

## POLICY NOTE

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

### *Executive Summary*

This policy note on Environmental and biosecurity Management for Sustainable Aquaculture Development in Southern African Region has been derived from Regional Framework on Environmental Management for Sustainable Aquaculture Development in Africa – Southern African Region, which was developed after consultative process by the African Union: Interafrican Bureau for Animal Resources (AU-IBAR) to support implementation of the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS). The regional framework was also drawn from African Union Aquaculture Action Plan for Africa (2016-2025) and was designed to provide a simple and clear pathway for the development and operation of aquaculture as an integrated component of the natural and human landscapes of the Southern African region. The PFRS is a product of the Comprehensive African Agriculture Programme (CAADP) and Council for African Ministers in Fisheries and Aquaculture (CAMFA) which aim at bringing policy coherence among African Members States.

The Regional Framework on Environmental Management for Sustainable Aquaculture guided the formulation of strategic objectives of the Southern African Development Community's (SADC) Regional Aquaculture Strategy and Action Plan (2016 - 2026).

This policy note seeks to highlight key issues and recommendations on environmental and socio-economic issues affecting the aquaculture sector for implementation by the SADC member states. Key environmental recommendations include issues that deals with sustainable access and use of natural resources for aquaculture, resource user conflict, climate change and pollution from other human activities as well as sustainable sourcing and use of feeds, the responsible use of exotic and genetically diffident species, impacts of health and disease and product safety and consumer health. The recommendations on socio-economic include issues that deals with resource access and zoning and clustering, research and technology development, access to knowledge, development of human resources and enhancement of sector participation through



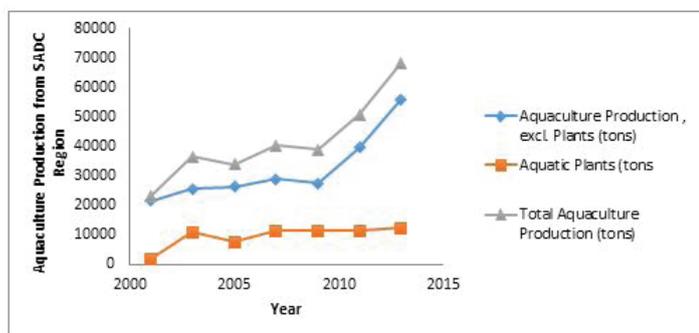
smallholder and commercial linkages, market development as well as the creation of a conducive and safe working environment. Implementation of these recommendations will support the advancement of aquaculture in the region.

## Introduction and Background

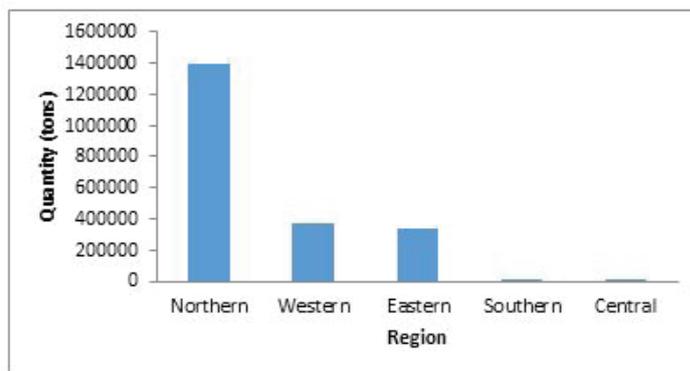
### Overview of Aquaculture in the Southern region

Aquaculture production in SADC is the fastest growing estimated at 13.5 percent compared to global statistics. The average annual increase in fish production in the SADC region was estimated at 13.5 percent in 2013. Between 2009 and 2013 aquaculture production (excluding aquatic plants) doubled from 27,452 tons to 56,063 tons translating to a gross revenue of over US \$ 247 million per annum (Figure 1). The growth in production is largely due to growth in commercial cage culture of tilapia in Malawi, Zambia and Zimbabwe and trout in Lesotho. Similarly, the production of seaweed in SADC has also increased significantly, by 9 percent per annum over the period 2001 to 2013; driven in particular by the demand for seaweed by the abalone farming industry in South Africa, Tanzania, and especially Zanzibar, remains the largest contributors to farmed seaweed in the region (Figure 1).

Although this data shows that aquaculture output in the SADC region is on an upward trajectory, it is still one of the lowest compared to other regions (Figure 2).



**Figure 1:** Aquaculture production statistics for SADC Member Region (2001 - 2013) - Extracted from the FAO Yearbook of Fishery and Aquaculture Statistics (2001 - 2013)



**Figure 2:** Aquaculture production in 2016 by Regions in Africa (Data source: FAO- Fisheries and Aquaculture Information and statistics)

In addition, although the region has the resource base (water, land and climatic) to pursue aquaculture - only 5% of the possible 23% of its land areas is used., In addition, It should be noted that commercial production by weight and value far exceeds production and revenue of the small holder sub sector. Approximately 77 % and 75 % of volume and revenue, respectively, is attributable to commercial aquaculture. The small holder (non-commercial) sector has not shown much growth, the reasons for which, amongst others, include a lack of access to capital, infrastructure, fingerlings and appropriate feeds.

### Vision for aquaculture development in the Southern region

The vision of the SADC Regional Aquaculture Strategy and Action Plan (RASAP) states that by 2025 SADC will become a leader of sustainably produced aquaculture products in Africa that contribute significantly towards economic growth, food security, poverty alleviation and job creation throughout the region. This policy note will also be based on this vision.

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

Opportunities for aquaculture in the SADC region outweigh the challenges. The challenges can be overcome with strategic intervention, planning, cooperation and mitigation.

#### Common aquaculture challenges

- The shortage of sector specific skills and access to relevant information.
- A lack of access to finance, financial support and business acumen.

- c. Poor cooperation within and between countries.
- d. Poor access to affordable feeds and quality stocks.
- e. Market competition with cheap, subsidized fish and fish product imports.
- f. The potential threat of aquaculture disease.
- g. Exotic species and the potential for environmental degradation where aquaculture is poorly planned and executed.
- h. Climate change.

#### *Common aquaculture opportunities*

- a. A strong demand and market for fish and aquaculture products, linked to a decline in natural fisheries.
- b. In most countries water, climate and natural resources are conducive to a variety of aquaculture types.
- c. The region has access to a rich natural fauna and flora of potential aquaculture species.
- d. The sector enjoys strong political support and can rely on continental and international development partners.
- e. A strong international interest in commercial aquaculture development in the region.

#### *Challenges in Relation to Environmental and Biosecurity Management (Issues) and Sustainable Aquaculture Development*

The development of aquaculture in the SADC region has not realized its full potential due to a poor grasp of the manner in which aquaculture works, including the technologies and methods, the business principles and the impacts (financial, social and environmental). Sustainable aquaculture development approaches should focus on the wider environment not just at the farm level because in practice, aquaculture is dependent upon the entire ecosystem. At geographical level, clusters of farms that share a common water body or watershed need coordinated management to ensure sustainable utilization and biosecurity. Cultured species are sensitive to water quality and are therefore extremely vulnerable to the damage inflicted by other users of the water body or watershed. Furthermore, while disease incidences can be controlled at farm level, their effects occur at the watershed level and

often do require control, management and mitigation at the watershed level. Likewise, exotic fish that escape from fish farms often impacts on biodiversity across the entire watershed. External drivers of aquaculture such as population growth and development, trade and climate change also affect entire ecosystem. Watershed boundaries, trade and climate change transcend national boundaries. Therefore, proper policy to promote management of the environment for sustainable aquaculture development through sustainable utilization of natural resources and effective protection of the environment need to be addressed and firmly entrenched.

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

The following subsections provide recommendations on environmental aspects and social economics aspects that relate to sustainable aquaculture development and operation, that should be adopted by each of the SADC Member States. These recommended are supported or further emphasized in the SADC protocols on fisheries (2001), FAO Code of conduct for responsible fisheries (1995) and the Policy Framework and Reform Strategy for Fisheries and aquaculture in Africa (2014).

#### **Regional environmental aspects**

##### *Natural resource needs for aquaculture*

With reference to the ecosystem approach, aquaculture should be developed in the context of available ecosystem services, with no degradation of these beyond their resilience and long-term sustainability. SADC Member State should ensure that before any aquaculture is initiated, the natural resource and ecosystem service requirements must be determined as accurately as possible.

##### **Water resources and water quality**

The water resource requirement for aquaculture must be determined with consideration to seasonal and annual climatic extremes before establishment and the maintenance of environmental integrity and mitigation measures must be devised for periods of water shortage. The quality and quantity of all water discharged from aquaculture activities must be within

the assimilative capacity of the receiving environment, in order to sustain environmental integrity without undue water quality and related impacts. Where applicable, sovereign water quality standards must be followed.

### **Potential User conflicts**

Just as aquaculture development and operation requires natural resources and environmental services, other human and natural activities depend on these resources and services. The water, land and other resources required for aquaculture must be shared equitably and within the capacity of these with other activities such as agriculture, recreation, tourism, industrial and urban uses, and with the inherent requirement (reserve) for maintenance of the environment itself.

### *Effects of environment of aquaculture*

In aquaculture development, most people only consider the directional effects of the operation on the surrounding environment and seldom consider the counter directional effects of a changing environment on the operation. However, there is a need to detailed understanding of the water needs, both quantitatively and qualitatively, and in relation to the seasonality or variability, before any development. Regardless of the cause of environmental effects on an aquaculture operation, internal migratory measures should be developed and implemented within practical and financial means.

### *Management of feed resources*

Feed and feed management has the potential to cause both upstream supply related impacts and downstream effects through direct and indirect pollution of water resources and the environment. Sourcing, management and responsible use of feed is not only an important environmental consideration; it is also a key factor that often determines the financial viability of aquaculture.

### *Candidates species and Biodiversity*

The introduction of non-native aquaculture species into an environment could cause significant ecological disturbances, the introduction of new diseases, invasion and displacement of other species. Therefore; where possible, preference should be given to locally

indigenous and non-threatened species for aquaculture as opposed to alien, extralimital and invasive species. The use of any particular candidate species must be authorized in terms of the applicable sovereign legislation in SADC Member State.

### *Genetic considerations*

The introduction of genetically different (including hybrids, genetically modified organisms and improved strains) aquaculture species into an environment could cause significant ecological disturbances. Aquaculture species that are able to hybridize should preferably not be farmed together, while species that are able to hybridize with indigenous species in the surrounding environment should not be used as production candidates. The potential for genetic impacts should be established before introduction of any new aquaculture species. In the near future, genetically modified (GMO) aquaculture species will become available for farming. Although the use of these enhanced organisms is not discouraged, it should be done with circumspection, especially in relation to the potential impacts on natural species and market perceptions. In all instances, such species may only be used in accordance with sovereign laws governing GMO matters.

### *Disease and health management*

Aquaculture disease is a threat, not only because of its potential impact on production, but also due to the potential of infecting other organisms in the environment. Disease should be managed by pursuing prevention and implementing prepared strategies and actions for treatment. If mortalities occur (natural, through disease or other factors), the management thereof is important to prevent environmental impacts. Disease management should take a holistic approach, which includes the management of water quality, hygiene, feed, stocking densities, stress, predators, husbandry techniques and more.

### *Climate change*

Given that reaction to climate change in the aquaculture sector will largely fall outside of planning or policy frameworks related to individual projects, the reaction to climate change must be done at a national level and through direction by SADC. Climate change mitigation

measures such as improved energy use, more efficient transport, the localization of markets and protection of environments that temper the acceleration of global warming, should be implemented.

#### *Product safety and consumer health*

As the end user of aquaculture products are consumers, the safety and quality of the products that the sector produce, must, in all instance, be safe for human consumption and use. Measures that ensure high standards of quality and safety, by implication, will also reduce post-harvest losses. Therefore, at commercial projects focus should be on the implementation of lesser or greater detailed versions of a Hazard Analysis Critical Control Point (HACCP) system in assuring food safety and quality.

#### **Regional socio-economic aspects**

##### *Zoning and clustering*

With due consideration to the ecosystem approach, access to resources for aquaculture development should be equitable and within the context of the available ecosystem services. Individual SADC Member States should spatially identify land and water resources that are suitable to aquaculture development. This spatial exercise could lead to the formation of aquaculture development zones or clusters, and people should be empowered by equitable access to these natural resources for aquaculture development and by the provision of incentives and essential services that can eliminate barriers to entry.

##### *Research and application of technology*

In order to develop region specific technologies and farming methods that are best suited to local conditions and/or the use of foreign technologies in a manner that allows for local optimization as well as to address the growing need for advancement of aquaculture methods, the SADC Member States must cooperate around aquaculture research and technology development.

##### *Access to knowledge and skills*

Much of the aquaculture potential in the Southern African region is underutilized due partly to a critical shortage of knowledge and skills. Aquaculture is not a traditional endeavour in the region, and in most

instances the skills and knowledge that is required for undertaking aquaculture must be learnt, transferred or developed over time. To empower local people in aquaculture, the SADC Member States must play an active role in knowledge and skills development and transfer.

##### *Human resource development*

Aquaculture requires a set of specific skills that have to be learnt. There is the need to develop and support the human resources required in the development of the aquaculture sector. Therefore, collection and dissemination effort of knowledge must be accessible to entrepreneurs that wish to develop aquaculture opportunities. The youth of the Southern African region should be exposed to aquaculture from a young age, through practical demonstrations and through incorporation thereof in schoolwork, alongside the concepts of traditional agriculture. Member States should seek opportunities for learnerships and internships at established commercial aquaculture operations. In addition, SADC Member States should establish and vitalise extension services to better disseminate aquaculture knowhow.

##### *Empowering the marginalized*

Marginalized communities that lie in proximity to natural resources such as land and water that is suitable for aquaculture, must be identified as potential beneficiaries of aquaculture development. In order to do this, people from such communities must be actively up skilled in aquaculture, so that they can develop projects or become employable in the sector. Access and dissemination of knowledge and skills, in all fields that support aquaculture developed and operation is imperative in empowering marginalized communities.

##### *Small holder and commercial linkages*

Small-scale projects can be established to support larger projects (with feeds, supplementary products or employment ready people), or products from smaller projects can be sold on and traded by the larger entities. The facilitative role that larger and commercial aquaculture projects can play, must be encouraged and, where appropriate, enforced through licensing and trade conditions that benefit all parties. Where possible,

large and commercial aquaculture ventures should be encouraged to use local services and products.

#### *Conducive and safe working conditions*

Although aquaculture does not generally create unsafe working conditions, some operations that could pose drowning hazards to people that are not proficient swimmers. General workplace hazards that are common to any type of farming also occur in aquaculture. Basic legal employment conditions must be upheld to ensure the maintenance of employee rights. Working conditions on aquaculture facilities must be such that they are safe and adequate protective gear must be provided.

#### *Market development and trade*

Products produced through aquaculture must be safe for human consumption. Wherever possible, the adding of value to primary aquaculture products through further processing, packaging and enhancement should be done locally, to optimize profitability and to capture a greater share of the value chain for local participants and beneficiaries. Where possible, and specifically for formal and export market orientated aquaculture projects, a product traceability system should be employed to assist with quality control. The use of eco-labeling should be encouraged as the global market for aquaculture products becomes increasingly attuned thereto. SADC Members States must actively develop means of supporting the export of aquaculture products to contribute to the generation of foreign revenue. Local and rural markets for aquaculture products should strive for the maintenance of quality standards, but must not be limited by overregulation.

### *Regional Tools in Aquaculture Development*

The tools that can be used regionally to improve the development and management of a sustainable sector in the Southern African region include spatial planning, project planning through environmental and strategic impact assessment within the ecosystem approach, impact mitigation and sector monitoring.

#### ***Spatial planning tools for aquaculture***

The location of aquaculture, as well as the clustering

and zoning requires high level spatial planning to ensure that the aquaculture type and species is adequately matched to the receiving environment, and to ensure that the natural resources and environmental services can sustain the operation. Spatial planning tools for aquaculture include the use of GIS, remote sensing, mapping, land use and resource characterization and capacity modeling. There is a need to spatially identify land and water resources that are suitable to aquaculture and endeavor to develop these areas as clusters or zones, by the provision of services, skills and other incentives.

#### ***Project planning tools***

The aquaculture planning and implementation must be done within the capability of the ecosystem, for the benefit of people and with due consideration to multiple natural resource dependencies. The ecosystem approach is not in conflict with the application of EIA's and SEA's, but places a greater emphasis on the ability of the ecosystem to sustain human (aquaculture) activities within the needs of people and the ability of the environment.

#### ***Impact mitigation tools***

Once an aquaculture initiative has been planned and established in terms of the ecosystem approach, the implementation of certain mitigation tools are required to ensure that potential impacts do not pose an unaccepted risk to the sustainable use of the environment. Once potential impacts are determined in an EIA or SEA process, the mitigation measures in the establishment (construction), operational and decommissioning phases should be recorded in an Environmental Management Programme (EMP).

#### ***Monitoring tools***

The monitoring of potential impacts of aquaculture development and operation is the only reliable means by which the manifestation of these impacts can be determined and tracked over time. Environmental auditing is an important component of monitoring. The following aspects are typical of aquaculture monitoring programme, but depend on the scale, species and nature of the operations: (1) water and potential degradation of water quality, (2) Monitoring

of the surrounding environmental integrity (3) waste generation and discharge (4) disease status, organism health and application of treatments and medications.

### **Standards and Best practices**

Increasingly, the need for the implementation of sector standards and best management practices is becoming an imperative to compete in the formal and global markets for aquaculture products. Although these may not be essential to the development of small scale or rural aquaculture, the sector as a whole will benefit from improvements therein.

### **Enhancing positive impacts**

The determination of aquaculture impacts, EIA and SEA processes and the ecosystem approach, often focus solely on potential negative impacts, and forgo the opportunity to identify and enhance the positive ecological and socio-economic impacts of aquaculture. The establishment and existence of an aquaculture project must provide for a beneficial trade-off and balance between ecological, social or economic advantages that support viability. Given the importance of using such a trade-off model of negative and positive impacts, it is imperative that the potential positive impacts of aquaculture be enhanced by means of interventions

### **Conclusion**

This policy note on regional Framework on Environmental Management for Sustainable Aquaculture Development in Africa - Southern African Region seeks to support the advancement of aquaculture in the SADC region, by providing guidance around the establishment and operation of an aquaculture sector that can thrive within the capacity of natural resources, which is accountable and which results in tangible benefits for the people of the region. There are significant challenges in maintaining and protecting the environment upon which aquaculture depends. Implementation of this policy note will strengthen the capacity of Member States to make more realistic and appropriate aquaculture development plans, approve appropriate projects and institute environmental management assessments more effectively. Additionally, the adoption

and mainstreaming of the recommendations into National Aquaculture Development Plans and Strategies shall facilitate the development and implementation of BMPs for all stakeholders, lower costs for undertaking Environmental Impact Assessments for practitioners, make it easier to implement labelling and certification of products and zone areas for aquaculture.

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