing pressures from deforestation, land degradation, agricultural expansion and weak water governance structures, which threaten both ecosystems and water resources (Akoete et al., 2026).

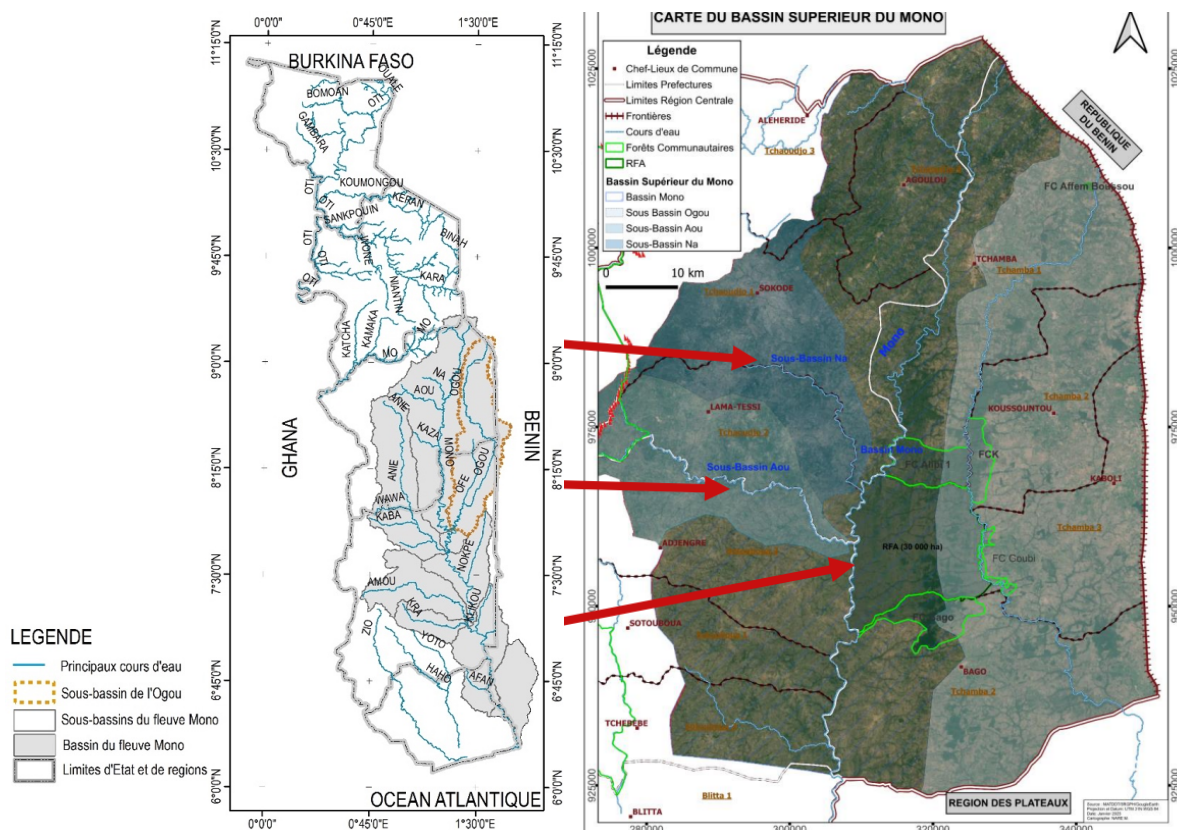


Figure 1 The geographical location of the Ogou sub-watershed within the Mono River basin in Togo. Source: GIZ Togo.

Field visit observations:

The Mono River is composed of a minor and upper riverbed. Field observations indicate that the upper riverbed has largely been converted into agricultural land (Figure 2), with farming activities progressively expanding onto the riverbanks (Figure 3). This encroachment increases pressure on riparian areas, weakens bank stability, and accelerates erosion processes.

The Mono is one of the major rivers in Togo. Although it is classified as a perennial river, local communities report a gradual decline in both the duration and volume of water flow. While the river historically contained water throughout the year, significant flows are now generally restricted to the period between July and November, and this period appears to be shortening over time.

The progressive sedimentation of the minor riverbed is altering the river's hydrological dynamics. The accumulation of sediments (Figure 4) reduces the riverbed's flow capacity, causing water levels to rise during high-flow events and leading to a widening of the riverbanks of the minor riverbed. This process further exacerbates bank erosion and contributes to the degradation of adjacent land.

Exchanges with local communities also captured significant observations of ecological changes. Around twenty years ago, the Mono River still supported a diverse range of wildlife, including hippopotamuses, crocodiles, and numerous fish species. The gradual disappearance of these species reflects a substantial loss of biodiversity and the degradation of both aquatic and riparian habitats, as well as a reduction in food security for the local population.



Figure 2: Agricultural land of the upper riverbed. Photo: SIWI.



Figure 3: Agriculture expanding to the riverbanks of the minor riverbed. Photo: SIWI.



Figure 4: Minor riverbed of the dried Ogou in January 2026. Photo: SIWI.

1.2 Key drivers of forest and landscape degradation

The Ogou SW faces multiple interconnected drivers of environmental degradation, with the most significant being anthropic, institutional, and natural (IUCN & GIZ, 2021; GIZ, 2024):

- **Logging** through uncontrolled removal of high-value species (e.g., *Pterocarpus erinaceus*, *Milicia excelsa*, *Khaya grandifoliola*, *Khaya senegalensis*) and intensive harvesting for fuelwood and charcoal. These illegal practices outside management frameworks cause the depletion of valuable forest species, and reduced natural FLR.
- **Agro-pastoral activities** expansion contributes to land-use change, from forests to cropland. These activities are often detrimental to the environment due to unsustainable agriculture, lack of crop rotation, excessive chemical use, slash-and-burn cultivation, traditional livestock systems, and unstructured transhumance. These practices contribute to agrochemical pollution, disruption of hydrological systems, biodiversity loss, and land degradation through erosion, compaction, pollution, and reduced natural productivity.
- **Pollution** resulting from the inappropriate use of pesticides and non-certified fertilizers, combined with increasing plastic waste. These methods contribute to soil fertility decline, contamination of surface water and groundwater through runoff and leaching, biodiversity loss, and reduced agricultural productivity.
- **Poverty and population growth** cause increasing dependence on natural resources and placing strong pressure on terrestrial and forest ecosystems (World Bank, 2025).
- **Climate change** exacerbates climatic variability, manifested through more frequent and intense flood events, droughts, heat waves, strong winds, and disruptions to traditional rainfall patterns.
- **Mining activities**, including sand and gravel extraction and artisanal gold mining, although currently limited in the Ogou SW, represent a potential risk and may lead to land degradation

and contamination of surface and groundwater when carried out without adequate environmental regulation (Tchable et al., 2025).

1.3 Potential barriers to forest and landscape restoration

The Ogou SW faces several challenges in implementing water-smart FLR. During the W-FLR workshop, local stakeholders identified and discussed the following key barriers:

- **Ineffective forest and water governance:** Together with weak law enforcement, are fundamental drivers of landscape degradation. This includes inadequate implementation of forest and water policies, limited cross-sector coordination, management plans, and protected area regulations, which undermine conservation efforts on the ground. Some policies remain unclear or insufficiently coherent regarding FLR objectives. There is a lack of a structured water management system in the Ogou SW, which also contributes to conflicts over water use.
- **Financial risk:** Lack of funding to meet the technical and material needs of Sustainable Land Management (SLM) and water-smart FLR, with public funding being the main source of financing.
- **Demographic pressure:** Unsustainable resource use practices and increasing pressure on natural resources due to rapid population growth, rural poverty and lack of land law knowledge.
- **Land rights:** Coexistence of customary and modern legal systems, limited knowledge of land laws and large-scale land acquisitions weaken FLR efforts. Although the current legal framework supports investment in the forest sector and FLR, land registration procedures remain costly, lengthy, and weakly decentralized, limiting the formalization of land tenure.
- **Environment:** Increasing climate variability and the advanced degradation of agricultural land contributes to declining forest health, as well as variable and unreliable water availability.
- **Anthropogenic activities:** Domestic waste, plastic pollution due to open dumping, continued reliance on firewood for cooking due to limited energy alternatives, and lack of sustainable sanitation and wastewater management systems.
- **Pastoralist livelihoods:** Unsustainable movements of transhumant or nomadic pastoralist groups, create additional pressure on land and natural resources and complicate FLR efforts.
- **Socio-cultural:** Cultural and religious practices linked to the different ethnic groups present in the SW may influence land use patterns and the management of natural resources, potentially affecting the implementation of restoration initiatives. Also, women and young people remain marginalized in decision-making, with low public participation and cultural barriers. Traditional norms and beliefs limit their autonomy, even though they are the primary users of resources.

1.4 Enabling opportunities for forest and landscape restoration

Despite the above-described challenges, the Ogou SW holds several enabling opportunities for an effective water-smart FLR.

Enabling Policies and Framework. Alignment with global restoration initiatives such as the Paris Agreement, United Nations Convention to Combat Desertification, Convention on Biological

Diversity, Bonn Challenge and AFR100. Engagement in these initiatives offers access to international expertise, funding, and recognition, strengthening restoration effectiveness in Togo.

Institutional and Policy Support. Land resources management framework implemented and coordinated by the Ministry of Environment and Forest Resources (MERF), which involves financial partners (GIZ, FAO, & UNDP).

Financial Mechanisms. Existing financing instruments supporting restoration investments, including, but not limited to, the National Forest Development Fund (FNDF), National Environment Fund (FNE), Integrated Water Resources Management Fund in Togo, Adaptation Fund, and Green Climate Fund.

Environmental and Ecological Conditions. Existing forest resources: Existing gallery forests, forest remnants, wooded savannas, wetlands, and community forests can serve as core restoration areas and important biodiversity refuges.

Ecosystem services. The Ogou SW ecosystems hold strong potential to provide valuable environmental and financial services, including water regulation, soil conservation, carbon storage, biodiversity habitat and resources that support local livelihoods. Strategically embedding ES into restoration planning boosts the effectiveness of water-smart FLR by drawing a clear line between restoring nature and improving livelihoods of communities.

Land availability. The Ogou SW has substantial areas suitable for large-scale water-smart FLR.

Community Engagement. Local communities rely on forests for medicinal resources, food and timber, creating strong interest in restoring and conserving these ecosystems. Their land rights, local knowledge, and active participation are essential for the success and long-term sustainability of water-smart FLR initiatives.

2. Water-related ecosystem services to consider and their current integration into policy and practice

The GIZ team conducted a comprehensive assessment of water-related ES in the Ogou SW with support from SIWI. The assessment followed a systematic approach to understand interlinkages within the socio-ecological landscapes, combining GIZ's scientific knowledge with their on-the-ground experience. Further, GIZ and SIWI co-hosted a workshop in Tchébébé with local stakeholders to validate the preliminary findings, ensuring their reliability, and robustness by integrating local knowledge in the analysis.

2.1 Water-related ecosystem services risk analysis

Effective water-smart FLR starts with a thorough assessment of current water-related ecosystem processes (Table 1). This assessment reveals the degree to which water-related ES within the system boundary are at risk of decline or loss. The current status offers a baseline of functionality and indicates potential future vulnerabilities. This comprehensive perspective enables the prioritization of restoration efforts and the formulation of adaptive strategies to manage both present and future challenges. To this end, the W-FLR team has conducted a risk analysis synthesizing publicly available data, GIZ's experience, and input gathered from a stakeholder workshop.

The Ogou SW is experiencing widespread degradation across multiple water-related ES. The analysis indicates that a large majority of assessed ecosystem processes face high risk (55%) and intermediate risk (40%) within the SW boundary, highlighting the urgent necessity for effective water-smart FLR investments to restore ecosystem functionality (Appendix 1. and summary table in Table 1). The W-FLR team noted

that all the provisioning and regulating ES are at high risk and that most cultural ES are also at high risk. Supporting ES are mostly at moderate risk.

Addressing these risks, especially for provisioning and regulating ES, is essential to safeguarding the long-term sustainability of the SW and future restoration investments. Through comprehensive risk management and targeted FLR actions, the resilience of water-related ES can be strengthened, ensuring lasting environmental and socio-economic benefits for local communities in the Ogou SW.

Table 1. Summary of the water-related ecosystem services risk analysis of the Ogou sub-watershed. Full table: Appendix 1.

Water-related ecosystem services	Ecosystem processes	Risks
Supporting services		
Hydrological cycle	E.g., through transpiration, recycling of precipitation, controlling water runoff, etc.	Progressive sedimentation of the minor riverbed, exacerbated by climate change and agro-pastoral expansion.
Nutrient cycle	E.g., in atmosphere, in soil organic matter and in soil and rock minerals.	
Soil formation/ quality	Tree roots and soil organic matter improve soil moisture and structure. High rate of organic matter in soil slows down water movement.	Extensive agriculture, slash-and-burn practices, and agrochemical pollution. Observable cracks in the soil.
Biodiversity	Water linking organisms and supporting pollen/propagule dispersal. Habitats that safeguard fisheries and biological diversity.	Degradation of aquatic and riparian habitats, (gradual disappearance of historically present wildlife (fauna and flora) e.g. hippopotamuses, crocodiles, various fish species and plants).
Provisioning services		
Freshwater	Tree density influence groundwater recharge. Tree species and age influence water yield.	Deforestation of gallery forest and decline of endemic tree species (e.g. <i>Pterocarpus erinaceus</i> , <i>Milicia excelsa</i>).
Food and medicines	Ecosystems provide conditions for producing food / extracting medicines.	Decline in wild food, fish stocks, and traditional medicinal plants.
Materials	Ecosystems provide raw materials for construction, production and fuel.	Over-reliance on wood extraction for charcoal/fuelwood, combined with weak enforcement of forest logging laws.
Regulating services		
Water flow regulation	Ability of the catchment's ecosystems to regulate water flow, including water retention, streamflow regulation, and increased infiltration.	Gradual decline in both volume and duration of water flow, with the river transitioning from perennial to seasonal and available flow period continually shortening (July - November).
Water purification	A catchment's natural ecosystems play a crucial role in filtering pollutants and improving water quality.	Intensive agricultural runoff, plastic waste accumulation from open dumping, and leaching of pollutants.
Climate regulation	Carbon sequestration in soil and in above- and below-ground vegetation. Regulation of local temperature by evapotranspiration.	Deforestation of riparian forests and encroachment of agricultural lands.
Cultural services		
Heritage / Cultural Identity	Catchment's significant cultural / spiritual value for local communities.	Historical presence of iconic fauna and flora (e.g., hippos, crocodiles, ...).
Wellness, Recreation, and (Eco)tourism	The catchment offers opportunities for recreation, wellness, and ecotourism.	Habitat degradation, disappearing wildlife, and seasonal drying of the river.

3. Entry points for how water-related ecosystem services can be integrated into relevant policies and plans

The Ogou SW is a zone of ecological importance with rich water resources and diverse forests, especially gallery forests. Integrating water-smart FLR into current policies is essential to combat environmental degradation, improve water-related ES, and enable sustainable land management. This analysis identifies policy entry points, assesses gaps, and proposes actionable recommendations to advance these efforts.

3.1 Mapping entry points and gaps in national/ sub-national policies and plans

Nationally Determined Contributions

Togo submitted its first NDC in 2015 and updated it in 2021. The revised version strengthened Togo's commitment to climate action goals, with a stronger emphasis on water resources, highlighting the recognition of the importance and relevance of water resources in climate objectives. The Agriculture, Forestry and Other Land Use (AFOLU) sector is expected to contribute 28.40% of national greenhouse gas reduction efforts by 2030. This creates a direct opportunity to position water-smart FLR as an effective climate mitigation and adaptation measure.

The NDC has a strong focus on adaptation, with AFOLU and water resources identified as priorities. The forest and water-related objectives are comprehensive, focusing on sustainable land management and improved water management. Nevertheless, to ensure long-term impacts and a systematic approach, the number of ha restored is an indicator which needs to be supplemented by spatial and environmental parameters. The area, the tree stand age, the species, the density, the current and previous land use practices are critical factors influencing the success of FLR, and its impact on water-related ES.

Restoration of gallery forests can significantly contribute to the mitigation and adaptation objectives; however, this type of intervention is not mentioned in the document. Several measures already included in the NDC are relevant to the Ogou SW, particularly the promotion of sustainable land management, reforestation with fodder trees, restoration of degraded forests and fragile ecosystems, biodiversity conservation, enhancement of carbon sinks, and participatory control of vegetation fires. Considering water resources in these actions can support water-related ES, especially through the protection and restoration of gallery forests.

A key entry point is the planned integration of community land tenure systems into the preparation of the NDC 3.0. This will help recognize community land rights as a lever for sustainable restoration, especially in areas where water resources, forest patches, sacred sites, community forests, and agricultural lands overlap. Involving local communities, and vulnerable groups, in particular women and youth, in the NDC development is thus essential to understand their needs and ensure ownership of the measures. In the Ogou SW, this is particularly important because restoration success depends on local participation, secure land access, and the long-term protection of restored areas. Future updates of the NDC should integrate more directly and explicitly the forest-water nexus into both mitigation and adaptation objectives to strengthen the mainstreaming of water considerations into FLR initiatives. Sound water management is a cornerstone of effective climate action and must be integrated as a central element across all adaptation and mitigation measures.

Togo 2025 Government Roadmap

The Togo 2025 Government Roadmap is based on a strategic ambition launched in 2020 and provides important levers for integrating water-related ES into FLR and climate adaptation. Through Project 35 (P35), the roadmap promotes climate risk management, restoration of degraded lands, and the fight against desertification, with the objective of increasing forest cover to 25% by 2025.

The roadmap also supports environmental reforms, including climate and forestry legislation, which can strengthen ecosystem-based adaptation and sustainable land management. These measures create opportunities for water-smart FLR through reforestation, agroforestry, restoration of riparian forests, especially gallery forest, and protection of wetlands and fragile ecosystems.

Gaps remain as water-related ES are not explicitly integrated into FLR objectives and frameworks. Stronger and integrated coordination between forestry, water, agriculture, and land-use planning institutions is also needed to ensure effective restoration and adaptation planning.

3.2 The best entry points for water-smart FLR in policies and plans

The review of the NDC, the Governmental Roadmap Togo 2025, and the other national strategies, identified in the case study, give several entry points for water-smart FLR interventions in the Ogou SW. These policies recognize the importance of sustainable land management, restoration of degraded ecosystems, climate resilience, and biodiversity conservation, creating favorable conditions for integrating water-related ES into FLR initiatives. Nevertheless, the NDC highlights the persisting land degradation and deforestation challenges due to agricultural expansion, unsustainable agricultural practices, logging and uncontrolled vegetation fires.

Water-related ES remain insufficiently integrated into restoration objectives, and institutional coordination frameworks. Strengthening cross-sectoral collaboration between forestry, water, agriculture, and land-use planning institutions will therefore be essential to ensure coherent and effective implementation of water-smart FLR actions.

Most local stakeholders from the workshop were unfamiliar with the reviewed national documents, which can reduce their capacity to participate effectively in FLR planning and access climate finance opportunities. Greater awareness raising, capacity building, and multi-stakeholder dialogue at SW level would help improve ownership of these policies and strengthen the integration of water-smart FLR principles into local development and restoration initiatives.

4. Key sectors and stakeholders to involve and influence

A key component of the W-FLR case study is the analysis and engagement of key sectors and stakeholders. The W-FLR analysis must align with FLR efforts and relevant initiatives and processes. The engagement of key stakeholders is a prerequisite for a successful workshop and for ensuring the long-term sustainability of water-smart FLR interventions.

The preparatory phase enabled GIZ and SIWI to identify relevant stakeholders from diverse sectors, including forestry, water, fisheries, and agriculture, and across various categories, such as local and national authorities, NGOs, community-based organizations, and academic institutions. The analysis considered stakeholders at national, regional and local levels, which could potentially be involved in policy mainstreaming, capacity development, and implementation. Then, these stakeholders were grouped based on their influence, interest, and overall relevance.

The W-FLR team proceeded with a selective process to invite local stakeholders with valuable knowledge. Stakeholders represented regional entities, basin organizations, committees, associations, local communities, and NGOs (Table 2).

Table 2: Organizations represented at the local W-FLR workshop in Tchébèbé

N°	Stakeholder categories	Sectors	Number of participants
1	National level	Prefectural Direction of the Environment, Forest Resources, Coastal Protection and Climate Change (DPERF) of Tchamba Prefecture	1
2		Prefectural Direction of the Environment, Forest Resources, Coastal Protection and Climate Change (DPERF) of Est-Mono Prefecture	1
3		Prefectural Direction of the Environment, Forest Resources, Coastal Protection and Climate Change (DPERF) of Anié Prefecture	1
4	Regional Offices/Councils	Local Government Administrator of Sokodé Prefecture	1
5		Secretary General of the Prefecture of Sotouboua	1
6		Accountant of Sotouboua 3	1
7		Planner of Sotouboua 3	1
8		ICAT Direction of Est-Mono 1 Prefecture	1
9		ICAT Direction of Anié Prefecture	1
10		ICAT Direction of Tchamba Prefecture	1
11		ICAT TS of Tchamba Prefecture	1
12		ICAT Technical Advisor of Tchamba prefecture	1
13		ICAT Gardener of Tchamba prefecture	2
14	Local associations, committees, and communities	Communities (Cooperatives) of Tchamba Prefecture (Affem, Larini, Alibi, Tchamba, Koussountou, Bago, Goubi, Balanka and Kaboli)	6
15		Communities (Cooperatives) of the East Mono Prefecture (Elevagnon, Gbadjahè, Morétan, Badin and Kamina)	2
16		Communities (Cooperatives) of Anié Prefecture (Kolokopé and Adogbénou)	2
17	Local NGOs	ONG SADIL	1
18	W-FLR team	GIZ F4F	3
19		SIWI Support Expert	2
		TOTAL	30

5. Priority actions and indicators related to policy mainstreaming, capacity development and implementation

The W-FLR Roadmap for the Ogou SW provides a strategy linking analysis (preparatory phase), planning (workshop phase) and tangible action. During the workshop, we followed a collaborative process where workshop participants identified, analysed, and prioritized key actions.

5.1 Process of identifying water-smart FLR priority actions

The development of the W-FLR Priority Actions followed a structured, multi-step process:

1. **Pre-workshop analysis by the technical GIZ local team, supported by SIWI:** The W-FLR Tool methodology requires the development of key preparatory analysis based on relevant available data and official documents. It includes (1) the identification of the system boundary, (2) the assessment of water-related ES at risk, (3) the identification of entry points for W-FLR in national policies and plans, and (4) a stakeholder analysis.
2. **Stakeholder verification and validation:** The W-FLR Tool is designed to produce a stakeholder-driven Roadmap, rooted in the active involvement of local stakeholders. Workshop participants reviewed the preparatory results and enriched them with their own experiences and observations.
3. **Development and prioritisation of actions:** Following the revision of the preparatory work, workshop participants defined a set of priority actions to integrate water-smart principles into all FLR interventions within the system boundary. These actions will contribute to addressing water-related ES at high risk of being reduced or lost within the system boundary.

5.2 W-FLR priority actions of local stakeholders in the Ogou sub-watershed

The priority action framework covers three levels: policy mainstreaming, capacity development, and implementation on the ground. The workshop participants identified actions for water-smart FLR under each pillar. Participants subsequently prioritized actions to determine the most urgent needs in water-smart FLR (Figure 5) based on the water-related ES at risk and the potential barriers of water-smart FLR. The GIZ and SIWI technical team reformulated and rearranged some actions to ensure coherence and exactitude of the information and alignment with the water-smart FLR principles (explained in the section “5.5. Ensuring alignment with water-smart FLR”). Low priority actions were not integrated into the final analysis.

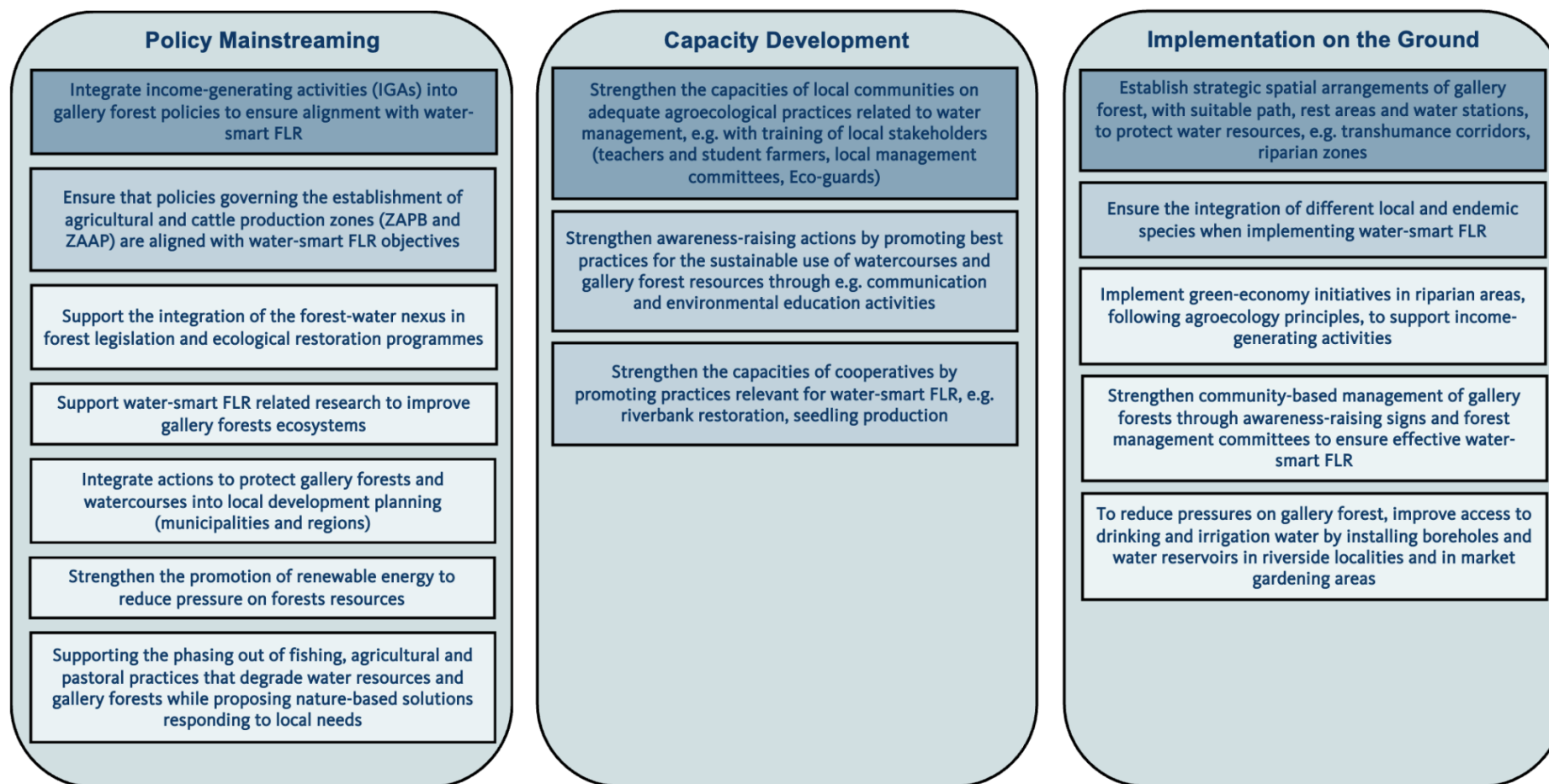


Figure 5: W-FLR Priority Actions of local stakeholders in the Ogou sub-watershed.

5.3 W-FLR Roadmap Strategic Actions Plan

The W-FLR Roadmap Strategic Action Plan (Table 3) summarizes and gathers the priority actions identified by local stakeholders. The GIZ and SIWI technical team reviewed, curated, and supplemented the priority actions to ensure relevance and coherence with the water-smart FLR principles (explained in the “Alignment with water-smart FLR” section).

Table 3: The W-FLR Roadmap Strategic Actions Plan for the Ogou sub-watershed

Task 4a: Priority actions	POLICY MAINSTREAMING OF WATER-SMART FLR	CAPACITY DEVELOPMENT IN WATER-SMART FLR	IMPLEMENTATION OF WATER-SMART FLR	TASK 5A: INDICATORS
1. Improve strategic spatial arrangements along gallery forests based on water-smart FLR principles	Ensure that policies governing the establishment of agricultural and cattle production zones (ZAPB and ZAAP) are aligned with water-smart FLR objectives. Enforcement of the Law (notably the article 17 of the Togo Coastal Law, article 507 of the Land and Public Property Code) protecting gallery forests (République Togolaise, 2018; 2021).	Strengthen awareness and capacities by promoting best practices for selected river basins and gallery forests, e.g. by providing trainings and environmental education activities.	Implement suitable livestock pathways, rest areas and water stations, to protect water resources, e.g. transhumance corridors, riparian zones. Strengthen community-based management of gallery forests, through awareness-raising and forest management committees, to ensure effective implementation of water-smart FLR.	Cross-sectoral coordination No. of trainings No. of knowledge products No. of local stakeholders trained No. of spatial arrangements implemented Improved water quantity Area of restored landscape Area of conserved landscape River siltation level (e.g. using a staff gauge)

2. Advocate for income-generating activities along with water-smart FLR	Integrate Income-Generating Activities (IGAs), such as agroforestry, aligned with water-smart FLR	Strengthen capacities of local communities on adequate agroecological IGAs related to water-smart FLR,	Implement green-economy initiatives based on agroecological principles, with water-smart FLR, to provide both environmental and financial benefits, encouraging community support for these measures.	IGAs developed No. IGAs implemented No. local stakeholders trained Return on Investment of IGAs
3. Strengthen policies and capacities on water-smart FLR	Support the integration of the forest-water nexus in relevant legislation and restoration programs, e.g. targeting forest, environment and climate issues.	Strengthen capacities of local communities and cooperatives by promoting practices relevant for water-smart FLR, e.g. on riverbank and gallery forest restoration, species selection, site selection, and seedling production.	Ensure the integration of native species when implementing water-smart FLR in gallery forests.	No. of laws integrating the forest-water nexus No. of local stakeholders trained No. of water-smart FLR principles applied in implementation No. of native species integrated in restoration operations.
4. Gallery forests conservation and sustainable management	Integrate actions to protect and sustainably managed gallery forests and watercourses into local development planning (municipalities and regions) in line with W-FLR principles			No. of local plans No. of projects successfully implemented Area of gallery forest protected No. of local development plan
5. Phasing out harmful practices	Supporting the phasing out of fishing, charcoal production,		To reduce pressures on gallery forests, improve access to drinking	

	agricultural and pastoral practices that degrade water resources and gallery forests while proposing NbS responding to local needs Strengthen the promotion of renewable energy to reduce pressure on forests resources		and irrigation water by installing boreholes and water reservoirs in riverside localities and in market gardening areas	Decreased use of harmful practices No. and type of NbS offered No. of boreholes and water reservoirs implemented No. of people benefiting from the interventions Type of renewable energy promoted Incentives promoting renewable energy No. of stakeholders benefiting from renewable energy
--	---	--	--	--

5.4 Analysis of identified priority actions

The W-FLR Roadmap Strategic Action Plan highlights the following priority areas for the successful implementation of water-smart FLR initiatives in the Ogou SW. The priority areas are ranked and listed with the most urgent action first.

- 1. Improve strategic spatial arrangements along gallery forests based on water-smart FLR principles.** Strategic spatial planning is needed to target priority riparian areas, degraded riverbanks, transhumance corridors, areas vulnerable to erosion and sedimentation. The enforcement of the law, notably [Article 17 of the Togo Coastal Law](#), and [Article 507 of the Land and Public Property Code](#), must be paired with supporting initiatives, ensuring a smooth transition period to restore gallery forests. Aligning agricultural and livestock activities with water-smart FLR will help reduce land-use conflicts and improve watershed management. Measures such as ensuring adequate use and rest periods for key pastures, livestock corridors, watering points, community-based management committees, and awareness campaigns can further reduce pressure on gallery forests and support their long-term conservation and restoration.
- 2. Advocate for income-generating activities along with water-smart FLR.** To address the socio-economic drivers of landscape degradation, the development of sustainable income-generating activities (IGAs) is crucial. Poverty and dependence on natural resources remain major challenges in the Ogou SW, often leading to unsustainable agricultural expansion, fuelwood extraction, and degradation of forest resources. Implementing green-economy initiatives combined with a water-smart FLR approach can generate financial returns for local communities while simultaneously improving environmental conditions. Linking restoration with tangible economic benefits may increase community support and improve the long-term sustainability of restoration interventions.
- 3. Strengthen policies and capacities on water-smart FLR.** A challenge identified during the review of national policies and plans is the limited integration of the forest–water nexus within existing legislation and FLR measures. National strategies already support sustainable land management, climate adaptation, and ecosystem restoration, nevertheless, water-related ES should be more explicitly mainstreamed into planning and implementation frameworks through water-smart FLR approach. In parallel, it is important to build the capacities of local communities, cooperatives, and technical actors by providing targeted training and practical guidance on riverbank restoration, gallery forest management, species selection, site identification, and nursery development to ensure strategic and effective water-smart FLR interventions. Promoting native species adapted to local ecological conditions will improve restoration success, biodiversity conservation, and long-term ecosystem resilience. During the interaction with local communities, it was suggested to use trees with vines to hold rocks in place, as well as creeping plants and bamboo to stabilize the soil with their extensive root systems. This action will strengthen institutional capacity while ensuring that restoration efforts deliver tangible benefits for both water resources and forest ecosystems.
- 4. Gallery forests conservation and sustainable management.** Gallery forests, and in particular primary gallery forests, should be considered valuable ecological assets within the Ogou SW, providing critical habitat connectivity, biodiversity conservation functions, and water-related ES. However, these ecosystems are increasingly threatened by unsustainable agricultural practices. Integrating gallery forest conservation measures into municipal and regional development plans can ensure long-term protection and sustainable management. This action promotes a landscape-scale approach, thereby improving coherence between environmental management and socio-economic development.
- 5. Phasing out harmful practices.** Unsustainable agricultural, pastoral, and fishing practices continue to exert significant pressure on water and forest resources throughout the SW. Addressing these challenges requires a combination of policy support, capacity development, and alternative practices. Promoting renewable energy solutions can reduce pressure on forest resources by decreasing reliance on fuelwood

and charcoal. Supporting NbS, such as agroecological practices, can provide multiple economic, social, and environmental benefits. At the same time, improving access to drinking water and irrigation infrastructure through boreholes and water reservoirs can curb direct dependence on fragile riparian ecosystems. Although some infrastructure interventions may require detailed feasibility studies, they can complement restoration efforts when carefully planned and implemented. Lastly, this action will contribute to increasing resilience to climate events of local communities while creating favorable conditions for long-term water-smart FLR implementation.

5.5 Ensuring alignment with water-smart FLR

To ensure alignment with water-smart FLR principles, the GIZ and SIWI technical team reviewed all workshop-proposed actions. The team refined those that required modifications, thereby strengthening the water-smart FLR compliance, success, and long-term sustainability of the initiatives.

Actions should focus primarily on NbS because they offer major strategic, ecological, and economic benefits. NbS tackle the root causes of water degradation through preventive and regenerative measures, often requiring less funding and resources compared to technical/“gray” solutions. NbS also offer multiple and systemic co-benefits, compared to “gray” solutions, which are generally monofunctional. NbS should be co-produced with local users to strengthen local water governance and reduce the risk of conflict or abandonment. NbS can also constitute a resilient foundation on which gray infrastructure can be built.

Actions must also be integrated with water resource management, as this is an essential parameter to be considered in water-smart FLR. Based on these two aspects, the W-FLR team has reformulated and adjusted the prioritization of actions.

5.6 Additional priority action to consider

Building on the priority actions set by the stakeholders, the SIWI technical team recommends adding the following priority actions. The SIWI technical team believes that these actions will bring significant value to improve the system readiness for water-smart FLR.

Effective sediment management and riverbed restoration to improve water availability. There is a severe sediment accumulation in the Ogou SW, reducing the riverbed flow capacity, limiting water availability, and restricting access to water for local communities. While water-smart FLR interventions, such as the restoration of gallery forests and riparian vegetation, are cost-effective and expected to improve soil structure, reduce erosion, and decrease sediment inputs over time, their impacts remain gradual and may not address urgent water access challenges in the short term. Therefore, a combination of NbS and targeted engineering measures can be considered to restore hydrological functioning more effectively. Implementing sediment removal operations through dredging activities (e.g. using silt pumps, diggers, and excavators), particularly in critical sections where sediment accumulation is obstructing water flow, can contribute to meeting the urgent needs of the local communities. It is recommended to pursue and scale up silt removal efforts through pumps and diggers, as observed during the field visit with the government-led dredging project (Figure 6).



Figure 6: Siltation removal pump on the minor Ogou riverbed implemented by the government. Photo: SIWI.

By combining ecosystem restoration through NbS with targeted technical sediment management interventions, this action can generate immediate benefits for local communities through improved access to water, while simultaneously supporting the long-term objectives of water-smart FLR by restoring hydrological processes, enhancing watershed resilience, and reducing future sedimentation risks.

Promote cross-sectoral collaboration on water-smart FLR. Effective water-smart FLR in the Ogou SW requires strong collaboration across stakeholders, sectors and governance levels. Embedding water considerations into related policy areas supports more coherent decision-making, enhances synergies between sectors, and contributes to both ecosystem functionality and water security.

To achieve this, it is important to develop structured multi-stakeholder processes, such as participatory workshops, consultation platforms, learning exchanges across sites, joint training sessions, and the establishment of Water User Associations (WUAs). These mechanisms help align practices, facilitate agreements, and support the co-design of shared action plans. They also strengthen policy coherence, build local capacity, and encourage mutual learning, knowledge exchange, and the dissemination of good practices, while fostering more inclusive and participatory governance. Field-based practical training is also essential to reinforce community skills and strengthen ownership of water-smart FLR actions.

Establish a monitoring and evaluation (M&E) framework for water-smart FLR initiatives. A standardized and participatory M&E framework is essential for effective water-smart FLR implementation in the Ogou SW. This measure should align with relevant national and subnational policies and be supported by appropriate tools, technologies, and capacity-building efforts, including training sessions, operational manuals, workshops, and the use of monitoring technologies (e.g. drones, early warning systems, hydrological measurement tools...). For the framework to be effective and widely adopted, it must be co-developed with local stakeholders and adapted to local conditions, including language, locally adapted indicators, and accessible methods of data collection and reporting. This ensures that the system is both meaningful and usable at community level, while strengthening ownership and long-term sustainability.

An accessible and well-understood M&E system enables continuous learning and adaptive management through real-time feedback from the field. It also empowers local communities to better understand, manage, and act upon environmental data, strengthening accountability and enabling them to advocate

for their needs. Ultimately, this contributes to more transparent governance and improved effectiveness of FLR interventions across all implementing partners.

6. Summary of the system readiness for water-smart FLR

The W-FLR Roadmap outlines the readiness, across three core pillars: policy mainstreaming, capacity development, and implementation on the ground. By evaluating the strengths, gaps, and opportunities within each pillar, the Roadmap provides a comprehensive analysis of the Ogou SW overall readiness for successful water-smart FLR initiatives.

Pillar 1. Policy mainstreaming of water-smart FLR. Policy mainstreaming examines the extent to which water-smart FLR is mainstreamed into existing policies and assesses the institutional framework for its execution. The focus is on diagnosing the policy environment, identifying entry points, and determining the adjustments required to enable effective water-smart FLR implementation.

The above analysis identifies that the overall policy readiness for water-smart FLR in the Ogou SW is low to moderate. Although encountering challenges with its enforcement, the existing Coastal Law and the Land and Public Property Code prohibit all types of degradation or land conversion of gallery forests for a specific zone, depending on the case and stipulates the need to keep 40 trees for a cleared hectare of land (République Togolaise, 2018; 2021). This is encouraging and highlights the awareness of the Togo Government regarding the instrumental role of gallery forests. Key national frameworks such as the NDC, the national development roadmap, and sectoral environmental and forestry policies already provide relevant entry points, particularly through commitments to sustainable land management, climate adaptation, and ecosystem restoration. However, the forest–water nexus remains insufficiently explicit and operationalized across these instruments. Strengthening cross-sectoral coordination between water, forestry, agriculture, and land-use planning institutions, as well as more systematically integrating water-related ES into restoration targets and indicators, will be essential to move toward a higher level of readiness.

Pillar 2. Capacity development in water-smart FLR. Capacity development is fundamental for successful implementation of water-smart initiatives and is deeply intertwined with supportive policies. It focuses on ensuring that local stakeholders, technical services, and institutions have the knowledge, skills, and tools required to design, implement, and sustain water-smart interventions.

Based on the above analysis and stakeholder consultations, the system’s capacity for water-smart FLR in the Ogou SW is low. Important gaps persist in technical expertise, awareness of the forest-water nexus, and practical implementation skills related to restoration planning, species selection, riverbank stabilization, and sustainable land and water management. Limited access to training, weak dissemination of policy knowledge at local level, and insufficient technical support structures further constrain capacity. Significant efforts are therefore required to strengthen targeted training programs, improve knowledge-sharing mechanisms, and build sustained institutional and community-level expertise.

Pillar 3. Implementation on the ground of water-smart FLR. Readiness for implementation addresses the preparedness to actively operationalize water-smart FLR interventions. It considers the status of Pillar 1 and 2, i.e. the availability of financial resources, governance mechanisms, infrastructure, technical tools, and coordination systems required for effective field-level action.

The system readiness for on-the-ground implementation of water-smart FLR in the Ogou SW is low. Despite the existence of potential financing mechanisms and strong ecosystem restoration opportunities, major constraints remain, including limited funding, weak enforcement of environmental regulations, insufficient coordination among stakeholders, and inadequate implementation structures at local level. Pressures such as land degradation, sedimentation of riverbed, agricultural encroachment into riparian

zones, and climate variability further complicate implementation. Strengthening financial mechanisms (including blended finance and NbS), improving governance and coordination frameworks, and operationalizing monitoring and implementation tools will be critical to close this gap.

The roadmap emphasizes a concrete trajectory to bridge these gaps and transition the Ogou SW toward a highly resilient, water-secure, and sustainably managed landscape. Its successful implementation lies in the continued collaboration of stakeholders, facilitation of access to blended financial mechanisms, and the shared objective of achieving the vision of a sustainable and resilient Ogou SW. Lastly, the significant engagement demonstrated by local stakeholders presents a considerable opportunity for successful future implementation.

7. References

GIZ. (2024). Forests4Future Togo. https://www.giz.de/en/downloads/giz2024-en-Forests4Future_Togo.pdf

Ministère de l'Environnement et des Ressources Forestières (MERF) - Togo. (2018). Plan National de Développement Forestier du Togo (2018-2028).

IUCN & GIZ, 2025

IUCN & GIZ, 2021

World Bank Group. (2025). Togo Country Climate and Development Report. <https://documents1.worldbank.org/curated/en/099032525165033420/pdf/P180966-19a9329f-a385-4e4f-af3f-d2c261f1d79c.pdf>

Akoete, K. K., Adjonou, K., Hlovor, A. K. D., Segla, K. N., Balzer, J., Janzen, S., Polizzi, V., Walz, Y., & Kokou, K. (2026). Spatio-temporal dynamics and future projection of land use for the sustainable restoration of forest landscapes in the central plains of Togo. *Forests*, 17(5), Article 556. <https://doi.org/10.3390/f17050556>

Tchable, B., Tchakala, I., Ouro-Agoro, F., Boguido, G., Dougna, A. A., Kodom, T., Alfa-Sika, S.-L. M., & Bawa, M. L. (2025). Study of the working conditions of semi-industrial and traditional gold miners in the central region of Togo and their impact on the environment. *Journal of Geoscience and Environment Protection*, 13(5). <https://doi.org/10.4236/gep.2025.135006>

Moluh Njoya, H. (2025). Advancing forest landscape restoration efforts at the local level: Unpacking the contributions of smallholder farmers and institutions in Central Togo. <https://doi.org/10.18452/35757>

République Togolaise. (2021). Loi relative à l'aménagement, à la protection et à la mise en valeur du littoral. <https://assemblee-nationale.tg/wp-content/uploads/2021/05/litoral-loi-AN.pdf>

République Togolaise. (2018). Loi n° 2018-005 du 14 juin 2018 portant Code foncier et domanial. <https://landportal.org/fr/library/resources/loi-n%C2%B02018%E2%80%990005-du-14-juin-2018-portant-code-foncier-et-domanial>

8. Appendix

Appendix 1. Water-related Ecosystem Services Table.

Services écosystémiques	Exemples de processus écosystémiques soutenant les services écosystémiques	Tâche 1b : État actuel des processus écosystémiques liés à l'eau	Tâche 2b : Traité dans les plans et politiques pertinents
Services écosystémiques de soutien			
Soutien du cycle hydrologique	Transpiration. Les arbres ont un impact sur la disponibilité de l'eau en extrayant l'eau du sol ou des eaux souterraines et en l'émettant dans l'atmosphère sous forme de vapeur. Avec une gestion appropriée, ils peuvent améliorer l'humidité atmosphérique à l'échelle locale et les flux d'eau verte.	OUI, mais implicitement	PNE, SPANB, CDN, LT LEDS, PA PSAT, SNAT, PNAT
	Interception de la canopée. Le couvert forestier réduit la vitesse de chute de l'eau de pluie à la surface du sol forestier, ce qui peut réduire le ruissellement de surface et l'érosion.	OUI. les documents stratégiques et politiques promeuvent la restauration des terres et l'amélioration du couvert végétal à des fins de lutte contre l'érosion des sols	PFT, SPANB, CDN, LT LEDS, SNAT, PNAT
	Redistribution hydraulique. Les arbres à racines profondes améliorent l'humidité du sol pendant les périodes sèches en redistribuant passivement l'eau des couches humides vers les couches sèches par l'intermédiaire de leurs racines.	OUI, idem	PFT, SPANB, CDN, LT LEDS
	Recyclage de l'humidité terrestre. Les forêts rechargent l'humidité atmosphérique et influencent la formation des nuages, entraînant (pompant) les flux d'humidité atmosphérique du littoral vers l'intérieur des continents, ce qui peut renforcer les précipitations à l'intérieur des terres.	OUI, idem	PFT, SPANB, CDN, LT LEDS, PA PSAT
Soutien au cycle des nutriments	L'eau favorise le cycle des nutriments du sol (par exemple l'azote et le phosphore) dans les sols forestiers à partir des matières organiques (vivantes et mortes) et des minéraux présents dans les sols et les roches, ainsi que des nutriments transportés par l'eau qui s'écoule. Les racines des arbres fixent également les nutriments dans le sol, empêchant le lessivage des nutriments dans les rivières et les ruisseaux.	Implicitement, les services de soutien au cycle des nutriments	PFT, SPANB, CDN, LT LEDS, PA PSAT
Soutien à la formation et la qualité des sols	Les racines des arbres et la matière organique du sol provenant des apports de litière (par exemple, les feuilles mortes) améliorent la structure du sol, ralentissent le mouvement de l'eau et favorisent l'activité de la faune.	La plupart des services de soutien à la formation et la qualité des sols pourront être induits avec les	PFT, SPANB, CDN, LT LEDS, PA PSAT

		activités envisagées dans les documents	
Soutien à la biodiversité	L'eau de forêt crée des habitats qui préservent les ressources halieutiques et la diversité biologique. L'eau qui coule dans les forêts favorise la production primaire, la capacité de charge et la formation de niches ; l'eau permet également la dispersion des organismes, du pollen et des propagules.	OUI, explicitement	PFT, SPANB, CDN, SN REDD+, LT LEDS, PA PSAT, SNAT, PNAT
Services écosystémiques d'approvisionnement			
Approvisionnement en eau douce potable	La forêt peut filtrer et absorber l'excès de nutriments provenant par exemple du ruissellement agricole, et la litière de feuilles, les racines et les micro-organismes du sol de la forêt piègent et décomposent les polluants.	OUI, explicitement	FNE, SNAT, PNAT
Approvisionnement en nourriture et en médicaments	L'eau est essentielle pour que les forêts fournissent les conditions nécessaires à la culture et à la récolte des aliments et à l'extraction de médicaments, par exemple à partir de fruits, de champignons ou d'écorces.	OUI, explicitement	PFT, SPANB, CDN, LT LEDS, SN REDD+
Approvisionnement en bois, fibres, énergie et combustible	L'eau est essentielle pour que les forêts fournissent des matériaux dérivés du bois pour la construction, la production, l'énergie et les combustibles, y compris les textiles, les biocarburants et les huiles végétales.	OUI, explicitement	PFT, SPANB, CDN, LT LEDS, SN REDD+
Services écosystémiques de régulation			
Régulation du débit d'eau	Infiltration. Les forêts et les arbres influencent l'entrée de l'eau dans le sol, en contrôlant le ruissellement des sols forestiers et la recharge du sol et des eaux souterraines, ce qui peut réguler l'humidité du sol et les flux hydrologiques. Dans les sols secs, les racines des arbres percent la surface dure et ouvrent des passages où l'eau peut s'infiltrer dans le sol.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
	Stockage d'eau dans le tronc. Les arbres stockent l'eau, ce qui leur permet de maintenir une transpiration élevée pendant certaines périodes, même lorsque l'absorption par le sol est limitée ; cela permet aux arbres d'émettre de la vapeur sur des périodes plus longues, influençant ainsi l'humidité atmosphérique.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Régulation du climat	Réduire la température locale et l'évaporation du sol. Les forêts et les arbres renvoient de l'énergie et de l'humidité dans l'atmosphère et créent des microclimats sous le couvert des arbres, refroidissant ainsi la surface de la terre et favorisant les précipitations.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
	Séquestration et stockage du carbone. L'eau joue un rôle clé dans le maintien de l'absorption du carbone par les forêts et	Implicitement dans plusieurs documents	PFT, SPANB, CDN, LT LEDS, SN REDD+

	dans la préservation du carbone déjà séquestré.		
Services écosystémiques culturels			
Valeur patrimoniale et identité culturelle	Les « souvenirs » liés au paysage et provenant de liens culturels passés, qui s'expriment principalement à travers les caractéristiques des paysages culturels.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Expériences spirituelles	Lieux saints ou spirituels importants pour l'identité spirituelle ou rituelle, par exemple le Gange en Inde, les forêts sacrées, les plantes ou les animaux sacrés.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Bien-être, loisirs et (éco)tourisme	Plaisir, confort, découverte et socialisation qui se déroulent pendant les loisirs en pleine nature, en observant les éléments naturels.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Éducation et recherche	Climat, topographie, cycle de l'eau, sol et biote utilisés pour l'éducation et la recherche.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Appréciation esthétique et inspiration	Perception visuelle des écosystèmes et des paysages.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
	Lacs et rivières représentés dans les chansons, la poésie, les peintures, etc.	Pas explicitement	PFT, SPANB, CDN, LT LEDS
Commentaires :			
Au regard de l'état des paysages forestiers, particulièrement ceux des zones riveraines, qui se trouvent sous forte dégradation, il convient de retenir que les services écosystémiques sont tous menacés. La grande majorité des services et processus liés à l'eau présentent un état de perturbation et dégradation allant de niveau modéré à niveau élevé.			