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Advancing Climate-Resilient Development in Madagascar

Integrating Nature-Based Solutions, Climate Services, social and Gender Inclusion, and Indigenous Knowledge and Local Knowledge

Country Synthesis Report

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Source: This synthesis report is based on ALBATROSS Horizon Europe Deliverable D6.1: *Multi-level policy analysis* (Nyasimi, Almassy, Muhwanga, et al., 2025). For more detailed information and supporting evidence, readers are referred to the full report.

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List of Abbreviations

DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
EbA	Ecosystem-based Adaptation
EIA	Environmental Impact Assessment
GFCS	Global Framework for Climate Services
IKLK	Indigenous Knowledge and Local Knowledge
IWRM	Integrated Water Resources Management
MDTP	Medium Term Development Policy Framework
NAP	National Adaptation Plan
NbS	Nature-based Solutions
NDC	Nationally Determined Contribution
SDG	Sustainable Development Goal
UN	United Nations
UNEA	United Nations Environment Assembly
WMO	World Meteorological Organization

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1. Objectives

This country synthesis report presents key findings from a detailed analysis of Madagascar's environmental and climate change policies, focusing on integrating Nature-based Solutions (NbS), climate services, Indigenous knowledge and local knowledge, gender inclusion and related cross-cutting themes.

This brief forms part of a broader multi-level policy analysis under the ALBATROSS Horizon Europe research project. The analysis aims to assess the extent to which, and key challenges and options of integrating Nature-based Solutions (NbS), climate services, Indigenous knowledge and local knowledge, gender inclusion into environmental and climate change policies across five African countries: **Ghana, Kenya, Madagascar, South Africa, and Tanzania.**

Drawing on national and sub-national policy documents, as well as relevant regional frameworks, the analysis mapped the extent and depth of policy integration across the following thematic areas:

- NbS approaches
- Climate services
- Gender-sensitive approaches and
- Indigenous Knowledge and Local Knowledge (IKLK).

The analysis also identified policy gaps, critical needs, and opportunities to scale up NbS and the integration of climate services, gender-sensitive approaches, and IKLK.

This **Madagascar country brief** provides an overview of national findings and presents a set of recommendations for advancing the integration of NbS, climate services, gender considerations and IKLK in national and sub-national policy documents.

2. Overview of the studied policy documents

The broader multi-level policy analysis included transnational, national and subnational environmental and climate policy documents. Some additional thematic documents were also included to cover additional thematic areas, such as meteorology services, gender mainstreaming, and IKLK. In total, 252 policies were included in the analysis from the five target countries. For Madagascar, 33 documents were analysed, consisting of multi-sectoral and sectoral policy frameworks, regulations, strategies, and plans.

2.1. SDG themes addressed by the policy documents

SDG 13: Climate Action is covered by 82% of the documents, followed by SDG 15: Life on Land (70%) and SDG 6: Clean Water and Sanitation (55%). Additionally, SDG 14: Life Below Water is also addressed by 13 policy documents (39%), focusing on marine and coastal ecosystem conservation. SDG 11: Sustainable Cities and Communities, and SDG 7: Affordable and Clean Energy were covered only in 39% and 36% of the documents. Given the central importance of sustainable urban development and low-carbon energy production in

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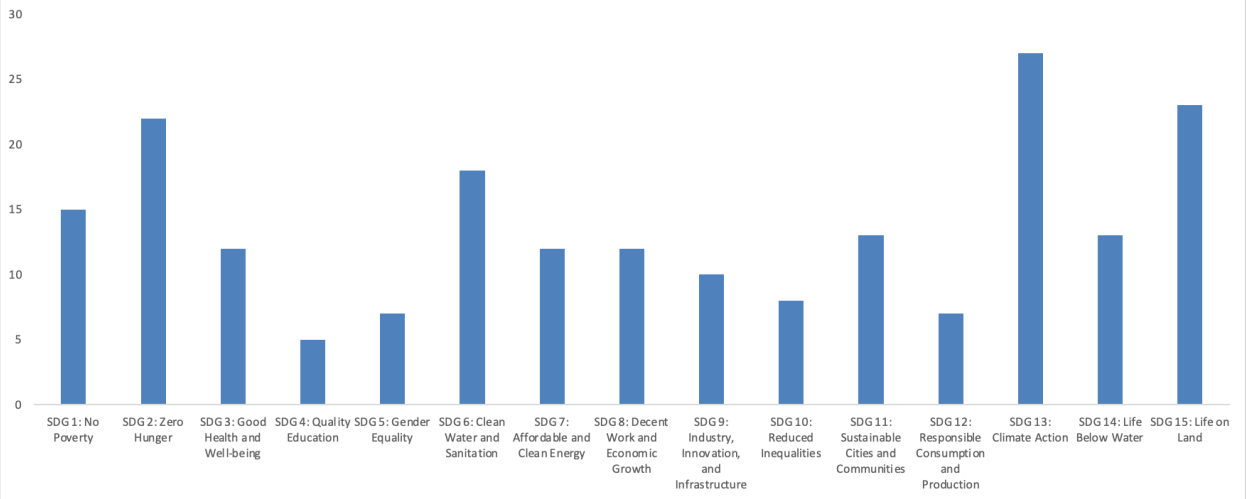
Sub-Saharan Africa, this indicates a potential policy gap. Socio-economic objectives such as SDG 2: Zero Hunger, SDG 1: No Poverty, and SDG 8: Decent Work and Economic Growth are featured in 67%, 45%, and 36% of the reviewed policy documents, respectively. Fewer policy documents, 21% and 15%, respectively, integrated themes relevant to SDG 5: Gender Equality and SDG 4: Quality Education.

Figure 1: Distribution of SDG themes in the studied policy documents of Madagascar



Source: Calculation based on the multi-level policy analysis for Deliverable 6.1

2.2. Climate hazards identified and addressed in environmental and climate policies

The policy documents reviewed in Madagascar identified a broad range of climate hazards:

- **Flooding:** Among the most frequently addressed hazards, flooding is a predominant concern, with 58% of the reviewed policies incorporating relevant considerations. Specific types of flooding mentioned include flash floods (12%), coastal flooding (12%), urban (pluvial) floods (6%), and riverine floods (3%).
- **Drought:** A key climate concern addressed in 52% of the reviewed policies is drought. Concerning water scarcity, policy documents addressed agricultural drought (9%), resulting in insufficient soil moisture to sustain crop growth and reduced yields.
- **Soil erosion and land degradation:** The third most frequently recognised climate risk is soil erosion, referenced in 39% of the policies. Many policy documents linked these problems to unsustainable land-use practices and deforestation.
- **Coastal erosion:** Several reviewed policies (24%) highlighted coastal erosion as a significant risk, often linked to sea-level rise and human-induced shoreline changes.
- **Other notable hazards** include wildfires (24%), forest fires (21%) and landslides (21%). Additionally, some policies also noted vulnerabilities to seawater intrusion (9%) and extreme weather events, such as strong winds (33%) and heat waves (6%).

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3. Integration of nature-based solutions (NbS) in environmental and climate policies

The following section provides an overview of identified NbS implementation trends, gaps, needs, and integration opportunities across the policy documents studied in Madagascar.

According to **internationally accepted definitions**,[1] NbS integrates various approaches such as ecosystem-based management, sustainable forest and water management, agroecology and agrobiodiversity, sustainable agriculture, urban ecosystem regeneration and green and blue infrastructure development. These approaches are implemented through various actions, such as reforestation and forest conservation, coastal and marine protection, freshwater and wetland conservation and restoration, ecosystem-based river basin and floodplain management, erosion control measures, regenerative and climate-resilient agriculture and rangeland management, as well as urban greening measures and hybrid of blue/green/grey infrastructures solutions.

Among the **reviewed policy documents for Madagascar**, around **70% contained NbS measures and actions**. The level of NbS integration across these documents was evaluated according to the following categorisation:

- **High:** NbS approaches are prominently embedded throughout the document, with straightforward integration into strategic objectives and implementation mechanisms. The document may also explicitly position NbS as a core component of climate adaptation and environmental management.
- **Medium-high:** NbS approaches are well-integrated into the policy document and supported by specific policy measures, but they have limited cross-sectoral coordination and alignment with broader policy objectives, such as health, education, or economic resilience.
- **Medium:** NbS approaches are referenced in multiple sections of the document. However, these remain fragmented or limited to general principles without detailed implementation actions.
- **Limited:** The policy document includes a few NbS measures, but these are limited in scope and lacking detail.

3.1. High-level, multi-sectoral policies, strategies and plans

NbS approaches were included in the broader national development strategies of all five studied African countries. Most reviewed high-level, multi-sectoral policy documents, such as national development plans, spatial planning frameworks, and other long-term strategic documents guiding sustainable development, included some relevant NbS aspects.

[1] United Nations Environment Assembly of the United Nations Environment Programme (2022). Resolution adopted by the United Nations Environment Assembly on 2 March 2022: 5/5. Nature-based solutions for supporting sustainable development. UNEP/EA.5/Res.5. Nairobi, 22 and 23 February 2021, and 28 February – 2 March 2022. United Nations Environment Programme. https://wedocs.unep.org/handle/20.500.11822/39864

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An overview of the identified high-level, cross-sectoral policy documents that integrate NbS approaches in Madagascar is presented below.

Table 1: High-level and cross-sectoral policy documents in Madagascar, including NbS approaches and considerations

Name of the policy document	NbS integration	Specific references
Plan Emergence Madagascar, 2019	Medium	Conserve, restore, and enhance Madagascar's biodiversity. Strengthen the protection of Protected Areas. Intensify reforestation efforts with medicinal plants, precious woods, and industrial timber. Promote sustainable mangrove management. Expand and strengthen Madagascar's network of Marine Protected Areas. Sustainably manage Conservation Zones.
Politique Générale de l'Etat / IEM 2019-2023, Madagascar[2]	Medium	Undertake reforestation and restore forest resources. Promote eco-tourism and sustainable management of forests and marine ecosystems. Intensify soil and watershed restoration and strengthen blue economy initiatives.

Stemming from national development policies, some NbS measures were also identified in the county-level and local development plans of the studied countries.

Table 2: Sub-national and local development plans including NbS approaches and considerations

Name of the policy document	NbS integration	Specific references
Plan régional de développement (PRD) de la région Atsinanana (2020-2023), Madagascar [3]	Medium	Preserve and restore forests. Intensify annual reforestation efforts. Large-scale bamboo cultivation for erosion control and carbon credit generation. Strengthen the protection of nature protection sites. Create new eco-tourism sites.

3.2. Climate regulations, strategies and plans

The reviewed African countries also explicitly integrated NbS into their **international climate commitment**s under the Paris Agreement. **Madagascar's** second NDC (2024) aimed to *introduce large-scale reforestation efforts with native species, plantations and mangroves as its most significant mitigation contribution* and also included ecosystem-based adaptation (EbA) measures in agriculture, water and coastal management, forestry and biodiversity to reduce climate risks and vulnerabilities.[4]

Specific NbS considerations were also identified more comprehensively in the National Climate Adaptation Plan (2021), as presented below.

[2] As of the time of this review, the official Politique Générale de l'État (PGE) 2024–2028 for Madagascar was not publicly available. Therefore, the review was based on the 2019–2023 version.
[3] There is no publicly available information confirming the development or publication of an updated Plan Régional de Développement (PRD) for the Atsinanana region covering the period beyond 2023 were therefore not included in the review.
4 https://unfccc.int/sites/default/files/NDC/2024-01/NDC%202%20MADAGASCAR.pdf

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Table 3: Climate change policies, strategies and plans in Madagascar, including NbS approaches and considerations

Name of the policy document	NbS integration	Specific references
Plan National d'Adaptation au Changement Climatique (2021), Madagascar	High	Conservation and climate-smart agriculture; Watershed management to reduce soil erosion and improve water storage; Wetland protection via urban planning; Forest corridors, climate refuges protection; Riparian forest restoration; Ecosystem restoration programs; Marine Protected Areas expansion; National mangrove restoration program; Nature-based erosion control measures; Coastal vegetation replanting.

The Politique Nationale de la Lutte contre le Changement Climatique (2008, revised in 2021) only includes limited consideration for NbS, with measures focusing on climate-smart agricultural practices. Similarly, the Stratégie Nationale du Genre et Changement Climatiques (2023) only reflected NbS approaches partially by emphasizing the importance of women's active participation in ecological transition, including managing forest resources, promoting climate-smart agriculture.

3.3. Environmental regulations, strategies and plans

The policy review also assessed sectoral policy documents focusing on biodiversity protection, forest management, water and coastal resource management and agriculture. Focusing on different ecosystems, such as forests, freshwater and coastal areas, rangelands, and agricultural and urban areas, various types of management, conservation and restoration actions were identified across the reviewed documents.

The table below highlights key environmental policy documents with a higher level of NbS integration in Madagascar.

Table 4: Environmental policy documents in Madagascar, including NbS approaches and considerations

Name of the policy document	NbS integration	Specific references
Loi n°2015-003 portant Charte de l'Environnement Malagasy actualisée, Madagascar	Medium-high	Restore degraded ecological habitats; Conserve genetic resources both in situ and ex situ; Prevent forest conversion into agricultural lands; Control soil erosion and manage watersheds; Reforestation; Promote the conservation of existing and future Protected Areas; Promote integrated and sustainable water resource management; Strengthen and improve community management;
Politique Forestière de Madagascar (2016)	Medium-high	Forest landscape restoration including degraded forests, mangroves, and agroforestry landscapes; Addressing deforestation through improved exploitation control; Delimitation of agro-pastoral lands for restoration; Management of forest fires.
Directives Nationales Synthétisées des Actions	Medium	Commitment to restoring 4 million ha of forest landscapes by 2030; Use of reforestation for erosion control.

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de Reboisement (2020), Madagascar		
Stratégie nationale sur la restauration des paysages forestiers et des infrastructures vertes à Madagascar (2017)	Medium-high	Forest landscape restoration to enhance ecosystem services; Stakeholder engagement for resilience; Integrated land use planning; Development of planning tools for ecological sustainability.
Stratégie Nationale REDD+ Madagascar (2018)	Medium-high	Sustainable agricultural practices; Reduced emissions from forest degradation; Strengthen protected areas; Sustainable forest management; Integrate REDD+ into land-use planning; Private and community-based reforestation; Bushfire prevention and control; Biodiversity conservation.
Stratégie et Plans d'Actions Nationaux pour la Biodiversité 2015 – 2025, Madagascar	High	Integrate biodiversity into socio-economic planning; Reduce habitat degradation and fragmentation; Promote sustainable agricultural, forestry, and aquaculture practices; Protect critical marine and freshwater ecosystems.
Lettre de Politique Bleue (2015)	Medium	Preserve and restore sensitive aquatic ecosystems; Integrated management of mangroves, lakes, spawning areas, and reefs. Reforestation activities in the back-mangrove areas.
Stratégie Régionale d'Approvisionnement en Bois Énergie, Région Menabe (2018)	Medium	Promote sustainable forest management and reforestation; Identify and regulate wood energy exploitation zones, excluding protected and sensitive areas; Promote reforestation for energy use with community involvement.

3.4. Identified trends in NbS approaches and actions

The quantitative analysis of the NbS integration patterns identified in the policy documents reveals varying priorities across ecosystems and thematic areas. Regarding the policy documents reviewed in Madagascar, the following trends can be identified:

- **Ecosystems covered:** The policy documents that were studied placed a more significant focus on forests (55%) and freshwater resources (48%), agricultural areas (48%) and coastal and marine ecosystems (45%). Urban areas (12%) and mountain ecosystems (9%) were considered in fewer documents.
- **Identified trends in NbS approaches and actions:** The policy documents have integrated multiple NbS actions, including reforestation and sustainable forest management activities (58%), coastal and marine conservation (39%), anti-desertification, land degradation and soil erosion measures (39%) and freshwater resource protection (30%). Urban green and blue infrastructure development (6%) were less frequently included.
- **Level of NbS integration:** 24% of policies integrated NbS approaches more comprehensively. Another 48% integrated NbS at a medium level by including some relevant measures but mainly focusing on specific ecosystems and activities.

3.5. Recommendations for NbS integration

NbS integration in high-level multi-sectoral policies: Both the Plan Emergence Madagascar (2019) and the Politique Générale de l'Etat / IEM (2019-2023) include activities that align with the NbS/EbA concept. However, not all ecosystems are addressed. The Politique Générale de l'Etat acknowledges the need to restore ecological balance by restoring forests and watersheds and protecting natural areas but mostly lacks ecosystem-specific

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interventions. Similarly, while the Plan Emergence Madagascar highlights landscape restoration, it does not incorporate freshwater resource management, wetland conservation, and urban NbS strategies. At the subnational level, the Plan Régional de Développement (PRD) de la Région Atsinanana contains some reforestation initiatives but lacks an integrated approach to ecosystem-based resilience. Supporting the implementation of the Convention on Biological Diversity, the Stratégie et Plans d'Actions Nationaux pour la Biodiversité 2015-2025, comprehensively incorporates ecosystem-based approaches for biodiversity conservation and land-use management, including agriculture, aquaculture, and forestry. These documents can provide a solid foundation for systematically mainstreaming NbS measures to sectoral and sub-national policies.

Strengthening NbS and EbA integration in key environmental and sectoral policies: Madagascar has several sectoral policies addressing environmental protection and climate change. Some, such as the Plan National d'Adaptation au Changement Climatique (2021) or the Politique Forestière de Madagascar (2017), already integrate NbS approaches quite comprehensively. Other sectoral policies could benefit from a more comprehensive integration of NbS and EbA. The Politique Nationale de l'Environnement pour le Développement Durable (2015) sets broad environmental objectives concerning ecosystem conservation but lacks specific NbS implementation measures that concern their active management and restoration. The Politique Nationale de la Lutte contre le Changement Climatique (2008, revised in 2021) lacks linkages to EbA and could be extended with NbS measures to support resilience building. The Lettre de Politique Bleue (2015) promotes integrated coastal management but could define concrete NbS strategies for improving coastal resilience.

Strengthening the legislative framework for NbS: Many assessed laws include provisions for environmental protection, but explicit references to NbS remain largely absent. The Loi n°2015-003 portant Charte de l'Environnement Malagasy includes several relevant ecosystem-based approaches but could be updated to explicitly position NbS as a cross-sectoral approach for land management, biodiversity conservation and ecosystem restoration. Systematic considerations could also be introduced in other legislation. For example, the Loi n°2020-003 sur l'Agriculture Biologique à Madagascar promotes organic farming but does not link activities to conservation and climate-resilience practices. The Loi N° 2014-042, Remise en état, la gestion, l'entretien, la préservation et la police des réseaux hydro-agricoles acknowledges the importance of environmental protection, but it lacks specific, actionable measures to restore or manage watersheds. The Décret n°2025-080 fixant les règles et procédures de l'Évaluation Environnementale et Sociale, requires infrastructure and development projects to avoid ecosystems and apply compensatory measures. However, the decree could be extended to mandate EbA/NbS considerations as part of infrastructure and development projects

Integrating NbS into urban planning: NbS integration into urban planning receives limited consideration across the reviewed documents. The Politique Nationale de l'Aménagement du Territoire discusses the protection and valorization of natural areas and the improvement of the quality of landscapes in cities and villages, but the integration of NbS approaches would provide a more systematic framework for developing resilient and sustainable urban landscape. The Approche Méthodologique pour l'élaboration d'un Schéma d'Aménagement

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Communal (2019) mentions reforestation and watershed management but could explicitly require the integration of ecosystem approaches into local development planning and could explore linkages between NbS measures and climate resilience of urban areas. The Strategic Program for Climate Resilience includes relevant considerations in this regard and could provide a basis for further policy development.

Introducing financing strategies and mechanisms for NbS: Most policies and strategies, even if they include NbS or EbA as strategic measures, do not allocate specific implementation budgets to such activities and lack clear financial mechanisms to support large-scale implementation. Establishing a dedicated funding stream can mobilise resources for large-scale NbS investments. In addition, considerations for innovative financial instruments and mechanisms, such as thematic bonds, biodiversity credits, carbon credits, guarantees or payment for ecosystem services, could incentivise private sectors/businesses to invest in NbS.

Monitoring frameworks: Establishing NbS-specific indicators and targets, as well as monitoring and reporting mechanisms, can help track progress, assess multiple co-benefits, support stakeholder involvement, and facilitate evidence-based policy adjustments. Strengthening monitoring, research, and data collection can inform evidence-based decision-making; for example, cost-benefit analysis can demonstrate the effectiveness of NbS.

4. Climate services provisioned in policy

The Global Framework for Climate Services (GFCS) of the WMO defines climate services as the "*provision and use of climate data, information, and knowledge to assist decision-making,*" with key components including observations and monitoring, research, modelling and prediction, climate services information systems, user-provider engagement, and capacity development. As such, climate services can be critical in supporting climate risk management, adaptation planning and evidence-based decision-making in various sectors, including disaster risk management, agriculture and food security, water management, health and energy. [5]

The analysis found that less than half (48%) of the reviewed policy documents in Madagascar consider climate services. The level of climate services integration was evaluated according to the following categorisation:

- **High:** Climate services are prominently embedded throughout the document, with clear integration into strategic objectives and implementation frameworks. The document may also explicitly position climate services as central to climate adaptation and risk management.

[5] **World Meteorological Organization (WMO).** (n.d.). *Components of GFCS*. Global Framework for Climate Services. Retrieved February 25, 2025, from https://gfcs.wmo.int/site/global-framework-climate-services-gfcs/components-of-gfcs

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- **Medium-high:** Climate services are well-integrated and supported by specific policy measures, but with limited cross-sectoral coordination or alignment with broader policy areas such as health, agriculture, or economic planning.
- **Medium:** Climate services are referenced in multiple sections, but treatment is often fragmented or limited to general principles without detailed implementation strategies.
- **Limited:** Climate services are mentioned occasionally, with minimal scope and lacking detail in terms of operationalisation or institutional support.

4.1. High-level, multi-sectoral policies, strategies and plans

The integration of climate services into high-level and multi-sectoral frameworks in Madagascar is limited. The Plan Emergence Madagascar (2019) set to develop multi-hazard contingency plans; institutionalize disaster risk management; establish risk information systems and strengthen community resilience to climate risk. The Politique Générale de l'Etat (2019-2023) does not explicitly mention climate services; it only provisions general monitoring of implementation. Similarly, at the sub-national level, the latest available Plan régional de développement de la région Atsinanana (2020-2023) also does not contain any requirements for the development and use of climate services, it only mentions the need to develop a disaster risk management strategy.

4.2. Climate policies, strategies and plans

The 2nd NDC of Madagascar (2024) aims to strengthen early warning systems for cyclones, droughts, and agriculture; develop climate-resilient infrastructure standards; enhance climate-health research; establish monitoring for salinization, pests, and climate-related diseases and expand institutional capacity for public education, information access, and stakeholder participation.

The majority of the climate policy documents of Madagascar also integrate climate services. Identified goals and measures mainly focused on climate data and monitoring and early warning systems and, in some instances, also to improve evidence-based decision-making.

Table 5: Climate policy documents in Madagascar incorporating climate services

Name of the policy document	Climate services integration	Specific references
Politique Nationale de la Lutte contre le Changement Climatique (2008, revised in 2021)	Medium-high	Assess climate risks and vulnerabilities using scientific, traditional, and local knowledge; Strengthen early warning systems considering differentiated impacts; Assess and enhance capacity-building needs for climate knowledge, technology, education, training, and transparent information; Strengthen institutional capacities for climate monitoring.
Plan National d'Adaptation au Changement Climatique (2021), Madagascar	High	Develop climate vulnerability and adaptation databases; Research and promote climate-adapted agriculture; Monitor climate impacts on marine ecosystems; Install river level observation stations for flood management; Conduct urban climate vulnerability assessments; Establish urban risk surveillance systems; Implement early warning systems and contingency plans in cities; Integrate DRR and climate

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		adaptation planning; Establish multi-hazard early warning systems with real-time data.
Stratégie Nationale du Genre et Changement Climatique, Madagascar	Medium	Involve women in early warning systems and promote traditional knowledge for climate prediction.
Plan National d'Adaptation du Secteur Santé au Changement Climatique (PNASS), 2016, Madagascar	High	Assess climate-sensitive health risks; Establish integrated surveillance and early warning systems; Strengthen epidemiological monitoring using new technologies; Map climate-related health vulnerabilities; Integrate and disseminate climate-health data; Promote biometeorology research.
Politique Nationale de la Météorologique (PNM), Madagascar	High	Promote integration of meteorological information into planning and decision-making. Improve weather, climate, and water observations and forecasting. Enhance dissemination and public access to reliable climate information.

4.3. Environmental policies, strategies and plans

Relevant activities are also included in some of Madagascar's sectoral policies, which mainly focus on agriculture and disaster risk reduction. See the table below.

Table 6: Environmental policy documents in Madagascar incorporating climate services

Name of the policy document	Climate services integration	Specific references
Stratégie et Plans d'Actions Nationaux pour la Biodiversité 2015 - 2025	Medium	Studies on best practices for ecosystem management with adaptation and mitigation programs; Regular publication of climate change information sheets; Study and dissemination of improved methods and tools for ecosystem-based adaptation to climate change.
Lettre de Politique Intersectorielle Agriculture, Elevage et Pêche (2015), Madagascar	Medium	Strengthening the resilience of vulnerable populations; Protection against risks and hazards; Expansion of the Early Warning System; Adaptation of agricultural infrastructure to climate disruptions and extreme events.
Stratégie de Mise en Œuvre de la Transparence de l'Accord de Paris du Secteur Agriculture, Élevage et Pêche (2021), Madagascar	Medium-high	Development of necessary tools for data capitalization and improvement of the data management system. Knowledge management and accounting of climate actions related to agriculture, livestock, and fisheries. Development of a monitoring system for mitigation and adaptation actions in the agriculture sector.
Plan Directeur de la Recherche sur l'Environnement et le Changement Climatique 2015-2019, Madagascar	Medium-high	Improve climate monitoring, data availability, and projections; support risk and disaster management structures with updated climate data; coordinate climate change data management across sectors; strengthen institutional capacities in climate research and data management.
Stratégie Nationale de Gestion des Risques et des Catastrophes (2016), Madagascar	Medium-high	Strengthen institutional capacity at all levels for risk reduction and climate adaptation. Enhance public risk awareness and communication. Develop training programs on multi-hazard risk management. Improve data collection, monitoring, and early warning systems. Promote integration of disaster risk reduction in education and research. Facilitate interpretation of scientific climate data for decision-making.

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4.4. Identified trends in climate services integration

The policy analysis identified the following trends concerning the integration of climate services in the reviewed policy documents.

- **Types of climate services integrated:** Climate observations, data collection and monitoring (36%), climate research and modelling (42%) and establishing climate services information systems (42%) are the most frequently included across the policies. The policies also place more emphasis on decision-support (45%), but activities to enhance resilience to strengthen adaptive capacities are less frequent (30%).
- **Sectors addressed by climate services:** Disaster risk reduction (27%), agriculture and food security (21%) and water (18%) are the most targeted sectors. Overall, the sectoral focus is less emphasised, and many documents provide general provisions only.
- **Level of integration:** One-fourth of the policies demonstrate a higher level of integration of climate services. A further 20% exhibit a moderate level of integration. Approximately 50% do not consider climate services.

4.5. Recommendations for climate services integration

Enhance the integration of climate services into national and sectoral policy frameworks: The Plan Emergence Madagascar includes objectives for the prevention and management of risks and disasters, the Politique Nationale de la Météorologique (PNM), Politique Nationale de la Lutte contre le Changement Climatique (PNLCC) contain comprehensive provisions for the collection and the use of meteorological and climate information. At the same time, several environmental policies do not establish linkages between environmental monitoring and climate information. These include the Politique Nationale de l'Environnement pour le Développement Durable (2015), the Politique Forestière de Madagascar (2017) or the Lettre de Politique Bleue (2015). At the subnational level, the Plan Régional de Développement de la région Atsinanana (2020-2023) should also incorporate considerations for collecting and assessing climate-related information and integrating these into planning and decision-making processes.

Improve climate data availability and accessibility: While some policies foresee climate data collection, these processes are not integrated across sectoral policies into a Climate Information System that consolidates and distributes climate data across all sectors. The Politique Nationale de l'Environnement pour le Développement Durable (2015) or the Politique Nationale de la Lutte contre le Changement Climatique (2021) could support the establishment of a centralized climate data system and ensure the systematic integration of climate data and information into environmental planning and management. Environmental laws, such as the Loi n°2015-003 portant Charte de l'Environnement Malagasy, the Loi n° 2015-031 relative à la Politique Nationale de Gestion des Risques et des Catastrophes or the Décret n°2025-080 fixant les règles et procédures de l'Évaluation Environnementale et Sociale, could mandate the integration of climate aspects into data collection, monitoring and environmental assessment.

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Expand early warning systems: Many policies include provisions for early warning systems, but these are often limited to disaster risk reduction. However, policies should promote multi-hazard early warning systems that considers various climate risks (droughts, floods, heatwaves, coastal erosion). For example, the Stratégie Nationale de Gestion des Risques (2016) could incorporate multi-hazard early warning approaches and extend its activities to other sectors, e.g. agricultural drought-related forecasts or climate-health vulnerability assessments. The local adoption of early warning systems should also be ensured, especially for small-scale farmers, vulnerable coastal communities, and urban settlements. For example, the Approche Méthodologique pour l'élaboration d'un Schéma d'Aménagement Communal (2019) could require the establishment of local multi-hazard and sector-specific early warning systems to ensure that climate risk information is available and accessible at the local level.

Utilize climate services for decision-support and capacity-building: Climate information services have a significant potential to support decision-making processes and build community resilience against climate hazards. Accordingly, policies should ensure that climate information is systematically utilized for these purposes. For example, while the Politique Nationale de la Météorologique (2022) and the Politique Nationale de la Lutte contre le Changement Climatique (2021) already promotes climate data collection, forecasting and dissemination, their scope could be expanded to consider how the collected information may be fed into planning and decision-making processes. To support capacity-building in utilizing climate information, sub-national training hubs for local governments and sector-specific climate awareness and capacity-building programs for businesses and communities could be established.

5. Gender-sensitive approaches in policy documents

Gender-sensitive and equity-based approaches are increasingly recognised as essential to effective climate adaptation strategies. Such approaches can significantly reduce vulnerability across critical African sectors, such as water, health, food systems, and livelihoods. [6]

The majority of the policy documents studied in Madagascar incorporate social inclusion considerations, although many of the reviewed documents do not cover all relevant needs. Regarding **gender mainstreaming**, around 25% of the reviewed policy documents included specific gender-responsive measures. An additional 25% of the documents acknowledged the need to address gender inequality without listing specific actions to address these challenges. The remaining half of the reviewed policy documents included limited or no consideration of gender inclusion.

[6] IPCC, 2023: Annex I: Glossary [Reisinger, A., D. Cammarano, A. Fischlin, J.S. Fuglestvedt, G. Hansen, Y. Jung, C. Ludden, V. Masson-Delmotte, R. Matthews, J.B.K Mintenbeck, D.J. Orendain, A. Pirani, E. Poloczanskaa, and J. Romero (eds.)]. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 119-130, doi: 10.59327/IPCC/AR6-9789291691647.002

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The table below provides an overview of identified environmental and climate policies with more comprehensive gender inclusion measures in Madagascar.

Table 7: Gender considerations in the climate and environmental policy documents of Madagascar

Title of the policy	Specific references
Stratégie Nationale du Genre et Changement Climatiques,(2023), Madagascar	Promote the integration of gender considerations in climate change policies. Strengthen women's involvement in climate action efforts.
Politique Nationale de la Lutte contre le Changement Climatique (2008, revised in 2021), Madagascar	Strengthen the participation of all stakeholders at all levels and promote cooperation, including gender and vulnerable communities; Develop and implement an inclusive planning process
Plan National d'Adaptation au Changement Climatique (2021) Madagascar	Ensure gender-responsive adaptation measures in climate action planning. Consider gender-specific needs in infrastructure and disaster resilience.
Strategic Program for Climate Resilience, Madagascar	Improve the understanding of climate risks and their gender implications. Gender-specific vulnerability assessment for policy development.
Plan de Contingence National Cyclones et Inondations, (2010), Madagascar	Prevent and respond to gender-based violence, including sexual violence, domestic abuse, and exploitation linked to humanitarian assistance.
Stratégie Nationale de Gestion des Risques et des Catastrophes (2023), Madagascar	Integrate gender in disaster risk reduction policies. Training on gender-responsive disaster management.
Stratégie de Mise en Œuvre de la Transparence de l'Accord de Paris du Secteur Agriculture, Élevage et Pêche (2021), Madagascar	Introduces a gender-climate approach in all Information, Education, and Communication processes.

5.1. Recommendations for improving the inclusion of gender considerations

Strengthen gender mainstreaming in environmental and climate policies: Policies must integrate gender considerations more systematically into environmental and climate policies. The Stratégie Nationale du Genre et Changement Climatiques (2023) provides a foundation for incorporating gender considerations in climate change policies and provisions included in this document. The Plan National d'Adaptation au Changement Climatique (2021) Madagascar also seeks to ensure gender-responsiveness in its adaptation measures. However, other key policies, such as the Politique Nationale de l'Environnement pour le Développement Durable (2015), the Politique Forestière de Madagascar (2017), the Lettre de Politique Intersectorielle Agriculture, Elevage et Pêche (2015), the Lettre de Politique Bleue (2015), the Politique Nationale de l'Aménagement du Territoire (2006), currently only include limited gender considerations. These policies should be extended to address how women and other vulnerable groups can be included in natural resource management, biodiversity conservation and ecosystem restoration activities.

Enhance gender inclusion in climate services: Climate services and disaster risk reduction strategies should also incorporate gender-responsive approaches. For example, provisions requiring gender-inclusive early warning systems and disaster risk reduction measures could be included in the Politique Nationale de la Lutte contre le Changement Climatique (2021), the Politique Nationale de la Météorologique (2022) or the Loi n° 2015-031 relative à la Politique Nationale de Gestion des Risques et des Catastrophes.

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Link economic opportunities and livelihoods to NbS approaches: Policies could be strengthened to promote green job opportunities for women and vulnerable groups in agriculture, forest and nature conservation. Multi-sectoral policies, such as the Plan Emergence Madagascar or the Politique Générale de l'Etat, have already included measures supporting gender inclusion. However, these policies could consider additional measures to increase women's participation in sustainable agriculture, forestry or eco-tourism activities. At the subnational-level, similar considerations can also be included in the Plan régional de développement de la région Atsinanana (2020-2023). Moreover, sectoral strategies, such as the Stratégie Nationale REDD+, (2018) or the Stratégie nationale sur la restauration des paysages forestiers et des infrastructures vertes à Madagascar, could include measures to enhance women's participation in specific economic activities through training and capacity-building, support to women-led enterprises and the introduction of payments for ecosystems schemes that provide financial incentives for sustainable natural resource management practices.

6. Indigenous knowledge and local knowledge inclusion in policy documents

Around one-third of the reviewed policy documents contain concrete provisions for integrating indigenous knowledge and local knowledge (IKLK), either comprehensively or partially. The remaining documents include limited considerations or do not mention IKLK systems.

Sectoral policies refer to IKLK primarily in the context of climate change adaptation, sustainable agriculture, natural resource management, and disaster risk reduction. Promoted approaches include the documentation of IKLK, its integration with scientific knowledge, and, to a lesser extent, the enhancement of capacity-building and inclusion in formal governance structures.

Table 8: Examples of IKLK considerations in the environmental and climate policy documents of Madagascar

Title of the policy	Specific references
Stratégie nationale sur la restauration des paysages forestiers et des infrastructures vertes à Madagascar (2017)	Improving local expertise to strengthen capacities for more sustainable management of larger territories and fire management (incl. Local and traditional knowledge)
Stratégie Nationale de Gestion des Risques et des Catastrophes (2016)	Enhance the use of knowledge, innovations, and education to establish a culture of risk, safety, and resilience at all levels through support for research, identification, and valorization of Indigenous knowledge, as well as raising public awareness to promote behaviour change.
Stratégie et Plans d'Actions Nationaux pour la Biodiversité (2015 – 2025)	By 2025, initiatives to protect traditional knowledge, innovations, and practices of local communities relevant to biodiversity are in place. The sustainable traditional use of biodiversity and its contribution to conservation is respected, preserved, and maintained
Stratégie Nationale du Genre et Changement Climatiques (2023)	Involve women in early warning systems and anticipatory measures and promote traditional knowledge on climate prediction indicators.
Plan Directeur de la Recherche sur l'Environnement et le Changement Climatique 2015-2019	Activity 4. Evaluate indigenous adaptation and mitigation practices and enhance them in innovative adaptation systems. Local communities have provided their own responses to climate change in the economic and social fields. Indigenous adaptation measures in agriculture, livestock, marine, and

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	forest areas will also be part of this. The synergy between local/indigenous knowledge and applied scientific research should be promoted.

6.1. Recommendations for IKLK integration

Strengthen the integration of IKLK consideration in environmental governance and natural resource management: Some analysed strategies include provisions for IKLK integration, but most high-level and sectoral policies still lack IKLK-based approaches for natural resource management and ecosystem conservation. The Politique Nationale de l'Environnement pour le Développement Durable (2015), Politique Nationale de la Lutte contre le Changement Climatique (2021), the Politique Forestière de Madagascar (2017), the Lettre de Politique Intersectorielle Agriculture, Elevage et Pêche (2015) or the Lettre de Politique Bleue (2015) could strengthen IKLK integration by incorporating provisions for forest and wildlife management, sustainable agriculture, food security, climate change adaptation, and disaster risk reduction. This could be achieved through documenting relevant IKLK practices, integrating them with scientific knowledge, and establishing governance mechanisms to support their formal recognition and systematic application.

Integrating IKLK in regulatory frameworks: The Loi n° 2021-019 relative à la Politique Culturelle Nationale provides a solid foundation for the conservation of cultural heritage protection in Madagascar and includes consideration for the preservation of traditional ecological models and conservation techniques. Key environmental legislations, such as the Loi n°2015-003 portant Charte de l'Environnement Malagasy actualisée, the Loi n°2020-003 sur l'Agriculture biologique à Madagascar or the Loi N° 2014-042: Remise en état, la gestion, l'entretien, la préservation et la police des réseaux hydro-agricoles, could incorporate legally binding requirements for IKLK integration in biodiversity conservation and sustainable land management strategies.

Moving beyond documentation to practical implementation: Policies should consider measures to apply IKLK-based approaches in biodiversity conservation, climate adaptation and natural resource management strategies. For instance, policies can promote knowledge-sharing platforms to ensure the uptake of IKLK-based approaches, as well as community-led NbS projects that integrate IKLK and introduce formal mechanisms for IKLK integration.

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