

## POLICY NOTE

# REGIONAL ENVIRONMENTAL AND BIOSECURITY FRAMEWORKS FOR SUSTAINABLE AQUACULTURE DEVELOPMENT FOR CENTRAL AFRICA

### *Executive Summary*

Despite the vital role aquaculture plays in contributing to food security in the regions, Central Africa has for a long time remained far behind in terms of development of aquaculture. In 2015, the region registered an average production of about 4,979 tonnes having the Democratic Republic of Congo contributing highest (4,847 tonnes) to the production. The region had low technical level and lacked inputs which resulted to low productivity from aquaculture. To reduce imports of fish to cover the needs of the people, the states of the region chose to develop aquaculture. This development requires a certain increase in production. With the increasing intensification, the environmental impact of aquaculture is likely to multiply qualitatively and quantitatively because aquaculture cannot develop itself at the expense of environmental protections. Several countries in Central Africa have shared waterbodies of the Atlantic Ocean, the Lake Chad Basin and the Congo Basin. This means they face the interlinked challenges for the management of aquatic natural resources for a common welfare.

It is an integrated management approach in which all stakeholders work together seamlessly for a co-management of resources that can lead to development of a sustainable aquaculture in the Central Africa. Participatory approach to aquaculture, undertaking strategic environmental assessment and environmental impact assessment will also assist in ensuring sustainable aquaculture whilst increasing production. The implementation of Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa as commissioned through the Fisheries Government project aimed at facilitating coherent policy development for the sustainable management of fisheries and aquaculture resources in the member states of the African union. This policy note on Environmental and biosecurity Management for Sustainable Aquaculture Development in Central African Region has been developed from the Central Africa regional framework which was developed by AU-IBAR through a consultative process with those involved) as a support tool to the PFRS. The PFRS stems from the Comprehensive African Development Programme



(CAADP) and Council of African Ministers on Fisheries and Aquaculture (CAMFA) and advocates for the sustainable management of aquatic resources. In addition to that, the Continental Aquaculture Development Action Plan 2016– 2025 was developed through a multi-stakeholder consultative process to actualize the PFRS. The policy note provides policy recommendations on environment and biosecurity issues and also provides approaches/tools/measures recommended in the Environmental Assessment framework for Environmental management to support sustainable aquaculture. Their implementation will support sustainable aquaculture development and hence contributing to increased production from aquaculture in the region.

### Introduction and Background

The growth of aquaculture has an important socio-economic impact for the people. It improves the income of rural populations and also their livelihoods. Central Africa contributes less than 0.009% to the world aquaculture production which signifies that the region is not advanced in terms of production. The upcoming section provides an overview for aquaculture in the region.

### Overview of Aquaculture in Central Africa

The aquaculture production in Central Africa consists mainly of fish produced in freshwater and the region used to produce an average of only 7,500 tons of farmed fish per year as of 2014 which does not satisfy the demand in the region. Due to this limitation, Central Africa imports more than 300,000 tons of fish to cover its annual consumption primarily from West Africa, Southern Africa and Europe. Aquaculture in the region contributes very little to the wealth of the region, contributing about 0.1% to the GDP. Average age of actors is 50 years old with less than 4% of women. Moreover despite fish consumption decline from 10 kg to 8 kg per capita over the past decade, it is expected that Central Africa will experience 1.5 million tons deficit of fish to meet the consumption needs of its 260 million people by 2050, if production growth were to steady. However, production from aquaculture kept increasing over the years up to having a production

of 4,978.5 tonnes in 2015 as shown in Figure 1 (FAO, 2017).

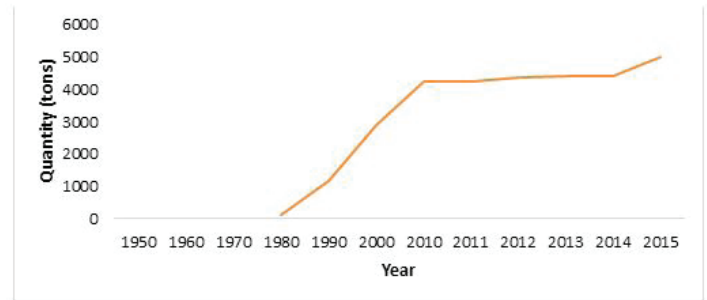


Figure 1: Aquaculture production trend for Central Africa

Democratic Republic of Congo is leading in terms of aquaculture production registering a production of 2871 tonnes in 2015 (FAO, 2017) (Figure 2).

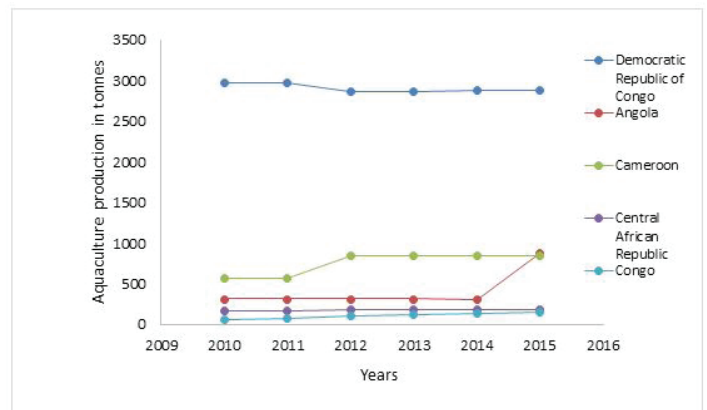


Figure 2: Aquaculture production for countries in Central Africa

Chad registers the lowest production in the region having a constant production since 2010. Of interest is also the growth of aquaculture production in Cameroon. The tendency observed during these past years was the renewal of aquaculture having an increase in the number of ponds.

However, production of aquaculture for Central Africa is mainly in extensive system with no fertilization, strain tilapia degenerate, no feeding, default fry and use of inefficient technology. This results into low yield hence low production compared to other regions. The SWOT analysis of aquaculture for Central Africa region is presented in Table 1.

**Table 1: SWOT analysis of aquaculture in the Central Africa**

Component	Strengths	Weaknesses	Opportunities	Threats
Environmental management of sustainable aquaculture development				
Economic	Existence of a strong demand for aquatic products, availability of sites, fish Conversion index	Feasibility study, access to finance, facilities costs and inputs (food, fry) transport and storage infrastructure, marketing and trade,	Economic Development and Food Security, Employment, Investment, Regional Market (CEMAC and CEEAC), Export	Import; dues and taxes ; new regulations and restrictions; ecological disaster; no funding
Technic and Social	Availability of appropriate operational or exotic species	Organization of the sector, research / development extension, education and training, quality of infrastructure and facilities; lack of ownership and lack of competence	Employment, livelihood, fighting rural migration, nutrition, health and well being	Existing capture fisheries; population depletion (seeds); user conflicts, social imbalance
Environnemental	Small-scale integrated systems and polyculture of complementary species and trophic levels	Inadequate or inappropriate legislation, Human Resources, Control and Monitoring, Diagnostic Laboratories	Reduction of carbon footprint, recycling nutrients and waste, water purification, biodiversity	climate change, rejection of unsuitable or contaminated effluents; diseases, parasites, vectors, sedimentation, eutrophication, biodiversity and genetic diversity, habitat, waste
Governance and democracy	integrated and participatory management CEBEVIRHA, LCBC, PRC	Organization of operators, communication and information, membership, proactive approach	Conflict Reduction, Equity and cost sharing	Conflicts and ecosystem threats

**Major challenges and Opportunities for aquaculture in the region**

The aquaculture sector in the region is poorly organized characterized by largely informal aquaculture establishments. The region has no facilities capable of producing sufficient quantities of quality fry and feed. The technical competence levels for aquaculture production is grossly inadequate. Other challenges include:

- Low access to finance for increased aquaculture production
- Existence of inadequate or no legislative framework for aquaculture
- Existence of aquaculture under more than one government agency

Nevertheless, sustainable and profitable aquaculture development in Central Africa remains possible with

some incentives and facilities investments like good governance, equity, economic, social and environmental management through the sustainability and resilience of vital ecosystems at global, at national or at sectoral and at territorial levels. However as shown in Table 2, aquaculture in the region could play a very important and cardinal role in food, nutrition, job creation and economic development.

**Vision for the region**

The vision for aquaculture in Central Africa region is to have increased production from aquaculture and hence bridging the gap between supply and demand whilst promoting sustainable aquaculture management practices.

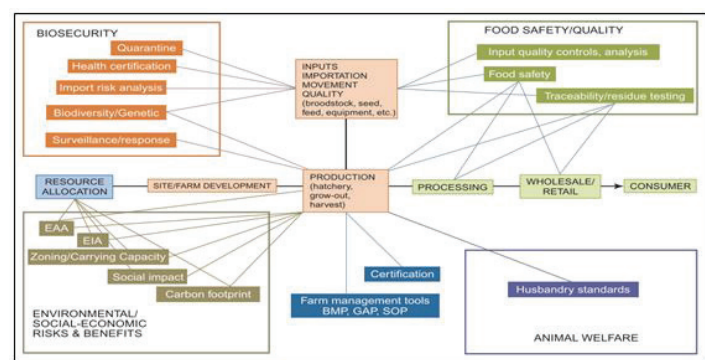
**Table 2:** Socio economic of aquaculture data in Central African region.

	Production <sup>1</sup>	Jobs <sup>2</sup>	Deficit <sup>3</sup>	Consumptio <sup>4</sup>	Area (ha) <sup>5</sup>
Cameroon	1000	4200	100,000	14	518
Congo	134	357	40,000	22	69
Gabon	100		8,000	30	
Equatorial Guinea	15			20	
CAR	250	3100		4	
DRC	3000	2000	200,000	5	8000
STP				36	
Chad	3			5	

### The Problem in Relation Environmental and Biosecurity Issues and Tool for Sustainable Aquaculture Development

There is limited growth in the aquaculture development for Central region as has been noted above that over 25 years production has only grown to about 5000 MT (see Figure 1). The sector is also poorly organized with players that have limited capacity for sustainable aquaculture business management.

As the quest for aquaculture growth is growing, some of the potential negative impacts include the effects on biodiversity, aquatic habitats and the generation of pathogenic and genetic diversity aside the existing challenges mentioned above. The absence of legislative framework for aquaculture has also been stated as one of the biggest challenges in the sector. Implementation tools framework for sustainable aquaculture supply chain is therefore needed (Figure 2).



**Figure 2:** Proposed implementation tools framework for an aquaculture supply chain (FAO's (2013))

The approaches/tools/measures recommended in the Environmental Assessment framework for Environmental management to support sustainable aquaculture are as follows

### Governance instruments and controls over marine and land use

**Location of production sites:** Siting tends to be based upon the following factors: the species to be farmed, the technology and methods to be used, and the ecological and social interactions that occur within an ecosystem and in the surrounding environment. Aquaculture siting should also account for a location's physical, production, ecological and social carrying capacity.

**Zoning:** GIS has increasingly been used to facilitate commercial fishery zoning consultations in coastal areas where there are competing uses of water resources.

**Registration and licensing:** Registration involves recording an operator's location, activity, site area and/or fishing vessel in a database whilst licensing grants permission to operate. Governments use licenses as statutory instruments to regulate many matters, by issuing licenses for water usage, waste disposal and farming known invasive species.

**Environmental Impacts Assessments (EIAs):** these are tools that help identify and assess the potential effects of projects. EIAs outline: an environmental management plan that covers potential mitigation, management and monitoring strategies; and possible alternatives that can be undertaken. Most EIAs are undertaken as legal requirements of national governments in the region and are a key part of the registration and licensing system.

**Social impacts:** Social Impact Assessments (SIAs) generally involve the development and collection of baseline indicators/data; the monitoring and evaluation of indicators over a period of time; and the preparation

of recommendations to reduce negative impacts or augment positive benefits. The purpose of pre-project SIAs is to predict social outcomes and either minimize the possible adverse or maximize the potential benefits of aquaculture operations.

*Climate change and vulnerability issues:* Changes in climate will likely have a massive impact on the productivity of aquatic habitats in coming years.

### **The commercial context for tools application**

*Export Production:* Bagumire et al. (2010) recommended that Africa's industry follow the latter's Hazard Analysis and Critical Control Points (HACCP) inspection and certification approach to satisfy the stringent requirements of major importers. The Food and Drug Administration (FDA) developed this regulatory tool to ensure that any food products in the US meet its environmental and food safety standards. HACCP minimizes incidences of contamination along a supply chain of raw material production, procurement and handling, manufacturing and distribution by planning controls for 'biological, chemical, and physical hazards'.

*Import substitution:* Many Sub-Saharan nations adopted import substitution policies as a means to rapidly industrialize and strategically provide for their own citizens

*Market research:* Undertaking a market-driven approach to meeting demand at the onset of an aquaculture venture.

*Research and knowledge sharing:* FAO has collated an immense amount of information about the aquaculture industry throughout the globe to inform other countries.

*Industry investments:* Improved stock strains through selective breeding regional facilities should be established in the Eastern Africa and Great Lakes region, so that affected farmers in these countries can benefit from being provided more productive seeds.

*Oversupply:* Measures to avoid oversupply include developing production for export, substituting imports,

and conducting informed market research.

### **General considerations for food safety**

Contaminated surface water, fish inputs, fish infection and disease, use of genetically modified organisms and improper hygiene and husbandry practices can cause chemical and microbial food safety concerns in aquaculture. This should be monitored prior to export to avoid affecting other countries as well. HACCP inspection and certification approach was therefore recommended to satisfy the stringent food safety requirements of fish importers.

### **Farm stock escape into the wild (bio-security)**

Procedures have been provided to reduce impact of farm stock escape in the following documents:

- Protocol for introducing species, outlined in its CCRF (FAO, 2011)
- Management of invasive alien species (Wittenberg and Cock, 2001)
- Understanding and applying risk analysis in aquaculture (FAO's 2008)
- Invasive species management plans
- Invasive alien plants and their management in Africa
- Identification, risk analysis, capacity building, management and legislative tools and case studies (<http://giasipartnership.myspecies.info/en>).
- Tool prototype to aid the prevention, eradication and control of invasive species (GIASI, 2015)
- Management of Biological Invasions (<http://www.reabic.net/journals/mbi/Default.aspx>)

### **The Aquaculture Management Area concept**

The concept proposes that farmers who share a water body or water source set-up either formal or informal aquaculture management areas (AMAs) where farmers can collectively access feed, seed, market and postharvest support from partners, as well as to encourage them to strategically work together to minimize their interconnected sites' environmental, social and biological health risks. The FAO and World Bank (2015) suggest that the boundaries of an AMA can be based upon Bio-physical factors and Socio-economic factors.



## *Policy Recommendations on Framework for Sustainable Aquaculture Development*

The following policy recommendations addresses key environmental management mediations with an integrated management approach in which all stakeholders work together seamlessly for the development of sustainable aquaculture in the Central African Region.

### ***Implementing an Ecosystems Approach for Aquaculture (EAA)***

The vision for implementing EAA in the region is to have a responsible management of aquaculture that benefits to producers without causing negative impacts on the environment and ensuring consumers health. Each country should develop a strategy to support the development of aquaculture policy. It should revisit the aquaculture and identify areas that require actions to implement and especially clarify the progress of this implementation in terms of actors and calendars. Aquaculture development programs must also be accompanied by legal and regulatory instruments for rational use of natural resources and reduction of environmental impacts as well as the consequences of environmental change generated by aquaculture.

### ***Undertaking Environmental assessments***

Governments should provide outlines for conducting strategic environmental assessments, diagnostic instruments of choice selected for regional development and the environment policies, plans and strategies for the development of sustainable aquaculture in the designated area. Aquaculture in Central Africa must comply with the environmental impact assessment requirements and Strategic Environment Assessment (SEA).

### ***Implementation of aquaculture sustainability Indicators***

For a strong aquaculture and ensuring water quality, it is important and mandatory to find, establish and implement reliable and socially acceptable indicators that contribute definitively to ensure continuous and sustainable growth of holdings. Impacts indicators and monitoring, and monitoring and evaluation are some of the sustainability indicators which are recommended

for implementation by countries in the Central African region.

### ***Participatory approach to aquaculture***

Based on the participatory governance and the self-regulation of the aquaculture sector, governments should identify and outline the different segments of affected stakeholders who should be consulted; the profession's representatives, administrative regulators, community partners and other stakeholders in the sector. The stakeholders of aquaculture in the countries of the region are the actors in the participatory approach. Issues of shared resources for example give a perfect picture of the participatory approach. Since the management of a transboundary resources often has multiple problems and involves a variety of actors, it is appropriate to approach them by using a sequential approach and targeting one issue at a time.

### ***Development of responsible Aquaculture, Biosecurity and product traceability***

These should be developed to provide potentially coercive guidance for the regional framework for Environmental Management for sustainable aquaculture. The development of a sustainable aquaculture involves several conditions as follows:

- Preservation of the general balance
- Respect for the environmental carrying capacity
- Prevention of the depletion of natural resource and extinction of local species
- Reduction of waste production and environmental impact by promoting the application of good aquaculture practices
- Streamlining and the revision patterns of production and consumption

### ***Aquaculture areas and sites***

These areas and sites must permit a sustainable development during the implementation of aquaculture operations. Environmental related considerations during aquaculture site selection should be made on the following:

- Identification of site
- Ranking
- Political Factors
- Climate change and World Trade

- Alien species / Modification of the genetic diversity
- Emerging Disease

Certification of good aquaculture practices and traceability (food safety, environment, social welfare, health and animal welfare)

Central Africa countries, in the context of food and mainly those from aquaculture, have some interest to embark on a common certification process. The certification required here must take care of the environment component, food safety, social welfare, public health and animal welfare. Certification programs should respect the following: a standards management body, an accreditation body and finally a certification body.

For the region, the implementation of a certification program could be based on standards under ASC (Aquaculture Stewardship Council) and the GLOBAL-GAP (Good Agriculture Practice). The system standards certification and labeling must be based on sound science and have a verifiable and controllable information system. International and national regulations on safety and food hygiene are generally based on HACCP. This is a preventive action in anticipating procedures through the adoption of critical thresholds and producing documentation. This may accompany the environmental management of small-scale aquaculture sustainability.

## Conclusion

This policy notes guide the regional environmental management and aim to drive sustainable development of aquaculture within the Central Africa region. Aquaculture in Central Africa should take into account its environmental sustainability in all steps for its implementation. To do this, a number of recommendations have been put forward in the policy note for implementation by countries in the region. Issues of Certification, environmental assessment, considerations on selection of aquaculture areas and sites, implementation of responsible aquaculture, biosecurity and product traceability, participatory approach to aquaculture and Ecosystems Approach

for Aquaculture (EAA). Implementation of the recommendations given in this policy note will guide countries in the region to make more realistic and appropriate aquaculture development plans, approve appropriate projects and institute environmental management assessments more effectively for increased aquaculture production.

## References

1. African Union Commission-NEPAD, 2014. Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa.
2. AU-IBAR, 2016. Regional Framework on Environmental Management for Sustainable Aquaculture Development in Africa - Western African Region. AU-IBAR Reports
3. AU-IBAR, 2016. The Continental Aquaculture Development Action Plan 2016 – 2025. Stakeholders' perspectives for implementing the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa.
4. FAO, 2008. Building an ecosystem approach to aquaculture. Rome: Food and Agriculture Organization of the United Nations, Available from: <ftp://ftp.fao.org/docrep/fao/011/i0339e/i0339e.pdf>.
5. FAO, 2011. Code of Conduct for Responsible Fisheries. Food and Agriculture Organization of the United Nations.
6. FAO, 2017. Fishery and Aquaculture Statistics. Global capture production 1950-2015 (Fishstatj). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated
7. Garcia S, 1997. Indicators for sustainable development of fisheries, p 131-162. In land quality Indicators and their use in sustainable Agriculture and rural development. FAO Land and Water Bulletin N°5 Rome. 212p
8. GIASI Partnership (2015) A toolkit to facilitate Parties to achieve Aichi Biodiversity Target 9 on invasive alien species. Global Invasive Alien Species Information Partnership.
9. Wittenberg R and Cock MJW (2001) Invasive alien species: a toolkit of best prevention and management practices. Wallingford: CAB International, Available from: [http://www.issg.org/pdf/publications/gisp/guidelines\\_toolkits\\_bestpractice/wittenberg&cock\\_2001\\_en.pdf](http://www.issg.org/pdf/publications/gisp/guidelines_toolkits_bestpractice/wittenberg&cock_2001_en.pdf).

**Prepared by:**

***Professor Emmanuel Kaunda***

Lilongwe University of Agriculture and Natural Resources (LUANAR)

P.O. Box 219, Lilongwe, Malawi

Email: [ekaunda@bunda.luanar.mw](mailto:ekaunda@bunda.luanar.mw)

**Note:** This Policy Note is a synthesis of series of reports based on activities implemented by AU-IBAR under the project ‘Strengthening Institutional Capacity to enhance governance of the fisheries sector in Africa’, Project number: DCI-FOOD 2013/331 -056’ funded by the EU.

**Citation:** AU-IBAR, 2018. Policy Note: Regional Environmental and Biosecurity Frameworks for sustainable aquaculture development for Central Africa



African Union – Interafrican Bureau for Animal Resources (AU-IBAR)  
Kenindia Business Park, Museum Hill, Westlands Road  
PO Box 30786-00100 Nairobi, Kenya.

Tel: +254 (20) 3674 000

Fax: +254 (20) 3674 341 / 3674 342

Email: [ibar.office@au-ibar.org](mailto:ibar.office@au-ibar.org)

Website: [www.au-ibar.org](http://www.au-ibar.org)