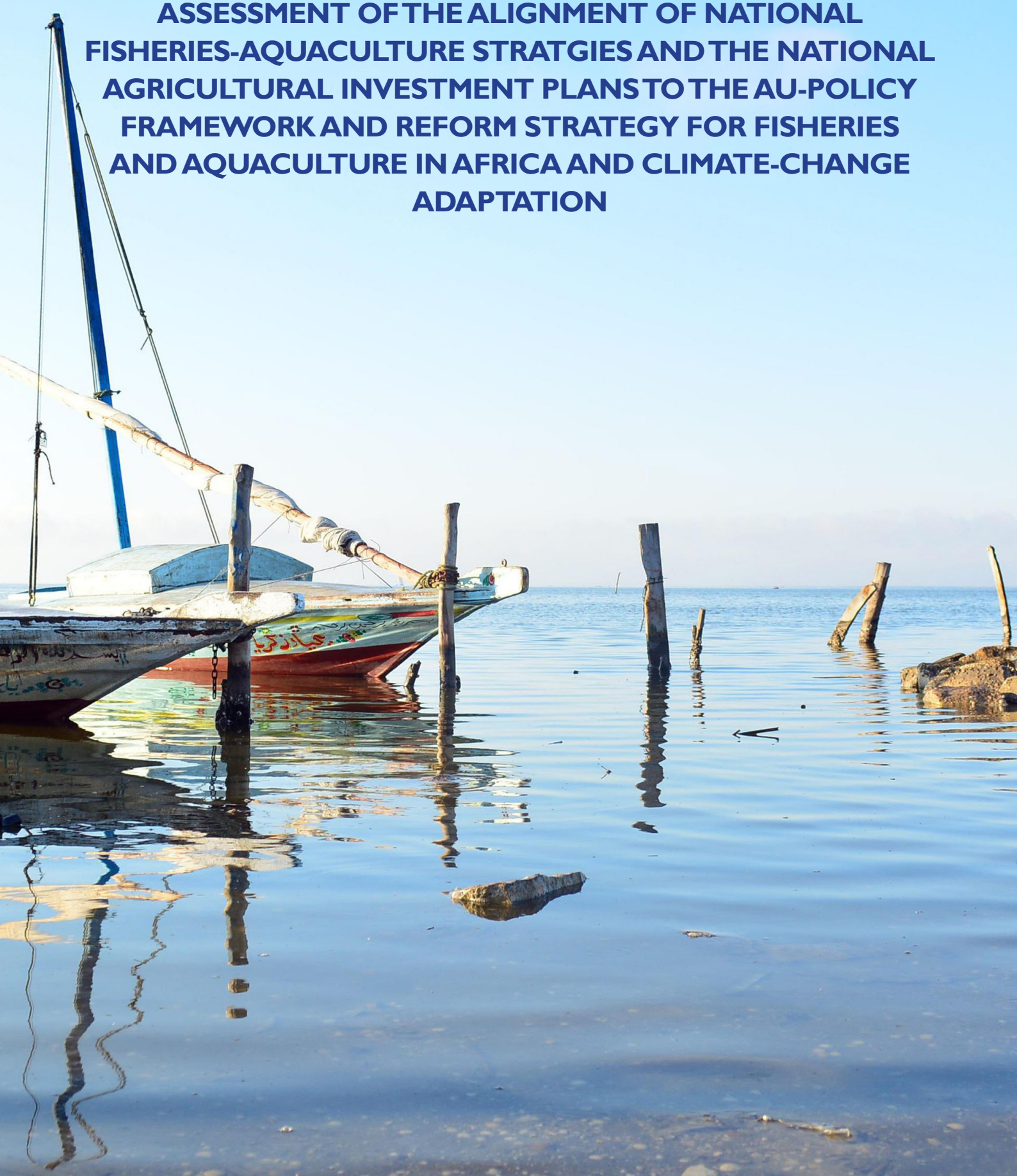
African Union

FishGov 2 Project

EUROPEAN UNION

Final Report

ASSESSMENT OF THE ALIGNMENT OF NATIONAL FISHERIES-AQUACULTURE STRATGIES AND THE NATIONAL AGRICULTURAL INVESTMENT PLANS TO THE AU-POLICY FRAMEWORK AND REFORM STRATEGY FOR FISHERIES AND AQUACULTURE IN AFRICA AND CLIMATE-CHANGE ADAPTATION



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Citation: ASSESSMENT OF THE ALIGNMENT OF NATIONAL FISHERIES-AQUACULTURE STRATGIES AND THE NATIONAL AGRICULTURAL INVESTMENT PLANS TO THE AU-POLICY FRAMEWORK AND REFORM STRATEGY FOR FISHERIES AND AQUACULTURE IN AFRICA AND CLIMATE-CHANGE ADAPTATION

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Published by AU-IBAR, Nairobi, Kenya

Executive Summary

The purpose of this Report is to support African Union Member States (AU-MS) in successfully developing and implementing national fisheries and aquaculture sectoral strategies and National Agricultural Investment Plans (NAIPs) aligned with the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS) and climate change adaptation. The aim is to benchmark and establish twinning mechanisms for peer review to strengthen coherence in the sector with the PFRS and to build capacity for realistic fisheries and aquaculture policymaking.

This Report Covers the following:- Assessment of the Alignment of National Fisheries and Aquaculture Strategies and Policy Framework for Fisheries and Aquaculture in Egypt and Climate Change Adaptation;- Assessment of the Alignment of Egypt's National Fisheries and Aquaculture Strategies and National Agricultural Investment Plans (NAIP) with the AU Strategy for Climate-Resilient Agriculture (SCAR);-Assessing Climate-Smart Fisheries and Aquaculture from National to Global Levels.

Overall, the comparative results show that Egypt (and many African NAIPs) has strong aquaculture potential but faces limited systemic mainstreaming of PFRS climate indicators into NAIPs; targeted reforms and an indicator set are essential to monitor CSFA adoption and impacts.

Egypt's fisheries and aquaculture sector's general alignment with AU-PFRS is estimated at approximately 65%, reflecting moderate to high coherence across policy areas, particularly in aquaculture development and value-chain strengthening. [1]In comparison, alignment with AU-SCAR is estimated at approximately 55–60%, indicating that climate resilience considerations are increasingly recognised but not yet fully mainstreamed into fisheries governance, ecosystem management, and regional cooperation mechanisms (Aligning AU-PFRS and AU-SCAR implementation offers Egypt a strategic opportunity to consolidate its leadership in fisheries and aquaculture while enhancing climate resilience, sustainability, and regional cooperation.

Climate adaptation actions in Egypt's fisheries and aquaculture sector can be effectively implemented by aligning AU-PFRS priorities with NAIP indicators that monitor resilient infrastructure, adaptive production systems, ecosystem restoration, and fisher livelihoods. Targeted technical assistance from AU-IBAR, combined with strategic donor financing aligned with NAIP priorities, will enable Egypt to translate its strong policy alignment with AU-PFRS into climate-resilient, inclusive, and sustainable fisheries and aquaculture outcomes consistent with Agenda 2063.

[1] Alignment scores were derived using the AU-IBAR "Guide for the Implementation of the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa". Each policy outcome was scored based on documentary evidence (0 = no evidence; 0.1–0.5 = partial evidence; 0.5–1.0 = substantial evidence). Scores were converted into percentages and aggregated across outcomes, policy areas, and the full framework. Results were triangulated with online survey responses and expert validation1- detailed calculation is presented in Appendix 4).

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Abbreviations

ABES	Africa Blue Economy Strategy
AU	African Union
AU-IBAR	African Union Inter-African Bureau for Animal Resources
BBNJ	Biodiversity Beyond National Jurisdiction
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
CAADP	Comprehensive Africa Agriculture Development Programme
CASEP	Climate Action in the Southern and Eastern Mediterranean
CCRF	Code of Conduct for Responsible Fisheries
COMESA	Common Market for Eastern and Southern Africa
EEZ	Exclusive Economic Zone
EAF	Ecosystem Approach to Fisheries
EAA	Ecosystem Approach to Aquaculture
FAO	Food and Agriculture Organization of the United Nations
FPIs	Fishery Performance Indicators
GCF	Green Climate Fund
GFCM	General Fisheries Commission for the Mediterranean
ICCAT	International Commission for the Conservation of Atlantic Tunas
IMTA	Integrated Multi-Trophic Aquaculture
LFRPDA	Lakes and Fish Resources Protection and Development Agency
ILO	International Labour Organization
IUU	Illegal, Unreported, and Unregulated (fishing)
LME	Large Marine Ecosystem
MCS	Monitoring, Control, and Surveillance
MoALR	Ministry of Agriculture and Land Reclamation
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NAIP	National Agricultural Investment Plan
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NCCS	National Climate Change Strategy
NCFDC	National Center for Food and Drug Control
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NPA	National Project of Aquaculture
PFRS	Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa
PPP	Public-Private Partnership
PSMA	Port State Measures Agreement
RAS	Recirculating Aquaculture System

RECs	Regional Economic Communities
RFBs	Regional Fisheries Bodies
SDGs	Sustainable Development Goals
SMEs	Small and Medium Enterprises
SSF	Small-Scale Fisheries
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFSA	United Nations Fish Stocks Agreement
WEF	World Economic Forum
WFP	World Food Programme

1. Introduction

[1]Climate change is significantly impacting the livelihoods of the world's 55 million fishers and fish farmers, threatening their livelihoods and the ecosystems they depend on. Historically, these communities have used indigenous knowledge to manage seasonal and climate variability, but the rapid pace of environmental change now challenges their ability to adapt. By establishing a co-management system that involves stakeholders from the community, governmental bodies, and NGOs, they have successfully balanced resource use with conservation efforts. This approach has proven to be a practical adaptation pathway, demonstrating the potential of polycentric governance solutions to address climate challenges.

Current issues include rising temperatures, shifting rainfall patterns, and more frequent extreme weather events. Ocean salinity and acidity are increasing, affecting aquatic species and altering habitats and migration patterns. Coastal communities, particularly fishing communities, face risks from sea level rise and stronger storms, while some inland water bodies are drying up, and others are experiencing regular flooding. The poorest communities often bear the brunt of these changes.

The impact of climate change on marine biodiversity and fisheries in Africa can be projected by estimating changes in catch potential driven by a range of ecological effects and factors (e.g., increases in sea temperatures, oxygen concentrations, ocean acidification, changes in the frequency and intensity of extreme events, and changes in biochemical structures). These changes, in turn, affect the abundance, physiology, phenology, and spatial distribution of targeted species, thereby altering food webs and, particularly when combined with ongoing maximum catch potential (MCP) ([2]World Bank, 2019).

Most proposed solutions are established practices that have been shown to enhance the resilience of small-scale fishers and fish farmers. Framing adaptation within a 'safe and just space,' as described in the doughnut framework, positions fisher resilience as essential to maintaining both planetary and social boundaries. This approach can garner broader coalition support. Managing climate risk is crucial for helping poor rural populations escape poverty, as they typically have fewer resources to withstand shocks. Innovative policies and investment programs are essential for enabling these communities to adapt to and recover from climate impacts. To make a compelling case for policymakers, consider the economic implications: an estimated loss of $10,000 in annual income per small-scale fisher could be mitigated with a $2,000 investment in adaptation strategies, highlighting the cost-effectiveness of proactive measures.

Small-Scale fisheries (photos by Suzan Kholeif)

[3]Aquaculture has significant growth potential and a lower carbon footprint than many land-based animal food production systems. It contributes to climate solutions by providing low-carbon, high-quality, nutritious foods to meet the needs of a growing global population. At the same time, aquaculture is highly vulnerable to climate change, facing increasing risks such as rising water temperatures, ocean acidification, oxygen depletion, and more frequent or severe extreme weather events that threaten its productivity, sustainability, and economic

[2] *"World Bank. 2019. Climate Change and Marine Fisheries in Africa: Assessing Vulnerability and Strengthening Adaptation Capacity. © World Bank. The Climate Change-Security Nexus in the Mediterranean, 2022. 2022 Edizioni Nuova Cultura - Roma ISBN: 9788833654584*

[3] *Thematic focus 1: Climate Change and Resilience in Aquaculture, FAO, 2025- COFI:AQ/XIII/2025/4 ;http://www.fao.org/cofi/aquaculture/documents/en*

viability. Recognizing these challenges, climate-resilient aquaculture and disaster risk reduction must be built on policies, strategies, and plans developed in full and effective consultation with aquaculture stakeholders and aligned with recommendations from the Guidelines for Sustainable Aquaculture (GSA), the FAO Strategy on Climate Change, and relevant multilateral instruments, including the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction. Given the critical role of aquaculture in global food security and livelihoods, it is imperative to implement effective adaptation and mitigation actions to safeguard the sustainability and climate resilience of aquaculture while maximizing its potential as a climate-resilient food source (FAO, 2025).

The need for action is clear, but discussions about response strategies and resource allocation are ongoing at international forums, particularly during the annual Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC). To transition from awareness to commitment, a concrete roadmap can be established with the following immediate steps:-

- **Funding:** Allocate resources specifically for the development and implementation of climate adaptation measures targeted at at-risk communities. This can include grants or low-interest loans to incentivize investment in sustainable and resilient fishing and aquatic farming practices.
- **Capacity-Building:** Strengthen the ability of local communities to adapt by providing training programs that focus on indigenous knowledge integration, innovative farming techniques, and sustainable business models. This approach will help communities to independently manage climate risks and opportunities.
- **Monitoring:** Establish robust monitoring systems to track the effectiveness of implemented strategies. This can include regular assessments of ecological changes and socio-economic impacts, allowing for adaptive management and timely interventions.

The socio-economic importance of fisheries and aquaculture for food security, economic development, employment and income generation necessitates a proactive approach to formulating adaptation and mitigation policies for climate change and aquaculture interactions. Raising awareness and understanding stakeholders' perceptions of the impact of climate change on fisheries are essential pillars of the adaptation and/or mitigation policy development process.

[4]Fisheries management is the process of managing fisheries sustainably to ensure long-term, optimal resource use. To effectively manage fish stocks, various control measures exist that directly or indirectly limit catches. However, the diversity of fishing gear types and target species makes fisheries management even more complex. In the Mediterranean basin, which is more heavily affected by climate change than the global seas and by human-induced pressures, intensive efforts are necessary to develop responsive fisheries management, for example, timely restrictions on fishing effort and protection of spawning stocks through fishery closures to minimise the amplified impacts of excessive fishing effort and environmental change.

Continuing to expand fishing capacity in the absence of effective, restrictive management measures may

[4] *Moncada, S., Djoundourian, S., Kholeif, S., Camilleri Fenech, M., Drius, M., Spagnuolo, F., 2024: Sustainable Development Pathways. In: Climate and Environmental Coastal Risks in the Mediterranean. [Djoundourian, S., Lionello, P., Llasat, M.C., Guiot, J., Cramer, W., Driouech, F., Gattacceca, J.C., Marini, K. (eds.)]. MedECC Reports. MedECC Secretariat, Marseille, France, pp. 253-295, doi: 10.5281/zenodo.13753895 (*https://doi.org/10.5281/zenodo.13753895
Guidelines for Integrating Climate Change Adaptation into Fisheries and Aquaculture Projects, FAO, 2014- ISBN 978-92-9072-499-5

exacerbate the risk of overexploitation. While considering the social, legal, and economic drivers fostering fleet growth, a bottom-up governance approach for the well-being of small-scale fishers is urgently needed (MedEcc, coastal report, 2025).

If we continue with a business-as-usual approach, the repercussions will soon become unbearably tangible. Coastal towns might experience more frequent flooding, leading to economic disruptions and displacements. Inland waters may collapse, pushing ecosystems to the brink of irreparable loss. As marine biodiversity diminishes, the scarcity of critical resources will lead to increased food insecurity, exacerbating poverty and inequality. Delayed action not only risks exacerbating these near-term losses but also jeopardizes any possibility of sustainable recovery for vulnerable communities (FAO, 2025)

Key international Climate Frameworks and sector relevance

Paris Agreement / UNFCCC

- Parties submit Nationally Determined Contributions (NDCs) and national adaptation planning under the UNFCCC.
- Fisheries & aquaculture are explicitly relevant to adaptation (livelihood resilience, early warning, ecosystem-based adaptation) and to a lesser extent mitigation (energy use, feed choices, improved efficiency, blue carbon).
- Current status: Many NDCs mention "coastal zones", "fisheries" or "aquaculture" but often in broad language without sectoral targets, costing or clear implementation plans.

National Adaptation Plans (NAPs)

- NAPs provide the vehicle for medium-term adaptation strategies. Where fisheries/aquaculture are included, measures typically cover coastal protection, mangrove restoration, and support for climate-resilient aquaculture. Coverage is uneven across countries.
- Green Climate Fund (GCF), Adaptation Fund, GEF
- Major sources of climate finance; they fund ecosystem-based adaptation, coastal resilience, and occasionally aquaculture projects.

SDGs & Global Frameworks

- SDG 14 (Life Below Water) and SDG 2 (Zero Hunger) link fisheries/aquaculture to climate goals.
- Sendai Framework (DRR) connects to disaster risk reduction for coastal fishers.

Regional / Continental frameworks — Africa context

AU Policy Framework & Reform Strategy (PFRS)

- PFRS (AU-IBAR) explicitly acknowledges climate change as a cross-cutting threat and includes resilience and ecosystem protection within its pillars. It provides a strategic anchor to align national fisheries plans with climate planning.

Regional Economic Communities & RFMOs

- Regional bodies (ECOWAS, COMESA, SADC, GFCM, CECAF) increasingly coordinate stock assessments, IUU control and cross-border climate adaptation (e.g., joint management of shared lakes/rivers).

2. National Agricultural Investment Plan and Strategic Agricultural Policy Context in Egypt

Egypt's National Agricultural Investment Plan provides the principal framework for translating agricultural and food-security priorities into coordinated investment programmes. Within this framework, fisheries and aquaculture are recognised as key contributors to protein supply, employment, and export earnings, particularly through expansion of aquaculture and value-chain development.

The assessment finds that several NAIP investment priorities are broadly consistent with AU-PFRS objectives, particularly in sustainable aquaculture development, infrastructure improvement, and market integration. However, alignment is less explicit in areas related to capture fisheries. governance, ecosystem rehabilitation, Monitoring, Control and Surveillance (MCS), and climate resilience (Table 1). While Egypt's NAIP demonstrates broad consistency with AU-PFRS priorities in aquaculture development and food security, climate adaptation and regional fisheries cooperation remain weakly mainstreamed and insufficiently reflected in investment allocations. policy areas, especially conservation, climate adaptation, and regional cooperation, would enhance the effectiveness of public and private investment and support Egypt's contribution to continental fisheries and aquaculture goals.

Table 1 : Indicative Evolution of NAIP-estimated share Investment in Fisheries & Aquaculture (2005–2024)

Period	Estimated Share of Fisheries & Aquaculture in Total Agricultural Investment	Main NAIP Investment Focus	Consistency with AU-PFRS Objectives	Key Sources
2005–2009	~3–4%	Inland fisheries support, lake management, small-scale aquaculture	Partial alignment with AU-PFRS PA2 (small-scale fisheries livelihoods) and PA1 (resource use), but weak governance and ecosystem focus	FAO Country Profiles; MALR planning reports
2010–2014	~4–5%	Expansion of pond aquaculture, feed inputs, rural employment programs	Moderate alignment with PA3 (sustainable aquaculture development) and PA2, limited attention to capture fisheries management	FAO (2012); World Bank (2014)
2015–2019	~5–6%	Large-scale aquaculture projects, hatcheries, value-chain infrastructure	Strong alignment with PA3 and PA4 (market integration), limited coverage of PA1 (conservation) and PA8 (climate)	IFPRI (2018); Egypt Vision 2030

2020–2021	~6–7%	Food-security response, aquaculture intensification, lake rehabilitation	Moderate alignment with PA3 and PA1, emerging relevance to PA8 (resilience), but weak fisheries governance	FAO (2021); World Bank COVID-19 briefs
2022–2024	~6–7%	Mega aquaculture investments, private-sector leverage, limited post-harvest infrastructure	High alignment with PA3 and PA4; partial alignment with PA8 (private sector), limited alignment with PA5 (regional cooperation) and PA7 (high seas)	FAO (2023); AU-IBAR diagnostics

As shown in Table 2 , Successive NAIP investment cycles demonstrate broad consistency with AU-PFRS objectives, particularly in sustainable aquaculture development, value-chain upgrading, and food-security-oriented investments, while explicit alignment with capture fisheries governance, climate resilience, and regional cooperation remains limited.

The NAIP investment priorities are broadly consistent with AU-PFRS objectives, particularly: Policy Area 3 (Sustainable Aquaculture Development), Policy Area 4 (Responsible Fish Trade), and, to a lesser extent, Policy Area 2 (Small-Scale Fisheries Development).

At the same time, it transparently shows where alignment remains partial or weak, notably in: Capture fisheries governance (PA1); Regional cooperation (PA5); High seas fisheries (PA7); and climate-smart fisheries implementation (PA8).

3. Egypt's fisheries and Aquaculture under the impact of climate change

Fisheries and aquaculture play a strategic role in Egypt's food security, nutrition, employment, and economic development. Egypt is Africa's largest aquaculture producer and one of the continent's leading fisheries nations, supplying affordable animal protein to a rapidly growing population while supporting livelihoods along coastal, inland, and rural production systems. As pressures on aquatic ecosystems intensify due to overexploitation, environmental degradation, and climate change, the need for coherent, resilient, and well-aligned governance frameworks has become increasingly urgent.

Climate change severely impacts Egyptian fish catching by increasing water temperatures (reducing oxygen, boosting disease), raising sea levels (salinizing freshwater, flooding farms), decreasing Nile flow, and altering habitats, leading to fish migration and potential catch declines, threatening both capture fisheries and vital aquaculture in the Nile Delta and Northern Lakes the Egyptian aquaculture sector faces several threats due to climate change. These include a significant decline in the flow of the Nile River, rising sea levels, the risk of flooding, saltwater intrusion, and the loss of productive farms. Additionally, increasing temperatures and decreasing water supplies are also areas of concern.

Given the pressing issues in Egypt, such as rising food and living costs, as well as declining coastal land productivity, climate change has recently become a top priority for national decision-makers. It is important to note that the most productive fish farms are located in brackish coastal lakes, which are particularly vulnerable to sea-level rise. This vulnerability could lead to saltwater intrusion, disruptions to the cultivated species, and the potential loss of aquaculture farms, all of which would have significant environmental and socio-economic repercussions.

Furthermore, climate change has severely impacted the physical well-being of small-scale aquaculture farmers. The vulnerability of these small farms is closely linked to their location, specific circumstances, inherent disadvantages, and the labour challenges they face ([5]Yacout et al.)

[6]In response to these Challenges, the Egyptian government has initiated a comprehensive response to the impact of climate change on its fisheries and aquaculture sectors through national strategies, legal reforms, and specific adaptation measures (MOIC, 2025). These efforts involve inter-ministerial coordination and partnerships with international organisations, such as the [7]Food and Agriculture Organization (FAO). In addition, FAO is facilitating the formulation of a Sectoral Agriculture Disaster Risk Reduction Action Plan for Egypt, in collaboration with the Ministry of Agriculture and Land Reclamation (MALR).

Climate-smart production and value chain improvements reflect the government's priorities for responding to climate change risks to fisheries and aquaculture, and rely on high-quality information on risks and vulnerabilities, dynamic models for stock and flow assessments, and analysis of macroeconomic impacts of climate change and other risks. Furthermore, measures to sustain fisheries and aquaculture require strong regulation, enforcement, continuous monitoring of resources and adaptive management (NCCDS, strategy 2025).

Within this context, Egypt has undertaken significant policy, institutional, and investment initiatives to modernize its fisheries and aquaculture sector. These efforts are reflected in national fisheries and aquaculture strategies, sectoral legislation, and the National Agricultural Investment Plan (NAIP), which serves as the primary vehicle for translating agricultural and food-system priorities into investable programmes. Ensuring coherence between these national instruments and the AU-PFRS (Table 1), while explicitly integrating climate change adaptation, is essential to maximize development impact and regional alignment. presents an assessment of the alignment of Egypt's national fishing and aquaculture strategies and the NAIP to national fisheries and aquaculture policies and strategy, the PFRS and national climate change adaptation strategies

The assessment aims to:

i. evaluate the extent to which national policies and investment plans are aligned with AU-PFRS policy areas and outcomes;

[5] *Yacout DMM, Khalil HH and Yacout MM (2025) Climate change impacts on Egyptian aquaculture: challenges, opportunities, and research gaps. Front. Sustain. Food Syst. 9:1527798. doi: 10.3389/fsufs.2025.1527798*

[6] *https://moic.gov.eg/news/1888#:~:text=16%20December%202024-,Minister%20of%20Planning%2C%20Economic%20Development%2C%20and%20International%20Co-operation%20Witnesses%20the,practices%20for%20new%20livestock%20breeds.*

[7] *https://www.fao.org/egypt/our-office/scala-programme-building-resilience-in-the-egyptian-livestock-and-dairy-sector/en*

ii. identify strengths, gaps, and implementation challenges; and
iii. provide evidence-based conclusions and recommendations to support policy reform, investment prioritisation, and technical cooperation with AU-IBAR and regional partners.

4. Methodology

The assessment applied a structured, multi-method approach consistent with AU-IBAR guidance for implementing the AU-PFRS, combining a desk review, documentary analysis, scoring of alignment indicators, and synthesis of stakeholder and survey-based evidence. The methodology was designed to ensure transparency, comparability, and consistency with recent AU-IBAR country assessment reports.

4.1 Desk Review and Documentary Analysis

A comprehensive desk review was conducted covering national and regional fisheries and aquaculture policies, strategies, legislation, programmes, and institutional mandates in Egypt. Particular attention was given to documents or reports relevant to production systems, governance arrangements, trade and value chains, climate change adaptation, and investment planning. The National Agricultural Investment Plan (NAIP), LERPD reports, Egypt strategy2030, Egypt National Climate Change Strategy (NCCS) and other reports of Egypt Climate change impact released by FAO, World Bank, IFD and others related strategic agricultural policy documents were reviewed to assess the extent to which fisheries and aquaculture priorities are integrated within broader agricultural and food-system investments.

In parallel, relevant continental and global reference instruments were reviewed, including the AU-PFRS and its implementation guide, AU-IBAR strategic and technical publications, and selected regional and international frameworks relevant to fisheries governance and climate resilience.

4.2 Triangulation and Synthesis

Document-based scores were triangulated with findings from stakeholder consultations and available AU-IBAR documents/reports. The combined evidence base enabled the identification of convergence and divergence between policy intent and perceived implementation performance.

4.3 Limitations

Variations in data availability across policy areas and the evolving nature of climate adaptation initiatives may affect the precision of some scores. Nonetheless, the report and recommendations provide a reliable and AU-IBAR-consistent basis for comparative and strategic analysis.

Figure 1: comparative analysis methodology employed

Table 1 : Indicative Evolution of NAIP-estimated share Investment in Fisheries & Aquaculture (2005–2024)

5. Summary SWOT analysis — extent to which PFRS & climate change are mainstreamed into NAIPs and impacts

Strengths

- **Policy framing exists:** AU-PFRS provides a clear continental framework; many NAIPs reference fisheries and aquaculture and recognize climate risks (stronger since CAADP 2026–2035).
- **Technical guidance available:** FAO NAP-Fish & FAO Climate-Smart modules give ready guidance for mainstreaming and indicators.
- **Private sector capacity** in aquaculture (feed, hatchery) in countries like Egypt allows rapid scaling of climate-smart technologies.

Weaknesses

- **Operational gaps in EBFM & MCS:** NAIPs often lack finance and technical plans for regular stock assessments and MCS expansion.
- **Data & M&E shortfalls:** many NAIPs do not map PFRS indicators to measurable M&E frameworks or budget monitoring.
- **Limited climate finance pipelines:** too few bankable fisheries projects submitted to GCF/GEF.

Opportunities

- **CAADP & new CAADP Strategy (2026–2035)** create a window to elevate fisheries/aquaculture within national investment plans and link to continental funds.
- **NAP-Fish guidance and FAO/UNDP toolkits** simplify the process of mainstreaming fisheries into NAPs and unlocking adaptation finance.
- **Technology & innovation** (satellite monitoring, digital traceability, insect feed) reduce input vulnerability and increase banker interest.

Threats

- **Accelerating climate impacts** (sea-level rise, salinity intrusion, floods) may outpace interventions if implementation is slow.
- **Resource competition and pollution** (agricultural runoff) could undermine restoration investments and increase costs.
- **Fragmented institutional mandates** risk delays and inefficiencies in NAIP implementation.

6. Egypt Climate Change National Strategies and Policies

Three overarching strategies primarily guide Egypt's response (with Cooperation from regional and international organisations such as the FAO, the World Bank, the EC, and the AU).

- **Egypt National Climate Change Strategy (NCCS) 2050:** Launched in May 2022, this strategy integrates climate change dimensions into national planning across all sectors, including the sustainable use and preservation of fish wealth and Mainstreaming SDGs and plans in Egypt's Strategy 2030.
- **Sustainable Agricultural Development Strategy towards 2030:** This serves as a key reference for agricultural and related interventions, including Fisheries and Aquaculture, with a current review incorporating climate-smart practices to enhance resilience.
- **National Adaptation Plan (NAP):** This plan strengthens the country's capacity to anticipate, plan for, and respond to climate risks by integrating adaptation priorities into national development and budgeting.
- **The National Agricultural Investment Plan (NAIP),** is a country-led framework that translates national agricultural policies and CAADP commitments into prioritised, costed investment programmes. It guides public and private financing across agriculture, livestock, fisheries, and aquaculture to enhance food security, nutrition, and inclusive economic growth.

Specific Government Actions and Adaptation Measures

Lake and Fish Resources Development Agency (LFRDA) organized in 2021 seeks to promote sustainable management of fisheries. The Law 146/2021 enables LFRDA to strengthen the regulation of fisheries, enhance legal support to fish farming, and improve coordination among authorities for the protection and management of lakes and fisheries. The LFRDA (formerly GAFRD) prioritizes management of fisheries and aquaculture, with climate change risks. The Egyptian government, primarily through the Ministry of Agriculture and Land Reclamation is implementing several measures:

- **Legal and Regulatory Reforms:** The government enacted Law No. 146/2021 for the Protection and Development of Lakes and Fish Resources. This law aims to unify legislation, strengthen sanctions against illegal fishing, and protect vital fish habitats, such as the Ashtoum Gemayel Reserve.
- **Water Management Optimization:** In collaboration with the FAO, the government is working to optimize water use amid scarcity, including implementing a comprehensive monitoring system to forecast the impact of sea-level rise on the Nile Delta and promoting modern irrigation systems.
- **Aquaculture Development:** Strategies to mitigate climate impacts on aquaculture include:
  - Expanding the use of solar energy.
  - Developing hatcheries for climate-resilient production of fish fry.

- Expanding integrated fish farming in reclaimed lands.
- Enhancing biosecurity governance and developing a National Strategy on Aquatic Animal Health (NSAAH) to reduce disease risks exacerbated by changing conditions.

- **Research and Awareness:** The government is supporting scientific research to address the impacts of climate change, drought, salinity, and heat, and to help the Ministry plan and implement national awareness campaigns to help farmers adapt to changing conditions
- **Ecosystem Protection:** Measures include protecting marine and coastal ecosystems, particularly nursery and spawning areas, and promoting nature-based solutions to safeguard biodiversity and marine life.

These initiatives aim to safeguard food security and the livelihoods of communities dependent on fisheries and aquaculture, ensuring the long-term viability and sustainability of Egypt's aquatic resources amidst climate challenges.

In consideration of all these challenges, the African Union adopted the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (AU-PFRS) to guide Member States in reforming and strengthening fisheries and aquaculture governance in support of sustainable development, food security, poverty reduction, and the Blue Economy agenda. The AU-PFRS provides a comprehensive framework structured around eight policy areas, covering conservation, production, trade, governance, capacity development, regional cooperation, and cross-cutting issues such as climate change and social inclusion.

6.1 Policy and Institutional Responses to Climate Change

Egypt has established a robust national climate policy architecture anchored in Vision 2030, the National Climate Change Strategy 2050, and its updated version, which provides a solid strategic basis for climate action in fisheries and aquaculture; however, alignment with the AU-PFRS remains largely implicit rather than operational. Climate considerations relevant to fisheries are mainly addressed through cross-sectoral instruments (water management, coastal protection, lake rehabilitation, and social protection), with the strongest and most tangible impacts observed in inland fisheries and small-scale livelihoods through ecosystem restoration of northern lakes. Despite this progress, fisheries-specific climate adaptation measures, particularly for capture fisheries governance, Monitoring, Control and Surveillance (MCS), climate-risk data systems, and regional cooperation on shared stocks, are insufficiently articulated, costed, and monitored. Aquaculture is better positioned to benefit from climate-smart agricultural investments, yet it still lacks a dedicated climate resilience framework to address water scarcity, heat stress, and disease risks. Overall, Egypt demonstrates moderate climate alignment with AU-PFRS, with clear institutional capacity and political commitment, but requires targeted AU-IBAR support to translate high-level climate strategies into fisheries-specific, measurable, and regionally coordinated adaptation and resilience actions consistent with continental best practice.

While climate considerations are increasingly referenced at the strategic level, they are not yet systematically mainstreamed into fisheries management plans, aquaculture development strategies, or investment

prioritisation under the National Agricultural Investment Plan (NAIP). Climate risk assessments, vulnerability mapping, and adaptive management tools are not consistently applied across sub-sectors and production systems.

Table 2: Matrix of Egyptian Policy and Institutional Responses to Climate Change – Mapping to [8]AU-PFRS Policy Areas

Policy / Instrument	Lead Institution(s)	Climate Focus	Key Measures	Relevance to Fisheries & Aquaculture	AU-PFRS Policy Area(s)	Assessment of Effectiveness	Key References
Egypt Vision 2030 (Sustainable Development Strategy)	Ministry of Planning & Economic Development	Climate resilience, sustainable growth	Climate main-streaming in food, water, and ecosys-tems	Strategic basis for aquaculture expansion and ecosystem protection	PA1, PA3, PA8	Moderate – Strategic alignment strong; operational fisheries measures limited	Government of Egypt (2016, updated 2023); FAOLEX
National Climate Change Strategy (NCCS) 2050	Ministry of Environment (EEAA)	Adaptation & mitigation	Climate-resilient food systems, coastal protection	Recognizes fisheries vulnerability to warming and sea-level rise	PA1, PA8	Moderate – Fisheries adaptation remains high-level	EEAA (2022); UNFCCC
Nationally Determined Contributions (NDCs)	EEAA, Council of Ministers	Mitigation & adaptation	Coastal protection, water efficiency, food security	Fisheries are included indirectly under food systems	PA1, PA8	Partial – No fisheries-specific costing	UNFCCC (2022 update)
National Adaptation Plan (NAP – partial / emerging)	EEAA	Sectoral adaptation	Vulnerability assessments	Potential platform for fisheries climate main-streaming	PA1, PA8	Emerging – Limited implementa-tion	EEAA; UNDP
Lake Rehabilitation Programs (Manzala, Burullus, Mariout)	LFRPAD	Ecosystem-based adaptation	Habitat restoration, pollution reduction	Direct resilience for inland fisheries and SSF	PA1, PA2	High – Measurable productivity gains	MALR; FAO (2020); World Bank
Water Resources & Irrigation Strategy	Ministry of Water Resources & Irrigation	Water scarcity adaptation	Efficiency, reuse, and allocation controls	Strong implications for aquaculture water availability	PA1, PA3	High – Strong policy coherence	MWRI (2017–2037)
Agricultural Climate-Smart Programs	MALR	Climate-smart production	Productivity and resilience	Aquaculture is mainly treated as production activity	PA3, PA8	Moderate – Governance gaps remain	FAO; [9]MALR

[8] *AU-PFRS Policy Areas (PA) are referenced in accordance with the AU Policy Framework and Reform Strategy for Fisheries and Aquaculture (AU-IBAR, 2014). Mapping reflects functional relevance rather than explicit policy tagging in national instruments.*

[9] *Ministry of Environment (2022). National Climate Change Strategy 2050. UNFCCC (2022). Egypt Updated Nationally Determined Contribution. Ministry of Water Resources and Irrigation (2017). National Water Resources Plan 2017–2037. FAOLEX Legal Database (FAO). World Bank (2020–2023). Egypt Fisheries, Climate, and Water Sector Reports.*

Coastal Protection & Disaster Risk Reduction Plans	Ministry of Housing, EEAA	Sea-level rise, erosion	Coastal defenses, risk zoning	Protects ports, landing sites, infrastructure	PA1	Moderate – Fisheries vulnerability mapping is limited	EEAA; World Bank
Social Protection & Rural Livelihood Programs	Ministry of Social Solidarity	Adaptive capacity	Income protection, safety nets	Indirect support to SSF households and women	PA2, PA8	Moderate – Not fisheries-targeted	World Bank; GoE
Research & Climate Knowledge Institutions	NARSS, Universities, CLAR	Climate analytics	Climate modelling, applied research	Limited fisheries-specific climate research	PA6, PA8	Low–Moderate – Capacity exists, linkage weak	FAO; NARSS

7. Assessment of Climate Change Drivers, Impacts, and Adaptation Measures Linked to National Agricultural Investment Plan (NAIP) Indicators (Egypt)

A National Agriculture Investment Plan (NAIP) for fisheries and aquaculture is a country's strategic roadmap to boost this sector for food security, economic growth, and poverty reduction, focusing on sustainable development through modernisation, private investment, value chain improvements, climate resilience, and better governance, often aligning with global goals such as the UN SDGs and regional frameworks.

Climate adaptation actions in Egypt's fisheries and aquaculture sector can be effectively implemented by aligning AU-PFRS priorities with NAIP indicators that monitor resilient infrastructure, adaptive production systems, ecosystem restoration, and fisher livelihoods (Table 1).

Table 3: Climate Change Drivers, Biophysical Impacts, and Implications for Fisheries and Aquaculture in Egypt

Climate Drivers	Biophysical Impacts	Implications for Fisheries & Aquaculture	Proposed Adaptation Measures	Linked NAIP Indicators (Examples)
Rising sea surface and air temperatures	Increased water temperature; reduced dissolved oxygen; heat stress	Species shifts, reduced capture productivity, higher mortality, and disease risk in aquaculture	Promote heat-tolerant species and strains; improve aeration and water management; integrate temperature monitoring into management systems	• % of aquaculture farms adopting climate-resilient practices • Number of farms using improved water management/aeration • Change in aquaculture productivity under climate stress

Sea level rise	Coastal erosion; salinisation; inundation of low-lying areas	Loss of infrastructure; reduced suitability of coastal ponds	Climate-proof landing sites and aquaculture facilities; promote raised/ lined ponds; integrate ICZM with fisheries planning	• Number of climate-resilient landing sites constructed/ rehabilitated • Area of aquaculture facilities climate-proofed • Investment in coastal resilience infrastructure (USD)
Changes in precipitation patterns (floods/droughts)	Altered freshwater inflows; variable nutrient loading	Unpredictable fish recruitment; inland fisheries vulnerability; water shortages for ponds	Improve water storage and efficiency; promote integrated water–fish systems; strengthen hydrological forecasting	• Area under water-efficient aquaculture systems • Number of inland fisheries benefiting from improved water management • Availability of hydrological/climate information services
Extreme weather events	Storm surges; habitat damage; infrastructure destruction	Safety risks; damage to cages/ponds; post-harvest losses	Strengthen safety-at-sea programmes; reinforce infrastructure standards; develop emergency response and insurance schemes	• Number of fishers trained in safety-at-sea • % of landing sites meeting resilience standards • Coverage of fisheries/ aquaculture insurance schemes
Ocean acidification	Reduced carbonate availability; ecosystem stress	Declining shellfish productivity; altered food webs	Support monitoring and research; diversify cultured species; adopt adaptive production practices	• Number of monitoring stations operational • Research outputs on climate-resilient species • Species diversification index in aquaculture
Ecosystem degradation (lakes, wetlands, coastal zones)	Loss of habitats and nursery areas	Declining stocks; reduced recruitment; long-term productivity loss	Restore critical habitats; implement ecosystem-based management; link restoration to fisheries outcomes	• Area of aquatic ecosystems rehabilitated (ha) • Stock recovery indicators • Adoption of ecosystem-based management plans
Increased disease and invasive species risks	Altered pathogen dynamics; invasive species spread	Increased production costs; higher mortality	Strengthen biosecurity and surveillance; promote best management practices	• Number of farms applying biosecurity protocols • Frequency of disease surveillance reports • Reduction in disease-related losses (%)

Table 4: Summary Assessment of Alignment of Egypt's Climate Change National Strategies (NAIP / NAP / NCCDS) with AU-PFRS

AU-PFRS Priority Area	Alignment (%)	Key Gaps / Comments	Proposed Mitigation Measures
Policy Area 1: Conservation and Sustainable Resource Use	63%	Climate change considerations are reflected in environmental and biodiversity strategies, but fisheries-specific climate risks (stock shifts, ecosystem degradation, lake salinity) are not fully integrated into fisheries management tools. Limited use of climate-informed stock assessments.	Integrate climate risk screening into fisheries management plans; strengthen climate-informed stock assessments and ecosystem monitoring; explicitly link lake rehabilitation programmes to climate adaptation objectives.
Policy Area 2: Small-Scale Fisheries Development	55%	National adaptation strategies recognise vulnerable coastal and rural communities, but small-scale fishers are not consistently identified as a priority climate-vulnerable group. Limited targeting of safety-at-sea and livelihood diversification measures.	Mainstream small-scale fisheries into NAP and NAIP climate adaptation actions; expand climate-resilient landing sites, safety-at-sea programmes, and alternative livelihood support.
Policy Area 3: Sustainable Aquaculture Development	80%	Strong alignment through NAIP investment priorities and aquaculture development strategies; however, climate resilience standards (water efficiency, disease risk, extreme weather preparedness) are not uniformly applied across production systems.	Develop and enforce climate-resilient aquaculture standards; promote low-carbon feeds, water-efficient systems, and climate-risk insurance mechanisms for aquaculture producers.
Policy Area 4: Responsible and Equitable Fish Trade	65%	Climate change is indirectly addressed through food security and value-chain resilience objectives, but limited integration of climate-smart post-harvest infrastructure and cold-chain resilience in fisheries trade planning.	Prioritise climate-resilient cold chains and post-harvest infrastructure within NAIP investments; integrate climate risk considerations into fisheries trade and market development strategies.
Policy Area 5: Regional and Sub-Regional Cooperation	66%	Climate change adaptation is addressed in regional environmental frameworks, but fisheries-specific climate cooperation (shared stocks, early warning systems) remains limited.	Strengthen regional cooperation on climate-related fisheries risks; engage in joint stock assessments, shared data platforms, and regional climate early-warning systems through AU and regional bodies.
Policy Area 6: Awareness, Knowledge and Capacity Development	74%	Climate change research and awareness programmes exist, but targeted capacity building for fisheries and aquaculture stakeholders remains limited. Weak integration of climate data into advisory and extension services.	Expand fisheries-focused climate training programmes; strengthen climate-fisheries research linkages; integrate climate information services into fisheries and aquaculture extension systems.

Policy Area 7: High Seas Fisheries	53%	Climate change impacts on high-seas fisheries are not addressed in national climate strategies due to limited national engagement in high-seas fisheries governance.	Develop a strategic position on climate impacts on shared and high-seas stocks; strengthen participation in relevant regional and international fisheries governance mechanisms.
Policy Area 8: Cross-Cutting Issues (Climate, Gender, Investment)	65%	Climate change is a core pillar of national strategies, but gender-responsive climate actions and private-sector climate finance for fisheries and aquaculture remain underdeveloped.	Mainstream gender-responsive climate actions in fisheries and aquaculture programmes; mobilise climate finance and private investment for adaptation and mitigation initiatives in the sector.

Table 5. Assessment of Alignment of Egypt's Fisheries and Aquaculture Strategies and NAIP with AU-SCAR

AU-SCAR Priority Area	Alignment Score (0–1)	[10]Alignment (%)	Assessment Findings / Gaps	Implications for Fisheries & Aquaculture
Climate-Resilient Production Systems	0.70	70%	Strong emphasis on aquaculture expansion and productivity in national strategies and NAIP; climate resilience standards not consistently applied across systems.	Improved resilience of aquaculture production, but variable vulnerability to heat stress, water scarcity, and disease outbreaks.
Sustainable Natural Resource Management	0.50	50%	Environmental and climate considerations included in national policies, but fisheries-specific ecosystem-based adaptation measures are limited.	Continued pressure on lakes, coastal ecosystems, and fish stocks under climate stress.
Risk Management and Early Warning Systems	0.45	45%	Limited fisheries-focused climate risk assessments and early-warning mechanisms; weak integration with MCS and data systems.	High exposure of fishers and aquaculture operators to extreme events and climate variability.
Inclusive and Gender-Responsive Climate Action	0.55	55%	Social vulnerability is recognised in climate strategies, but adaptation programmes are poorly targeted to small-scale fishers and women.	Uneven resilience outcomes for vulnerable fishing communities.
Climate-Smart Infrastructure and Value Chains	0.60	60%	NAIP prioritises infrastructure investment, but climate-proofing of fisheries landing sites and cold chains is not systematic.	Reducing post-harvest losses is possible, but climate risks remain for coastal and inland infrastructure.
Knowledge, Innovation and Capacity Development	0.55	55%	Climate research capacity exists, but limited fisheries-specific extension and advisory services on climate adaptation.	Slow uptake of climate-smart practices among fishers and farmers.
Investment and Financing for Climate Resilience	0.60	60%	NAIP provides an entry point for climate-related investments, but has limited access to dedicated climate finance for fisheries and aquaculture.	Adaptation actions remain under-financed relative to sector needs.
Regional and Transboundary Cooperation	0.45	50%	Climate cooperation frameworks exist regionally, but limited fisheries-specific coordination on shared climate risks.	Missed opportunities for joint stock management and shared adaptation solutions.

[10] Alignment scores (%) are based on a structured review of national policies, legislation, NAIP investment priorities, and implementation evidence, assessed against AU-PFRS criteria on policy presence, institutional coverage, implementation, and monitoring. Scores were calculated on a 0–1 scale and converted to percentages to enable comparability across policy areas and AU Member States, consistent with AU-IBAR assessment practice.

8. Comparative Analysis of Alignment with AU-PFRS and AU-SCAR

Comparative Analysis of Alignment with AU-PFRS, AU-SCAR, and the AU Climate Change & Resilient Development Strategy (2022–2032)

The alignment assessment distinguishes clearly between the complementary but distinct roles of the AU Policy Framework and Reform Strategy for Fisheries and Aquaculture (AU-PFRS), the AU Strategy for Climate-Resilient Agriculture (AU-SCAR), AU-PFRS provides the sector-specific governance and development framework for fisheries and aquaculture, while AU-SCAR offers the principal technical guidance for climate-smart production systems, ecosystem resilience, and livelihood adaptation within agriculture, including aquaculture and inland fisheries.

The assessment finds that Egypt's fisheries and aquaculture strategies demonstrate strong technical alignment with AU-SCAR, particularly in aquaculture development, water-use efficiency, feed management, lake rehabilitation, and livelihood resilience for small-scale fishers. These areas reflect the practical application of climate-smart principles consistent with AU-PFRS Policy Areas 2 (Small-Scale Fisheries), 3 (Sustainable Aquaculture), and 8 (Cross-Cutting Issues). Overall, AU-SCAR serves as the primary operational bridge between AU-PFRS and climate action in the fisheries and aquaculture sector

Egypt's fisheries and aquaculture sector is better aligned with sector-specific reform priorities under AU-PFRS than with climate-focused priorities under AU-SCAR. This reflects a strong production- and market-oriented policy base, but only partial integration of climate resilience into sector-specific planning, monitoring, and investment frameworks. Strengthening coherence between AU-PFRS and AU-SCAR implementation is therefore critical to ensuring climate-resilient and sustainable fisheries and aquaculture development.

Table 6 : Comparative Roles of AU-PFRS, AU-SCAR, and AU Climate Change & Resilient Development Strategy (2022–2032)

Framework	Primary Role	Focus on Fisheries & Aquaculture	Relationship to Egypt Assessment
AU-PFRS	Sector policy and governance framework	Fisheries and aquaculture governance, sustainability, trade, inclusion, and regional cooperation	Core assessment framework used to measure alignment of Egypt's policies, NAIP, and institutions
AU-SCAR	Technical and operational climate guidance	Climate-smart aquaculture, ecosystem resilience, livelihood adaptation, water and feed efficiency	Main source of climate-smart technical indicators supporting AU-PFRS implementation
AU Climate Change & Resilient Development Strategy (2022–2032)	Continental climate governance and resilience framework	Climate adaptation, mitigation, finance, MRV, and institutional coordination	Enabling framework used to assess strategic coherence, climate governance, and finance readiness

9. Framing AU-IBAR Technical Assistance Requests

This framing transforms the previous analytical findings into specific technical assistance requests, directly aligned with AU-PFRS, AU-SCAR, NAIP priorities, and AU-IBAR mandates.

Based on the alignment assessment with the AU Policy Framework and Reform Strategy for Fisheries and Aquaculture (AU-PFRS) and the AU Strategy for Climate-Resilient Agriculture (AU-SCAR), Egypt identifies targeted areas where AU-IBAR technical assistance would significantly accelerate implementation, close identified gaps, and enhance regional coherence.

Priority Areas for AU-IBAR Technical Assistance

1. Strengthening Climate-Informed Fisheries Governance

- Technical support to integrate climate risk assessment, ecosystem-based management, and adaptation measures into national fisheries policies, management plans, and Monitoring, Control and Surveillance (MCS) systems.
- Alignment with AU-PFRS Policy Areas 1 and 8 and AU-SCAR resilience pillars.

2. Modernisation of MCS and Digital Fisheries Systems

- Support for the design and deployment of digital MCS systems, including vessel registration, licensing, catch reporting, and climate-sensitive data platforms.

3. Climate-Resilient Aquaculture Development

- Technical guidance on climate-resilient aquaculture standards, low-carbon production systems, biosecurity, and risk management.
- Supports scaling of best practices under Policy Area 3 (Sustainable Aquaculture Development) and AU-SCAR production system priorities.

4. Small-Scale Fisheries Adaptation and Livelihood Resilience

- Assistance in mainstreaming small-scale fisheries into national climate adaptation frameworks, including safety-at-sea, resilient landing sites, and livelihood diversification.
- Aligned with Policy Area 2 (Small-Scale Fisheries Development) and AU-SCAR social inclusion objectives.

5. Regional Cooperation and Shared Stock Management

- Facilitation of regional cooperation mechanisms, peer-learning, and twinning arrangements on climate-resilient fisheries management, shared stocks, and early-warning systems.
- Supports Policy Area 5 (Regional and Sub-Regional Cooperation).

6. Monitoring, Evaluation, and Reporting Alignment

- Support to harmonise AU-PFRS and AU-SCAR indicators within national M&E frameworks, including CAADP Biennial Review reporting.
- Enhances comparability and evidence-based decision-making at national and continental levels.

9.1 Egypt's Role in Sustainable Fisheries and Aquaculture, AU-IBAR Twinning, and Climate Adaptation (Future Orientation)

Building on the results of the AU-PFRS alignment assessment, the SWOT–AHP analysis, NAIP review, and climate change evaluation, Egypt is well-positioned to play a pioneering role in promoting sustainable fisheries and aquaculture in Africa, particularly through technical twinning, regional capacity development, and climate-smart practices (See third Part of this Report).

1. Egypt as a Continental Hub for Twinning and Knowledge Exchange

Egypt's strong aquaculture production, value-chain integration, and institutional capacity create a natural foundation for serving as a twinning partner for other African Union Member States (AU-MS). Twinning can facilitate:

- **Policy and regulatory exchange:** Sharing experiences in modernizing fisheries legislation, establishing Monitoring, Control, and Surveillance (MCS) systems, and integrating climate adaptation into governance frameworks.
- **Technical capacity transfer:** Providing training and advisory support for small-scale fisheries, aquaculture innovation, and ecosystem management.
- **Digital governance and data systems:** Assisting AU-MS in establishing vessel registration, licensing, and catch-monitoring platforms, leveraging Egypt's emerging digital solutions.

2. Climate-Smart Fisheries and Aquaculture Leadership

Egypt's alignment with AU-PFRS and its moderate-to-high climate adaptation integration position it to promote climate-resilient production models across the continent, including:

- **Sustainable aquaculture expansion:** Scaling marine and inland aquaculture with water-efficient, resilient species and biosecure production systems.
- **Ecosystem restoration and protection:** Demonstrating northern lake and coastal lagoon rehabilitation as models for climate adaptation and biodiversity preservation.
- **Early warning and disaster preparedness systems:** Extending operational best practices for small-scale fishers to other AU-MS facing climate-related risks.

3. Strategic Twinning Priorities

To maximise continental impact, Egypt's twinning initiatives should prioritise:

1. **Policy and Governance:** Support AU-MS in aligning national strategies with AU-PFRS, including climate integration, MCS strengthening, and regional cooperation mechanisms.
2. **Capacity Development:** Deliver training and mentorship programs for fisheries officers, aquaculture technicians, and research institutions, emphasizing climate adaptation and sustainability.
3. **Innovation and Market Access:** Facilitate transfer of aquaculture technology, feed and breeding innovations, and regional trade integration strategies.
4. **Monitoring and Evaluation:** Support implementation of AU-PFRS aligned M&E frameworks, including climate resilience indicators, to enable evidence-based decision-making across the region.

10. Global/continental/regional best practices for promoting and implementing climate-smart fisheries & aquaculture

A. *Global best practices (synthesis)*

1. **Ecosystem approach to fisheries and aquaculture (EAF/EBA/EBFM):** adopt integrated spatial planning, science-led stock assessments, habitat protection and ecosystem services valuation as the foundation for resilience. (FAO climate-smart guidance).
2. **Climate-smart production technologies:** promote low-water, low-emission systems (RAS, biofloc, IMTA), genetic improvement (disease-resistant strains), and feed innovation (insect meals, algae) to reduce vulnerability and GHG intensity. (UNDP, FAO).
3. **Risk management & early warning:** integrate climate risk into harvest calendars, closed seasons, insurance instruments (index insurance), and early-warning systems for extreme events. (FAO/NAP guidance).
4. **Value-chain resilience:** invest in cold-chains, decentralized chilling, traceability, SPS compliance and market diversification to reduce exposure to shocks. (FAO, World Bank practice).
5. **Finance & governance instruments:** use blended finance, PPPs, blue bonds and targeted subsidies tied to environmental performance; institutionalize M&E with publicly available indicators. (UNDP, AU guidance).

B. *Continental / regional best practices (what works in Africa)*

1. [11]**Mainstreaming fisheries in CAADP/NAIPs —** successful country cases embed fisheries into NAIPs with costed investments for cold chains, hatcheries and MCS linked to climate adaptation components. (NEPAD/CAADP guidance).
2. [8]**NAP-Fish supplement approach —** FAO's NAP-Fish module recommends sectoral vulnerability assessments, prioritized adaptation measures and alignment with national climate plans (NAPs) to unlock climate finance.
3. [8]**Regional MCS & stock assessment platforms —** joint stock assessments and interoperable MCS (VMS + e-MCS for SSF) produce

[11] *AU-IBAR, "A Guide for the Implementation of the Policy Framework & Reform Strategy for Fisheries & Aquaculture in Africa (PFRS)". 2015.* au-ibar.org *FAO, "Climate-Smart Agriculture Sourcebook — Fisheries & Aquaculture Module (B4)". (FAO C-SA).* FAOHome *FAO, "Addressing Fisheries and Aquaculture in National Adaptation Plans" (NAP-Fish supplement).* FAOHome *CAADP Strategy & Action Plan 2026–2035 (African Union / NEPAD).* au.int

11. Summary & Conclusion

The Comparative Analysis of Alignment with AU-PFRS, AU-SCAR finds Egypt's fisheries and aquaculture strategies demonstrate strong technical alignment with AU-SCAR, particularly in aquaculture development, water-use efficiency, feed management, lake rehabilitation, and livelihood resilience for small-scale fishers. These areas reflect the practical application of climate-smart principles consistent with AU-PFRS Policy Areas 2 (Small-Scale Fisheries), 3 (Sustainable Aquaculture), and 8 (Cross-Cutting Issues). However, alignment with the AU-CCRD is more strategic than operational, with climate change largely mainstreamed through national climate and water policies rather than fisheries-specific instruments.

Overall, AU-SCAR serves as the primary operational bridge between AU-PFRS and climate action in the fisheries and aquaculture sector. Strengthening explicit linkages between fisheries strategies, NAIP investment envelopes, and AU-SCAR implementation mechanisms, particularly climate finance, early warning systems, and regional adaptation platforms, would significantly enhance Egypt's and other AU Member States' capacity to deliver climate-resilient fisheries and aquaculture fully aligned with AU-PFRS objectives.

Based on the Egypt AU-PFRS and AU-SCAR Alignment Assessment, the following recommendations are addressed to AU-IBAR;

1. Strengthen AU-IBAR's Technical Leadership on Climate-Smart Fisheries and Aquaculture

AU-IBAR should consolidate and formalize its technical leadership role by developing sector-specific guidance on climate-smart fisheries and aquaculture, clearly translating AU-PFRS, AU-SCAR, into practical tools for Africa Member States. This includes standardized indicators, climate-risk screening tools, and operational checklists for integrating climate resilience into fisheries governance, aquaculture development, and NAIP investment planning.

2. Institutionalize a Harmonized Alignment and Scoring Framework

Based on the outputs from the former assessment, AU-IBAR is encouraged to harmonise an alignment methodology/approach that jointly assesses AU-PFRS, AU-SCAR, and climate strategies across AU Member States, applying a standardised scoring and reporting framework with common indicators, benchmarks, and evidence-based requirements to improve comparability, transparency, and peer learning, while reducing fragmentation across continental and regional initiatives.

3. Support NAIP Mainstreaming of Fisheries, Aquaculture, and Climate Adaptation

AU-IBAR should work closely with AUDA-NEPAD and RECs to ensure that fisheries and aquaculture are systematically integrated into NAIPs as climate-responsive investment sectors. This includes guidance on budget tagging, climate finance readiness, and development of bankable projects for ecosystem restoration, climate-smart aquaculture, and small-scale fisheries resilience, aligned with both AU-PFRS and AU-SCAR.

4. Establish Peer Review and Twinning Mechanisms Among Member States

To accelerate implementation, AU-IBAR should operationalize peer review and twinning mechanisms linking countries with advanced practices (e.g. Egypt in aquaculture and value chains) with those requiring targeted support. Such mechanisms can strengthen institutional capacity, promote south-south learning, and translate policy alignment into practical, on-the-ground results consistent with AU-PFRS objectives.

5. Enhance Regional Climate Governance and Transboundary Cooperation

AU-IBAR is well-positioned to convene regional platforms to address climate impacts on shared stocks, inland waters, and marine ecosystems, particularly in climate-vulnerable regions. Strengthening coordination with RFBs, LMEs, COMESA, and other RECs will support harmonized adaptation measures, data sharing, and climate-informed management of transboundary fisheries.

6. Improve Monitoring, Learning, and Knowledge Management

AU-IBAR should invest in a continental monitoring and learning system that tracks implementation progress, climate outcomes, and lessons learned across Member States. Regular synthesis reports, policy briefs, and digital knowledge platforms would enhance evidence-based decision-making and demonstrate the contribution of fisheries and aquaculture to climate resilience, food security, and the Blue Economy under Agenda 2063.

Strategic Future Orientation for AU-IBAR

Going forward, AU-IBAR has the advantage and opportunity to position fisheries and aquaculture as core climate-resilient development sectors within the African Union countries. By bridging policy frameworks with investment planning, strengthening peer learning, and mobilizing climate finance, AU-IBAR can transform alignment assessments into a continent-wide implementation pathway that delivers tangible resilience, livelihoods, and sustainable growth for Africa's aquatic systems.

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APPENDICES

Appendix 1: Alignment of NAIPs and RAIPs to climate Change and environmental management Guidelines for Assignment

1. **Does your country have a: (Yes/No. If yes, give title, reference, and share copy/URL link)**
   a. National Climate Change Adaptation Plan Yes
   b. National Fisheries and Aquaculture Development Policy and Plan, Yes
   c. National Environmental Management Policy and Plan Yes
   d. National Agricultural Investment Plan Yes

National Frameworks Availability (Egypt)

Instrument	Yes / No	Title and Reference
National Climate Change Adaptation Plan	Yes	Egypt National Climate Change Strategy 2050 (Ministry of Environment, 2022)
National Sustainable Agriculture Development Strategy	Yes	National Fisheries and Aquaculture Development Strategy (MoALR / LFRPAD)
National Biodiversity Strategy (NBSAP)and its action plan	Yes	National Environmental Action Plan (NEAP) (Ministry of Environment)
National Agricultural Investment Plan (NAIP)	Yes	National Agricultural Investment Plan of Egypt (MoALR, CAADP-aligned)

2. What does the National Climate Change Adaptation Plan describe and qualify (e.g. high, low risk) the:

Risk Assessment and Mitigation

Risk Category	Description	Likelihood	Mitigation Measures
Climate shocks	Rising temperatures & salinity	High	Climate-proof systems, early warning, RAS expansion
Input price volatility	Feeds, fuel	High	Feed innovation, subsidies, local ingredient production
Weak enforcement	Limited capacity	Medium	e-MCS, co-management,VMS expansion
Funding constraints	Limited public budgets	Medium	PPPs, IFAD/World Bank funding
Ecosystem degradation	Pollution, sedimentation	High	Wetland restoration, stricter regulation
Trade barriers	SPS restrictions	Medium	Harmonization with AU SPS, traceability systems

Risk Category	climate-change vulnerabilities and risks	Anticipated Risks	Proposed mitigation measures

Overall/generally for the country	High exposure to temperature increases, food and water scarcity, sea-level rise, ocean acidification, changes in environmental characteristics, and extreme events.	Direct: Reduced agricultural and fisheries availability and stability, access, thus, productivity, ecosystem degradation, and coastal flooding, the cost of migration or absence of some species, and the cost of market changes Indirect: damage infrastructure, income, human risks, health, and the economy.	Climate-resilient production systems, early warning systems, ecosystem restoration, water-use efficiency, nature-based solutions, disaster risk reduction and monitoring systems
Aquatic ecosystems	Vulnerabilities and risks: Coastal erosion, salinization, wetland loss, and declining water quality.	Loss of aquatic habitats, biodiversity decline, and reduced ecosystem services.	Wetland rehabilitation and restoration, coastal protection, pollution control, and ecosystem-based management.
Fisheries and aquaculture	Temperature stress, disease outbreaks, water availability and quality constraints.	Stock variability, reduced yields, increased reproduction, production and mortality risks, disease epizootics	Climate-resilient aquaculture systems, diversification, improved biosecurity, adaptive management and selecting adaptive species (cryo-preservation), implementation of SOPs, including all disaster probabilities for effective relief

3. What does the National Fisheries and Aquaculture Development Policies/Plan say about climate change? Can include other relevant documents/policies that influence fisheries and aquaculture development in your country

Document	Reference	Climate Change Content	Remarks
National Sustainable Agriculture Development Strategy.	MoALR / LFRPAD	Mentions climate change impacts on productivity, water quality, and stock sustainability; adaptation is referenced but partially implemented	Need more enhancement.
Egypt Vision 2030	Government of Egypt	Climate resilience is recognised under the natural resources and food security pillars.	Fisheries-specific actions limited
NAIP	MoALR	Climate-smart agriculture included; fisheries and aquaculture addressed indirectly.	Needs more decisive fisheries-specific climate actions
National biodiversity strategy (NBSAP)	EEAA		

4. May you elaborate the climate change risks and impacts identified in the documents above for the fisheries and aquaculture in the table below: (please specify whether referring to freshwater/marine aquatic environment)

Drivers	Biophysical Impacts	Implications for Fisheries & Aquaculture	Proposed Risk Mitigation Measures
Changes in surface water temperature	Altered metabolism, species distribution shifts, an increase in ammonia toxicity, sex shift, shift in spawning time, and affect productivity rate	Reduced growth, stock variability,	Adaptive management, temperature-tolerant species
El Niño–Southern Oscillation	Irregular productivity, ecosystem instability	Unpredictable catches	NA in Egypt
Rising sea level	Coastal habitat loss, salinisation, absence of freshwater species, and new marine species introduced, change in water reproductivity and characteristics	Reduced nursery areas, aquaculture losses, and destruction of facilities	Coastal protection, site zoning, nature-based solutions, risk management plan
Higher inland water temperatures	Oxygen depletion, pollution concentration, and disease outbreaks	Fish mortality, reduced yields	Aquaculture: Aeration system redesign, introduce macroalgae and micro-cultivation Fisheries: management of vegetation and restoration of the ecosystem, improve water circulation
Changes in precipitation & water availability	Altered flows, water stress, alter the freshwater level, and increase soil salinity	Reduced aquaculture water supply	Efficient water use, integrated water management
Increased storm frequency/ intensity	Infrastructure damage Deterioration of water quality	Loss of gear, safety risks	Early warning system, Climate-proof infrastructure, safety-at-sea
Drought	Reduced lake and river levels Affect groundwater sustainability Increase diseases	Lower fish productivity Affect agriculture productivity	Lake rehabilitation and restoration, water reuse
Sea current intensity	Infrastructure Fish migration Catch yield alter	Decrease productivity Social and health impact	Early warning system Climate change scenarios, prediction, and modelling Global mitigation Recording of hotspots areas

5. Are any of the issues raised in table 4 above addressed in the National Environmental Management Policy and Plan and National Agricultural Investment Plan

Addressing Climate Issues in [11][12]NEMA (National Environmental Management Authority) and NAIP

Issue	NEMA – General	NEMA – Specific	NAIP – General	NAIP – Specific	Remarks
Climate variability	Yes	Environmental protection Capacity building of relevant authorities Mitigation measures (MRV system) Adaptation measures Monitoring and assessment (water quality and habitats)	Yes	Climate-smart agriculture	Sustainable Fisheries need stronger targeting
Ecosystem degradation	Yes	Wetlands restoration Integrated Coastal Zones Management (ICZM), EIA, SEA, MSP	Partial	Lake rehabilitation Coral reef restoration	Alignment exists, but is fragmented
Water scarcity	Yes	Water efficiency	Yes	Irrigation focus	Fisheries are not fully mainstreamed RAS system, BIO-Flock

6. Based on the information and deductions derived above, what is your SWOT analysis of the NAIP on issues pertaining to climate change and environmental management and related policies for the fisheries and aquaculture

i. NAIPs:

Strengths 1. Alignment with CAADP and climate-smart principles 2. Recognition of sustainability and resilience 3. National strategies and action plans support mitigation and adaptation to climate change. 4. community mitigation plans. 5. relevant projects for climate resilience and blue economy. 6. Qualified minds and physical facilities	**Weaknesses** 1. Limited fisheries-specific climate indicators 2. Weak integration of marine fisheries
Opportunities 1. Blue economy investments 2. Climate finance mobilisation	**Threats** 1. Climate shocks 2. Resource degradation 3. Global warming

General remarks: NAIP provides a solid framework but requires stronger integration of fisheries and aquaculture into the climate.

[12] *In Egypt, the functions commonly attributed to a National Environmental Management Authority (NEMA) are undertaken by the Ministry of Environment through the Egyptian Environmental Affairs Agency (EEAA).*

ii. National fisheries and aquaculture policies and development plans

Strengths	Weaknesses
• Strong aquaculture focus • Institutional presence (LFRPAD) • Wetlands restoration • National adaptation plans	• In progress climate operationalisation • Data and MCS gaps • Need more MSP • Capacity building • Vocational training • Need investment and the private sector involvement • Introduce sustainability
Opportunities	**Threats**
• Climate-resilient aquaculture expansion • Regional cooperation • Early warning system • Loss and damage fund	• Climate-induced stock variability • Environmental degradation

Your general remarks and recommendations if any

iii. National Environmental Management Policies and Plans

Strengths	Weaknesses
• environmental protection law with holistic mandates • Alignment with international conventions • Regional and international collaboration • Protected areas and RAMSAR sites • National committee for enhancing the ecosystem of wetlands	• Presence of challenges • shortage of funds • Limited public awareness
Opportunities	**Threats**
• Ecosystem-based fisheries management • Coastal restoration	• Pollution • Climate impacts

Your general remarks and recommendations if any

iv. National Climate Change Action Plan

Strengths	Weaknesses
• Clear national vision • Strong international alignment • Enhanced adaptation • Investment in a green area • Road map for sustainable economic process • Mainstreaming climate change in all development sectors • NAP project	• Limited fisheries specificity • no mitigation plans for fisheries
Opportunities	**Threats**
• Access to climate finance • Integration with NAIP and PFRS • MRV system • RAP • Loss and damage fund	• Implementation capacity constraints

General Comments and Recommendations

- Strengthen explicit integration of fisheries and aquaculture into climate and NAIP frameworks.
- Develop measurable climate adaptation indicators aligned with AU-PFRS and AU-SCAR.
- Prioritise ecosystem rehabilitation, climate-resilient aquaculture, and digital governance.
- Use AU-IBAR peer review and twinning mechanisms to accelerate implementation.

APPENDIX 2: Basis for Assigning Alignment Scores (%)

The alignment scores (%) presented in the assessment matrix are derived from a structured qualitative–quantitative policy screening approach, consistent with AU-PFRS Implementation Guidelines, AU-IBAR assessment practices, and comparable continental policy reviews.

1. Scoring Framework

Each AU policy objective (AU-PFRS or AU Climate Strategy pillar) was assessed against four core criteria:

Criterion	Assessment Question
Policy Presence	Is the objective explicitly reflected in national laws, strategies, or NAIP investment priorities?
Institutional Coverage	Are responsible institutions, mandates, or coordination mechanisms defined?
Implementation Evidence	Is there evidence of implementation through programmes, projects, or budget allocations?
Operationalization & Monitoring	Are indicators, M&E systems, or reporting mechanisms in place?

Each criterion was scored on a 0–1 scale:

- 0 = Not addressed
- 0.25 = Mentioned but not operational
- 0.5 = Partially operational
- 0.75 = Largely operational
- 1.0 = Fully operational and monitored

2. Evidence Base Used

Scores were not perception-based, but grounded in documented evidence from:

- National legislation and executive regulations
- Egypt's NAIP and sector strategies
- National Climate Change Strategy (2050)
- Annual reports of GAFRD, MALR, EEAA
- FAO, AU-IBAR, COMESA, World Bank assessments
- Peer-reviewed scientific literature

3. Interpretation of Alignment Levels

Alignment %	Interpretation
≥ **75%**	Strong alignment – operational and scalable
60–74%	Moderate alignment – foundations exist, gaps remain
40–59%	Partial alignment – fragmented or indirect
< 40%	Low alignment – major policy and implementation gaps

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