AFRICAN UNION
INTERAFRICAN BUREAU FOR ANIMAL RESOURCES

Trade and improved livelihoods in aquatic production in Africa: *Building capacity on environmental management, aquatic animal health management and biosecurity governance and food safety in aquaculture and aquatic animal production systems in Africa* (TILAPIA)

1 Rationale

1.1 Sector context: Partner Government(s) policies and strategies

Aquatic animal production has been identified as among the key agricultural value chains for transformation under the *New Partnership for Africa's Development* (NEPAD) *Comprehensive Africa Agricultural Development Programme* (CAADP) framework as well as the Malabo Declaration. The overall aim of this initiative is to transform Africa's agricultural sector into one that fosters equitable socio-economic development. The mandate of the *African Union – Inter-african Bureau for Animal Resources* (AU-IBAR) is to support and coordinate the sustainable development and utilization of animal resources on the continent. AU-IBAR plays a major role in enabling *Member States* (MS) achieve this goal in line with its key thematic areas of AU-IBAR's strategic plan notably:

1. *A*nimal health, disease prevention and controls,
2. Animal resource production systems and ecosystem management, and
3. Access to inputs, services and markets for animal and animal products.
4. Animal resources information and knowledge management.

AU-IBAR is therefore the Continent's lead agency that provides strategic support and helps implement other high-level African and global initiatives on fisheries that include the Abuja Declaration (NEPAD, 2005), NEPAD's Action Plan, the *Conferences of African Ministers of Fisheries and Aquaculture* (CAMFA 1 and 2), Africa's policy framework and reform strategy for fisheries and aquaculture, the *Food and Agriculture Organization of the United Nations* (FAO) Code of Conduct for Responsible Fisheries (1995) and other relevant international agreements and guidelines.

The project proposed contributes towards attaining the Sustainable Development Goals, Accelerated African Agricultural Transformation Goals, and the objectives of Africa's fisheries and aquaculture policy framework and reform strategy on *Sustainable Aquaculture Development; and Responsible and Equitable FishTrade and Marketing*.

At country level, the project's activities will contribute to national strategies on food and nutrition security, poverty reduction and economic growth.

1.2 Strategic analysis

The fisheries and aquaculture sector overview.

(i) Aquaculture

According to FAO, the total aquaculture production in sub-Saharan Africa has grown from 55 800 metric tonnes in the year 2000 to about 615 000 metric tonnes in 2012, with an estimated value of US$1,3 billion. Aquaculture growth has been impressive over the years in Nigeria, Uganda, Ghana, Kenya and Zambia (FAO Stats, 2012).

Due to high local demand, the vast majority of farmed aquatic animals in Africa are freshwater fish species, mainly the Nile tilapia (*Oreochromis niloticus*) and African sharptooth catfish (*Clarius gariepinus*). These species are relatively easy to rear in ponds, cages and in advanced technologies such as recirculation systems and aquaponics. There is also growth in marine aquaculture of shellfish (molluscs) in countries such as South Africa and Namibia where high value species e.g. abalone, oysters and mussels are produced for the export markets. Until recently, shrimp aquaculture has been developing modestly in Madagascar and Mozambique.

Several countries have prioritized aquaculture development and have included it in their national development plans. Thus a significant increase in aquaculture production is envisaged in years to come. In response to this, at the recent Conference of African Ministers of Fisheries & Aquaculture (CAMFA) held in April 2014 in Addis Ababa (Ethiopia), strategies were put in place to scale up the adoption of best practices in fisheries and aquaculture development in Africa within the result framework of the CAADP.

With an annual growth rate of over 6% in the last two decades, aquaculture is the fastest growing animal production sector in the world. It is estimated that half of all aquatic animal production is now generated from aquaculture (the other half being capture fisheries). Not only does aquaculture contribute significantly to food production, it also contributes to job creation. Worldwide, 80% of aquaculture production originates from small-holder farms (< 2ha). The increase in aquaculture production is related to the increase in demand for fish, the increase in the price for aquatic animals (making it more profitable for aquatic animal farmers) and the results of research to improve production and to increase the number of species farmed.

Another catalyst to the growth of aquaculture is the relative decline in fish production from capture fisheries.

Traditionally Asia has been the power house of aquaculture. Countries such as China and Vietnam are the bulk producers of fish. Their long tradition in aquaculture created the platform for this industry to diversify and expand exponentially. However, in recent years, environmental management and aquatic animal health issues have been a major concern for this region, causing huge loss of revenue.

In Africa, aquaculture has so far been a low key affair. Total aquaculture production from Africa represents about 2% of total global production as compared to 25% from Asian countries. In the 70's and 80's aquaculture was promoted at the level of subsistence farming and the net results were poor – though the continent has favourable environmental conditions for farming. However in the last two decades there has been a shift to aquaculture as a commercial venture. Nigeria has become the largest producer of catfish in the world and Egypt seconds China only to tilapia production. International investors are increasingly considering Africa to invest in aquaculture ventures. Global markets for fish and shellfish and fishery products are expanding, representing a growing source of foreign currency earnings for many developing countries.

With increasing demand for fish throughout Africa and the dwindling catches from capture fisheries, especially in large marine ecosystems, aquaculture development offers an alternative to sustaining the supply of fish to markets. The development of aquaculture in Africa is not only limited to fish production, it is developing both upstream and downstream businesses and creating opportunities for skilled jobs, for example in the manufacture of fish meal. If there is a lesson to be learnt from the Asian success story in aquaculture, it is that adequate environmental practices underpinned by strong legislative frameworks, need to be put in place as the industry develops to ensure sustainable growth and safeguard the economic interests of farmers.

(ii) Inland Fisheries.

Inland fisheries are conducted continent-wide across Africa from its extensive network of lakes, rivers, wetlands, as well as natural and man-made reservoirs. These ecologies are critical to Africa's security and livelihood needs. Some of the shared freshwater bodies that have supported huge fisheries resources on the continent include Lake Victoria, Tanganyika, Chad, Nile River, Zambezi River as well as other waters bodies such as Volta Lake, Aswan dam, Kainji Lake and Lake Kariba. The annual harvest of inland fisheries in Africa is 1.5 million tons per annum. The contribution of inland fisheries is approximately 54% of the total fish harvest.

As a considerable portion of the marine open water fisheries are exported out of the continent, inland fisheries play a critical role in food production and job creation for millions of Africans. In Africa, fish from inland fisheries is indeed "rich food for the poor". The potential for inland water fisheries on the continent is immense. Catches from inland water fisheries in Africa increased from 325 787 mt in 1950 to 2 705 519 tonnes in 2012 representing 23.26% of total global production of 11 630 320 mt. The benefits of inland fisheries to food security, micro-nutrients for children, and economic development cannot be understated.

Fish in Africa is traded, often across many international borders and women play an important role in this part of the sector. While men traditionally fish, women play an important part in the processing, preservation and trade of fish. The threats to inland fisheries in Africa (apart from the pressures of over-fishing) arise from a lack of comprehensive management plans that include weak policy and legislative frameworks on environment management, aquatic animal health and biosecurity. The level of movement of fish and fish products by traders between catchments as well as the increase in aquaculture activities across the continent pose a threat of disease outbreaks or environmental disasters. Furthermore, the extent of environmental degradation (for example through industrial, mining or agricultural pollution) poses a risk of ecosystem disasters that predisposes to outbreaks of aquatic animal diseases. Should a disease outbreak occur in a lake or

section of river that supports large inland fishery communities, thousands of fishers could lose their livelihoods and thousands more who depend on that resource for food, their food security.

In the last few years there have been several such outbreaks in Africa. The reporting of *Epizootic Ulcerative Syndrome* (EUS)[1] in fish and *White Spot Syndrome Disease* (WSSD) in shrimp has demonstrated how vulnerable the continent is to aquatic diseases and how ill-prepared Member States are to effectively deal with such situations. There is thus a need for sound environmental management practices that include *environmental impact assessments* (EIA), sound regulatory frameworks, strategies and capacity for effective and timely response to unforeseen environmental disasters, aquatic health management issues and maintenance of ecosystem integrity.

As the most internationally traded commodity, fish and shellfish are often an overlooked component of global food security. They provide essential local food, livelihoods and foreign earnings for many developing countries. In regions such as Africa, it is the most important protein source in people's diet. Since global capture fisheris are unlikely to increase production to meet population growth needs, and already half of the world's fish production comes from aquaculture, aquaculture production is therefore expected to continue increasing to become the most important source of the world's fish for consumption. Taking projected population growth into consideration, average per capita demand for fish is expected to increase by 2030 (although per capita fish consumption in Africa itself is expected to decrease from 7.5 kilograms per year to 5.6 kilograms per year by 2030).

Unfortunately, appropriate regulatory frameworks for control and governance of fish health infrastructure are not well enough established to support rapidly growing aquaculture industries and meet its biosecurity needs. In other parts of the world, similar scenarios have shown to have resulted in devastating environmental and socio-economic consequences when aquaculture was emerging. On the continent, the rapid spread and impact of EUS and WSSD highlights the consequences of lack of regulatory frameworks in an environment of irresponsible movement of live aquatic animals (including of ornamental fish that is by and large an unregulated trade), aquaculture intensification and diversification, and poor biosecurity knowledge and infrastructure. The overall goal therefore, should be to have in place appropriate strategies and frameworks as seen in many developed aquaculture regions.

Effective, well-coordinated and proactive biosecurity systems are the product of science-based knowledge and practices used within effective regulatory frameworks that are backed by sufficient resources for enforcement. As aquaculture becomes more intensive, the need for capacity and appropriate governance frameworks becomes apparent in light of the emerging challenges that border on management and institutional arrangements within and between countries. This calls for regional and international cooperation, pooling of resources and sharing of expertise and information.

1.3 Crosscutting issues

Gender

[1] Recently renamed *"Infection with Aphanomyces invadans (epizootic ulcerative syndrome)"* by the OIE

It is accepted that there is a strong relationship between hunger and gender inequality. As has been mentioned before, the empowerment and leverage of the status of women to that of men in Sub-Saharan Africa has the potential to reduce the number of malnourished children by a significant 1.3 million. In aquatic animal production and fisheries, women are mostly involved in processing and marketing. Empowering women and youth by building their capacity in best practices in fish handling, processing methods for post-harvest reduction and marketing will consequently have a positive impact on household incomes and the health status of families. Strengthening the capacity of value chain actors that include women and youth consequently shall strengthen intra-regional fish trade, improve food and nutritional security as well as rural livelihoods.

Climate Change

In recent years there has been an increase in the reporting of OIE notifiable aquatic and terrestrial diseases in Africa. While this can be attributed to anthropological causes, it is reasonable to assume that climate change is in some cases a factor in the occurrence and intensity of diseases outbreaks. With climate change, weather patterns change that affect natural systems including rivers and lakes resulting into stressful conditions for aquatic animals making them more susceptible to disease.

2 Problem Analysis

Capacity on aquatic animal health issues on the continent in relation to aquaculture, commercial fisheries, ornamental fisheries, the tourism industry and the environment are very weak. In order to meet the above mentioned policy objectives of the sector – aquatic animal health, aquatic biosecurity and foods safety are critical components.

2.1 Weak capacity to implement ecosystem approach to aquaculture

The capacity to adopt and implement ecosystem approaches to market-oriented aquaculture production systems as well as inland capture fisheries is very weak. Considering the rapid rate at which aquaculture is growing on the continent as well as the challenges the inland fisheries sector is facing, there is a need to streamline development in line with sustainable ecosystem approaches to avoid environmental degradation and mitigate against biosecurity risks that cause enterprise failure.

For example, it would be more sustainable if aquaculture establishments were located in zones/areas that are environmentally appropriate. The establishment of aquaculture producing zones based upon natural resource potential and ecosystem carrying capacities would facilitate the implementation of environmental management, biosecurity measures as well as marketing.

Such an approach however, will entail the undertaking of regional and national strategic environmental assessments for aquaculture that would provide baseline information on ecosystem characteristics and capacities. Such an approach would enable planners and developers to ascertain what sort of developments should be approved and to what level, institute appropriate environmental management and biosecurity control strategies which in turn would minimise conflict and risks of failure from aquatic developments. Such an approach would also improve the ability of stakeholders and member states to better cope with the effects of climate change.

2.2 Weak capacity for aquatic animal diseases prevention, early detection and rapid response

The capacity and mechanism for early detection and response to disease outbreaks in aquatic production systems is a serious hindrance. This inadequate capacity for aquatic animal disease control and biosecurity management remains a major challenge and poses a big threat to food production and livelihoods among fishery-dependent communities. This was manifested by the outbreak of *Epizootic Ulcerative Syndrome* (EUS), in the Chobe-Zambezi system in Africa in 2006. Typical outbreaks of EUS are associated with high mortality rates in fish to the extent that it may have the potential to disrupt livelihoods of fishing communities. The further spread of this disease inland where millions of fishers and rural communities depend on fish for their livelihoods and food security is a real possibility that poses a potential to threat to social stability on a massive scale. The lack of opportunity and alternative livelihoods for the fisheries dependent communities is a major risk determinant in the spread of this disease inland as fishers tend to regularly move in search of better fishing grounds.

The capacity of veterinary services (and aquatic animal health services) to address these challenges in AU member states therefore needs to be developed accordingly so as to ensure sustainable aquatic production for increased sectoral growth.

Undergraduate veterinary education is recognized as an important cross-cutting issue in the improvement of aquatic animal health services. Aquatic animal health management capacity development needs to be incorporated in training modules of existing veterinarians to orientate them towards aquatic animal diseases and pests, and food safety to enable them provide relevant services to stakeholders in the sector.

2.3. Weak legal and regulatory frameworks

Most African countries have policies and regulations on fisheries and aquaculture. However these policies have a strong bias towards regulating capture fisheries and are very limited when it comes to aquatic environmental health, aquatic animal health and biosecurity. Regulatory frameworks for sustainable aquaculture development where available are weak in content and are underscored by the absence of regional or national strategies on issues of aquatic environmental health, aquatic animal health and biosecurity governance. These weaknesses in regulatory frameworks and strategies were amply illustrated in the wake of the White Spot Syndrome Disease outbreak in Mozambique and Madagascar prawn farms and the EUS outbreak in the river Zambezi.

Sound legislative frameworks stipulating regulations for the aquaculture industry that encompass the use of inputs and catering for value-chain development needs are important. Current instruments generally are not comprehensive enough and are therefore limited in their capacity to adequately regulate the industry. The lack of mechanisms for coordination in the wake of disease outbreaks is also a major issue in the majority of the regions.

2.4. Weak capacity for compliance to aquatic animal trade standards, guidelines and certification procedure

The export of fish and fish products from several African countries to markets such as the European Union is limited because they do not meet the stipulated sanitary, phyto-sanitary standards (SPS). Consequently revenues from this resource are limited. The basic international standards that animal resources (including fisheries and aquaculture) need to meet to access international markets are those stipulated by the World Organisation for Animal Health (OIE) and the WHO/FAO Codex Alimentarius. The lack of certified accreditation procedures and facilities for aquatic animal and aquatic animal products is another constraint to accessing international trade. African countries additionally are often limited in their capacity to adequately contribute to the standard setting processes set by OIE and Codex Alimentarius. To address this constraint, human and infrastructural capacity needs to be developed in the relevant scientific disciplines. Furthermore, African countries need to be encouraged to come up with common coherent positions, based on scientific evidence, for the effective participation in the meetings of these organizations.

3 **Lessons learned and** Complementary Actions

3.1 FAO-IGAD project on *"Support to Capacity building to promote formal marketing and trade of fish and fish products from the Horn of Africa"* (TCP/RAF/3308).

This project was implemented by IGAD in collaboration with the FAO Sub-regional Office for Eastern Africa between June 2011 and May 2013. The lessons that can be learned from this project include the analysis of value chain actors for capacity building towards improved fish quality standards, fish trade and marketing, critical processes and procedures for establishing regional networks, such as fish market information systems, and the identification of constraints and issues in harmonizing regional policies.

3.2 SADC Strategy for Biosecurity governance and fish diseases control

Lessons drawn from this project cover the systematic processes adopted in the formulation of the regional biosecurity strategy.

3.3 EAC project on *"SPS Measures for Fish and Fish products"* by the EU Smart-Fish project

Lessons drawn from this project cover the formulation of strategies on regional sanitary measures for fish and fish products.

3.4. AU-IBAR Project on *"Participation of African nations in Sanitary and Phytosanitary Settings Organizations*" (PAN-SPSO), funded by the EU and implemented by AU-IBAR since 2009 (ends in December 2015, except for WTO and OIE related activities – August 2017, see VETGOV project below).

The project aims at facilitating the effective participation of African countries in the activities of the *World Organisation for Animal Health* (OIE), the *International Plant Protection Council* (IPPC) and the *Codex Alimentarius Commission* (CAC) during the formulation of international standards on animal (terrestrial and aquatic) and plant health, and food safety.

The mains outputs are the following:

i. African countries are strengthened to empower SPS entities for effective participation in SPS standard-setting activities;
ii. Common position on SPS standards at continental and regional levels rare reached by African countries;
iii. Technical capacity of African countries are strengthened to draft standards and to develop science-based arguments;
iv. SPS-related data and information are acquired and disseminated to African countries through established accessible information sharing platform.

3.4 3.5. AU-IBAR / FAO / OIE Project on *"Reinforcing Veterinary Governance in Africa"* (VETGOV) funded by the EU since 2012 (ends in August 2017).

The program aims at improving animal (terrestrial and aquatic) health in Africa, and in particular to control emerging and re-emerging diseases, and to build the capacity of Veterinary Services and improve their governance, in accordance with the quality standards in the Terrestrial and aquatic Animal Health Code, which are adopted by all Member Countries and Territories of the World Organization for Animal Health (OIE). The strategic goal of the programme is to bring about institution strengthening of veterinary services towards (i) the establishment of adequate veterinary services at the national level (ii) strengthen regional institutions to play their roles of: coordination, harmonization, integration and support to countries with the aim to stimulate a more conducive environment for public and private investments in the livestock sector.

3.5 3.6. AU-IBAR / AU-NEPAD Project on *"Strengthening institutional capacity to enhance governance of the fish sector in Africa".*

This EU funded project is implemented by AU-IBAR with support from the *NEPAD Planning and Coordination Agency* (NPCA) and runs from March 2014 to September 2017.

The specific objective of this action is to improve the institutional and policy environment for sustainable management and utilization of fisheries resources in Africa. The project has activities on strengthening human and institutional capacity in aquatic environmental management, biosecurity governance and fish diseases control that will be complementary to

the proposed activities in the proposal for aquatic environmental management and fish diseases control.

3.6 WORLDFISH project on *"Improving Food Security and Reducing Poverty through intra-regional Fish Trade in sub-Saharan Africa"* (FISH-TRADE)

This EU funded project is implemented by WorldFish in collaboration with AU-IBAR and the NEPAD *Planning and Coordination Agency* (NPCA) and runs from March 2014 to September 2018.

The objective of this project is to improve food and nutritional security and reduce poverty in sub-Saharan Africa by enhancing the capacities of regional and Pan-African organizations. The activities in the FISH TRADE project that will be complementary to the proposed activities in the proposal for aquatic environmental management include formulating guidelines and frameworks for increasing compliances with best practices in trade and market issues, development harmonized regional policies with the RECs proving leadership, capacity building of national veterinary services to support aquatic production systems.

4 Formulation of the project

The *African Union – Inter-african Bureau for Animal Resources* (AU-IBAR), in collaboration with OIE, FAO, NPCA, have formulated a concept note on *'Building capacity on fish health, aquatic biosecurity and sustainable management to develop and sustain aquaculture and fisheries production systems in Africa'* for **Trade and Improved Livelihoods in Aquatic Production in Africa** (TILAPIA). With the financial support of the *Standards and Trade Development Facility* (STDF)[2] a stakeholder's consultation workshop was organized to consolidate the Concept note and prepare the full project proposal.

The objective of the workshop was to identify, discuss and build consensus on the elements to be included for improving the TILAPIA proposal and procedures to be followed for responding to the call from STDF for the proposed project.

There were 47 participants drawn from African Union member states (AU-MS), Regional Economic Communities (RECs), private sector and individual experts. There were representatives from partner organizations including AU/IBAR, FAO, OIE and the NPCA.

5 Description

5.1 Objectives

The project intends to address key issues in aquatic environmental management, aquatic animal health and biosecurity and food safety in fishery and aquaculture production systems. It shall include capacity development, strengthening of policy, institutional and regulatory frameworks in the emerging aquaculture sector in Africa. It is meant to create a conducive environment for

[2] Insert the reference of the grant

increased production, increased food safety and increased regional trade of aquatic animals and their products, while securing rural livelihoods, fostering investment in the sector, and sustaining production through environmentally sound practices.

Project goal: To enhance the contribution of the fisheries and aquaculture sectors to food security, poverty reduction and improved livelihoods in Africa

Overall objective: To strengthen capacity for environmental management, aquatic animal health and biosecurity governance and food safety in aquaculture and fisheries production systems in Africa.

Specific objectives:

The specific objectives therefore are:

1. Enhance capacity for environmental management in aquatic animal production systems.
2. Strengthen capacity of stakeholders in aquatic animal health management and biosecurity.
3. Enhance compliance of aquatic animal products to aquatic animal trade standards, regulations and certification procedures in order to promote access to national, regional and international markets.

5.2 Expected Results

R.1. Capacity for environmental management in aquatic production systems enhanced

A.1.1. Strengthen policy and institutional capacities on aquatic environment management and biosecurity;
this will include Develop and provide guidance on effective governance models to facilitate sustainable aquaculture development; harmonization of policies and regulatory frameworks on ecosystem approach to aquaculture and aquatic animals etc)

A1.2. Develop and implement guidelines for demarcating and managing aquaculture zones.
This will include facilitating regional strategic environmental assessment for aquaculture development on shared ecosystems

A1.3: Develop and implement mechanism for collaboration and sharing of expertise between private sector and public institutions in environmental management

R2. Capacity of stakeholders in aquatic animal health management and biosecurity governance strengthened

A.2.1. Strengthen/develop capacities and systems for early detection and reporting of aquatic animal diseases
This will include Strengthen provisions of diagnostic services, by raising diagnostic capacity in national reference laboratories in each country, establishing regional reference infrastructure services on aquatic animal health and biosecurity.

A.2.2 Strengthen public veterinary services and other competent authorities in aquatic animal disease control and biosecurity.
This consists of strengthening the position/role of the aquatic animal disease focal point within the department of veterinary services; build the capacity of practitioner in aquatic animal diseases and biosecurity control; enhance collaboration between academia, competent authority, veterinary authority and private sector representatives.

A2.3 Strengthen regional early warning and response systems.
This will be done by improving knowledge of public and private sector aquatic animal health professionals, veterinarians and veterinary para-professionals in diseases surveillance, disease recognition, species identification, emergency response, emergency preparedness plans, bio-security at farm level and between farms, inspection of live animals (ornamental aquatic animal, seed, brood stock, table aquatic animal) and products (at farm level, at import, at export), inspection of feeds, veterinary inputs, services and processes, quarantine, international standards on aquatic animal health, welfare, trade and veterinary public health, international zoo-sanitary certification; establishing regional frameworks for aquatic animal disease and biosecurity control

R.3. Enhanced compliance to aquatic animal trade standards, regulations and certification procedures.

A.3.1. *Capacity-building of private sector stakeholders (producers, processors, suppliers, traders) on best practices in aquatic animal health management, hygiene and HACCP, international trade standards (OIE, Codex) and responsible use of pharmaceutical products*.

A.3.2. *Develop and implement an accreditation mechanism for aquatic animal feed and seed.*
to ensure availability of quality broodstock and seed and also to build technical capacity in hatchery and farm management. There is a need for adopting/implementing appropriate technology for different production scales and this would enable farmers to be more market oriented and capture information on economic performance (i.e. Feed conversion ratio and specific growth rates etc.).

A.3.3. Develop and implement mechanism to improve value addition, food safety and traceability.
This will include enhancing the role of focal points for the Codex Alimentarius Committee on aquatic animals and aquatic animal product

A3.4 Strengthen the capacity of stakeholders associations to monitor the implementation of standards.

R.4 Capacity of stakeholders on improved aquaculture productivity and trade enhanced

A4.1 Conduct Value chain analysis for aquaculture and capacity of stakeholders strengthen on environmental management, biosecurity and food safety along the value chain.

A.4.2. strengthen regional cooperation on aquatic animal market information, trade agreements and policy harmonization

A4.3 Enhance services delivery in aquaculture production systems
this will entails strengthening extension services, implement supportive PPP models, organize exchange visits

6 Risks and assumptions

Table 1. Potential Project Risks.

Risk	Mitigation	Assumption
Lack of ownership of the project by stakeholders	Extensive consultative processes and participatory approach	There will be ownership of project activities due to AU leadership
Lack of or limited implications of project outcomes - strategies, policies and regulatory frameworks.	High level consultative processes and forums for adoption of project outcomes - CAMFA processes.	The project outcomes will be implemented by member states and regional institutions due to the high level adoption and tangible positive outcomes.
Political instability at member states and regional levels.	Pro-active and Early warning systems would be adopted.	There shall be no political instability along the identified corridors.
Declining aquatic animal resources.	Sensitization on aquatic animals and aquaculture resource sustainability will be an integral component of the project implementation.	There will be abundant aquatic animal resources for trading and marketing.

Environmental randomness (climate change and other natural disasters).	The project will rely on existing emergence response systems and also incorporate awareness for adaption in communities along the corridors.	There are existing emergency response systems to natural disasters along the corridors.
Emergence of difficult relationships between partners in project implementation.	Periodic internal coordination meeting	There will be smooth implementation by partners

7 Sustainability

Table 2. Factors likely to impact on sustainability.

Key Factor	Conditions to Ensure Sustainability
a. Ownership	Involvement of MS institutions and RECs as well as the private sector, practitioners, producers, and processers through networks and associations
b. Appropriate technology	Research and training institutions, value-chain approach technology development and dissemination taking into account needs and building capacity of actors along the value-chain.
c. Institutional, governance and management structures	Capacity building of managers, diagnostic and phyto-sanitary facilities as well as personnel running facilities to generate the appropriate data that shall advise processes and institutions.
d. Economic and financial viability	Involvement and capacity building of private sector value-chain actors to under-take some of the tasks. Re-investing returns from increased production and trade both by the private and public sector independently and together.
e. Environmental and natural resources	Biosecurity measures in place, increased public awareness, increased capacity of aquatic animal health practitioners, managers and other stakeholders to evaluate and implement biosecurity measures.
f. social and cultural issues, including gender equality	Adopt EIAA approaches that ensure participation of general public , users of resources and vulnerable groups.

8 Method of implementation

The proposed action will be implemented collaboratively through strategic partnerships and coalitions. To ensure continuity and register high impact, the action will ensure that it builds on previous and on-going actions. A partnership comprising AU-IBAR, NEPAD Planning and Coordination Agency (NPCA), FAO and the World Organisation for Animal Health (OIE) will implement the action. A partnership agreement between these institutions will be signed in which detailed activities to be implemented will be provided. The action will be coordinated by AU-IBAR's Animal Production Unit.

The *Inter-African Bureau for Animal Resources* (AU-IBAR) is the African Union's technical agency (under the Department of Rural Economy and Agriculture of the African Union Commission) for animal health and production. AU-IBAR will be the lead implementation partner. Established as the Interafrican Bureau of Epizootic Diseases (IBED) in 1951 to study the epidemiological situation and fight rinderpest in Africa, the organization's mandate today is to support and coordinate the utilisation of animals (livestock, fisheries and wildlife) as a resource for

human wellbeing in the Member States, and to contribute to economic development, particularly in rural areas. Being a specialised technical office of the African Union Commission (AUC), AU-IBAR enjoys unique convening power, and is a critical instrument for advocacy; it is able to bring together animal resource policy- and decision-makers from AU member states, including at ministerial level or higher. This means it is very well placed to translate technical recommendations into national, regional and continent-wide policy and practice, and to achieve real impact on the lives and livelihoods of those who depend on Africa's animal resources [www.au-ibar.org]. AU-IBAR is well placed to provide leadership in the implementation of project in view of its mandate and experiences in animal resources development and utilization on the African continent.

The NEPAD *Planning and Coordination Agency* (NPCA) is an economic development program of the African Union. NEPAD was adopted at the 37th session of the Assembly of Heads of State and Government in July 2001 in Lusaka, Zambia. NPCA aims to provide an overarching vision and policy framework for accelerating economic co-operation and integration among African countries. NEPAD's four primary objectives are: to eradicate poverty, promote sustainable growth and development, integrate Africa in the world economy, and accelerate the empowerment of women.

At international level, the two main technical agencies involved are the *Food and Agriculture Organisation of the United Nations* (FAO) and the *World Organisation for Animal Health* (OIE). **The FAO's** involvement covers both capture fisheries (inland and marine) and aquaculture production, with strong emphasis on stock statistics, biodiversity and best practices in governance of wild and farmed aquatic animal resources. FAO has also been involved in aquatic animal health management and biosecurity governance in aquaculture and aquatic production, worldwide and food safety of aquatic animal products through Codex Alimentarius Comission (CAC), while the OIE focuses on international standards for the safe trade of live aquatic animal species and their products, as well as on the welfare and transport of farmed aquatic animals, diagnostic methods and risk analysis.

Internal and External Evaluation Procedure

A cause-and-effect results framework will be developed in line with the CAADP Results Framework. A detailed Monitoring and Evaluation (M&E) framework will also be developed. Consistent with indicators developed to track implementation of the Malabo Declaration, a set of relevant indicators will be developed for the action and a baseline survey to assess the prevailing situation will be conducted.

Communication Strategy and Dissemination Methods

A communication plan will be developed and implemented for the project. The communication strategy will be two-pronged covering internal communication among project implementing partners and external non-implementing partners. The essence of the communication strategy will be to communicate what is being done under the project, the achievements of the project, and the experiences of different stakeholders.

Project Administration

The general direction and management of this action will be guided by a Steering Committee comprising representatives from the main stakeholders. The Steering Committee will be tasked to validate strategies and work plans for the joint implementation of the project.

9 Budget

Wherever possible provide a very preliminary idea of resource requirements, including, where possible, sources of financing (beneficiary countries or other donors).

10 Project Logframe

10.1 Project Logframe

Objectives/Activities	Objectively Verifiable Indicators	Outputs	Outcomes	Project Assumptions
Overall Goal To enhance the contribution of the fisheries and aquaculture sectors to food security, poverty reduction and improved livelihoods in Africa.			1. National and sub-national governance and institutional arrangements in environmental management, aquatic animal health and biosecurity control and aquatic food safety that have the greatest impacts at the most appropriate level 2. Strengthened scientific and socio-economic basis for aquatic environmental management, animal and biosecurity control and aquatic food safety. 3. Development of market-led sustainable aquaculture development plans and actions for sustainable commercial aquaculture development. . 4. Increased benefits resulting from improved	

			access to aquatic animal products. 5. Accelerated trade and marketing in aquatic animal products. 5. Strengthened South-South (bilateral and regional) cooperation and coordinated mechanisms among RECs in aquatic environmental management, aquatic animal and biosecurity control and aquatic animal food safety. 6. Increased awareness of the potential and importance of aquatic animal resources. 7. Enhanced capacity of people and institutions in African to manage and ensure sustainable development of aquatic animal resources. .	
Project Objectives: 1. Enhance the capacity for environmental management in aquatic production systems. 2. Strengthen the capacity of stakeholders in aquatic animal health		**Result Areas:** 1. Capacity for environmental management in aquatic production systems enhanced.		

management and biosecurity governance. 3. Enhance compliance of aquatic animal products to aquatic animal trade standards, regulations and certification procedures in order promote access to markets and intra-regional trade.		2. Capacity for stakeholders in aquatic animal health management and biosecurity governance strengthened. 3. Enhanced compliance to aquatic animal trade standards, regulations and certification procedures.. 4. Capacity of stakeholders to improve aquaculture productivity and trade enhanced.		
Activities				
R1. Capacity for environmental management in aquatic production systems enhanced.				
A.1.1. Strengthen policy and institutional capacities on aquatic environment management and biosecurity; this will include Develop and provide guidance on effective governance models to facilitate sustainable aquaculture development; harmonization of policies and regulatory frameworks on ecosystem approach to aquaculture and aquatic animal, strengthen institutional capacity to implement, etc)	- Regional and continental seminars on environmental management approaches and guidelines for sustainable aquatic animal production systems conducted for policy makers and managers. Regional and continental seminars to harmonize policies and regulatory frameworks on	- seminars and workshops conducted. - Number of participants - Workshop and training Reports - Policy briefs - Regional and continental policy and framework - Guidelines for the governance and implementation of environmental management in aquatic	- Inclusion of environmental management for aquatic animal production systems in regional and national policies and budgets. - Increased levels of adoption and implementation of FAO code of conduct and Ecosystem approach to fisheries aquaculture by	

	environmental management approaches for aquatic animal production systems Regional training workshops (short courses) for technical personnel in public NEMA's, government departments, training and private sector practitioners on standard approaches to environmental management for aquatic animal production systems.	animal production systems in Africa. - Training modules for technical personnel.	African member states. -improve implementation of OIE and Codex Alimenatrius	
A.1.2 Develop and implement guidelines for demarcating and managing aquaculture zones. This will include facilitating regional strategic environmental assessment for aquaculture development on shared ecosystems	- Spatial assessment and site selection of best production areas- Regional strategic environmental assessments to s for aquaculture conducted. National and regional consultative workshops to select and demarcate land and water-based aquaculture producing zones. National and regional	Assessment reports Workshop reports Consultancy reports National, regional and continental policy frameworks on the selection of sites, development and environmental management of aquaculture zones. Guidelines for managers and operators of	-Improved planning for commercial aquaculture development based upon ecosystem approach to aquaculture principles. Production and environmental management measures that promote biosecurity. Sustainable large scale commercial aquaculture operation models Increased confidence of private sector to invest. Increased infrastructural	

	workshops to develop management policies and frameworks for demarcated aquaculture producing areas. Regional and continental workshops to harmonize management policies and frameworks for aquaculture zones. National workshops to develop action and investment plans to develop designated aquaculture zones Regional and continental workshops to develop action and investment plans to develop designated aquaculture zones.. .	Aquaculture Zones. Harmonized action, investment and management plans for land and water based aquaculture zones in shared ecosystems.	public sector investment to operationalise aquaculture zones. Development and implementation of appropriate PPP management and service delivery models for aquaculture	
A.1.3. Develop and implement mechanism for collaboration and sharing of expertise between private sector and public institutions in environmental management.	Consultancies to assess socio-economic and technical feasibility of operationalizing selected demarcated aquaculture	Consultancy reports Regional aquaculture zonal consultative workshop reports	Establishment of aquaculture zones Operationalization of aquaculture zones under	

	zones Consultancies development of appropriate regional and national PPP management and service delivery models for aquaculture zones Consultative aquaculture zonal workshops to select and discuss implementation mechanisms for feasible PPP management and service delivery models for regional and national aquaculture zones. Consultancies to undertake business and investment plans for selected key regional PPP management and service delivery models for aquaculture zones.	Harmonized mechanisms and protocols that facilitate standardized transboundary service delivery to aquaculture zones within shared ecosystems. PPP investment and business plans for presentation to development finance institutions.	regional environmental and business management framework. Increased private sector investment into aquaculture zones.	
R2: Strengthen capacity of stakeholders in aquatic animal health management and biosecurity governance				
A.2.1. Strengthen regional early warning and response systems.	Strengthen provisions for diagnostic capacity within	Consultancy reports.	- Improved diagnosis,	

Strengthen/develop capacities and systems for early detection and reporting of aquatic animal diseases.	national reference laboratories. Consultancies to assess capacity and policies to facilitate establishment and operations of accredited regional reference diagnostic and surveillance services for aquatic animal health and biosecurity. Consultative workshops to strengthen legal and policy provisions for the establishment and operations of accredited regional reference infrastructure and services on aquatic animal health and biosecurity control - Consultative workshops to strengthen legal and policy provisions for the establishment and implement regional aquatic animal early warning and response systems.	Workshop reports Number of trained participants. Policy framework and guidelines to establish and operate regional aquatic animal health management and biosecurity plans National and regional frameworks and guidelines for implementing aquatic animal health early warning and response systems.	reporting surveillance and control of aquatic animal diseases economic importance. Improved regional and national biosecurity governance and control. Improved access of aquatic animal and aquatic animal products to markets. Fewer incidences of disease outbreaks and when they do occur, faster and more effective control mechanisms implemented.	
A2.2. Strengthen veterinary public	Regional training workshops	Regional and national	Improved collaboration	

institutions in aquatic animal disease and biosecurity control.	to enhance knowledge (capacity) and mechanisms for provision of aquatic animal veterinary services (veterinarians and veterinary para-professionals) in the following areas: • Diseases recognition surveillance, emergency response and emergency preparedness plans, • Bio-security control at farm and national level • Inspection of live aquatic animals and aquatic animal products at farm level, markets and portals of entry inspection. • Inspection of feed and veterinary inputs • Provision of quarantine services based upon international standards on aquatic animal health, • Aquatic animal welfare and trade	guidelines and protocols on inspection and certification of aquatic animals and products. Regional and national guidelines and protocols on quarantine of aquatic animals. Regional and national guidelines for the inspection, use and certification of aquatic animal veterinary inputs, including aquatic animal feeds. Competence to provide international aquatic animal health and zoo-sanitary certificates. Competence to provide national and regional diagnostic and disease control services at farm, national and regional level.	among the different veterinary units within both the public and private sectors to provide quality veterinary services to the industry. Improvement in biosecurity control. Increased farm productivity. Improved access of fishery and aquaculture products to markets.	

	• Public health, • International zoo-sanitary certification • Establish and implement regional frameworks for aquatic animal disease and biosecurity control. Consultancy needs assessment of the status and factors that would improve aquatic animal health service delivery among the different arms of the veterinary services Consultative workshops to develop collaborative mechanisms to ensure effective service delivery for aquatic animal health among the various arms of the veterinary services including private and public sectors.	Assessment report on the status analysis and impact of consultation mechanisms between key stakeholders on the implementation status of aquatic animal health and biosecurity Guidelines for the provision of public and private veterinary aquatic animal health services. PPP's in aquatic animal health service delivery.		
R.3. Enhance compliance to aquatic animal trade standards, regulations and certification procedures				
A.3.1. Capacity building of private sector stakeholders on best practices in aquatic animal health management, hygiene and	- Consultancies to: (i) Assess capacity building needs of private sector	- Needs assessment reports.	Improved level of public awareness and adoption of recommended	

HACCP, OIE standards and use of pharmaceutical products.	stakeholders among the various value chains, (ii) Develop and distribution of appropriate training and user manuals for private sector stakeholders individually on aquatic animal health management, hygiene and HACCP, OIE standards and use of pharmaceutical products. National and regional stakeholders training workshops for Production and distribution of media programs and adverts.	Soft and hard copy training and user manuals for stakeholders. Media adverts and brochures - Training DVDs	standard operating procedures. Improvement in, service delivery and quality of products produced. Improved levels of biosecurity and bio-safety Increase in returns for operators	
A.3.2. Develop and implement an accreditation mechanism for aquatic animal feed and seed	(i)Conduct an evaluation of the status of aquatic animal feed and seed quality and standards on the continent. Conduct assessment of policies and regulatory frameworks governing and strategies for assuring aquatic animal feed and seed quality.	Assessment reports Workshop reports.. Aquatic animal feed and seed policies and standard requirements included into national policies on animal feed and stocking materials.	- improved performance of aquatic animal feed and seed Implementation of HACCP for aquaculture production. Improved access of farmed aquatic animals to markets	

	aquatic animal. Consultative workshops to develop frameworks and mechanisms assure monitor aquatic animal feed and seed standards Training workshops on implementation of mechanisms to assure aquatic animal feed and seed standards. Stakeholder training workshops, shows and media events to promote visibility and use of certified standard aquatic animal feeds and seed.	Media adverts and evidence based information on source, quality, best practices and benefits of certified feed and seed. Aquatic animal feed and seed standards Aquatic animal feed and seed standards registered with National Bureaus of Standards.	Increase in the use of certified feed and seed. Increased adoption rates best practices for handling, storing, transporting, and using standard aquatic animal feed and se ed by stakeholders	
A.3.3. Strengthen policy and institutional capacities to develop and implement mechanism to improve value addition, food safety and quality assurance of aquatic animal products. This will include develop and provide guidance on effective governance models; harmonization of policies and regulatory frameworks and strengthen	Regional situation analysis of aquatic animal processing, products and quality assurance from aquatic animal value chains. Regional consultative workshops to develop harmonized mechanisms to reduce post-harvest losses, improve quality and	Situation analysis report. Workshop reports Data collection and monitoring systems. Aquatic animal product standards registered by national Bureaus of	Improvement in level of quality assurance of aquatic animal products on the market. Increase in best practice adoption rates by stakeholders Improved access to	

institutional capacity of both the public and private sector to implement key components for post-harvest food-safety and quality assurance.	assurance of aquatic animal products alongthe value chains. National and stakeholder workshops stakeholder workshops to develop and harmonize frameworks and mechanisms for aquatic animal product phyto-sanitation control (e.g. development of standards) National and stakeholder workshops stakeholder workshops to implement mechanisms for aquatic animal product phyto-sanitation control (e.g. development of standards including Codex alimentarius). Regional and national training workshops to develop and harmonize frameworks and implementation mechanisms to capture, monitor and disseminate information on attributes of aquatic animal products	Standards. -	markets Consumers protected as a result of product standardization.	

	within markets.by national and regional market monitoring structures e.g. INFOPECHE, farmers and consumer associations, government departments, etc.)			
A.3.4. Strengthen the capacity of stakeholder associations to monitor the implementation of standards along the value chain.	Regional situation analysis of stakeholder associations; their characteristics, systems and ability to undertake marketing and advocacy. National and regional training workshops for members to implement best practices for product quality assurance. National and regional training workshops for associations (i.e. along value chain: farmers, processors, traders and consumer) to set up systems facilitating compliance and monitor members application of standards as well as	Situation analysis report. Workshop reports. Training and user manuals for operators. Technical support. Monitoring systems. Tools and equipment for monitoring (e.g. ICT equipment for data management, etc.). Policy and management guidelines for set-up and operations of PPP's in quality assurance of aquatic animals	Increase in the level of compliance to standards. Improved access of products to markets. More private sector funding attracted to support provision of services in quality assurance.	

	standards of products Technical and material support to stakeholder institutions to enable them implement and monitor SOPs. Develop and establish PPP's frameworks to provide relevant accredited technical services in quality assurance along the value chain.			
R.4. Capacity of stakeholders to improve aquaculture productivity and trade enhanced.				
A 4.1. Conduct value chain analyses for aquaculture and capacity of stakeholders strengthened on environmental management, biosecurity and food safety along the value chain.	Conduct value chain analyses for aquaculture and capacity of stakeholders strengthened on environmental management, biosecurity and food safety along the value chain. Regional and national workshops to strengthen stakeholder capacity to implement environmental management, biosecurity	Analytical reports Workshop Reports Training manuals User guidelines.	Improvement in the adoption of best management practices. Improvement in the viability and sustainability of operations and the industry.	

	and food safety measures along the value chain.			
A 4.2. Strengthen regional cooperation of fish market information, trade agreements and policy harmonization.	Conduct an assessment of the implementation status and impact of regional trade agreements and policy harmonization on the livelihoods of aquatic animal producers, processors and traders. Conduct an assessment of the impact of and trade information observatories on regional and national levels of aquatic animal trade. Regional consultative and stakeholder workshops to develop frameworks to strengthen performance and impact of fish market information, trade agreements and policies. Regional stakeholder workshops to strengthen capacity of fish market information observatories improve their services and impact on trade.	Assessment reports Workshop reports Policy implementation guidelines Technical support hired and reports. Material support delivered (e.g. ICT equipment, etc.). Price indices and other market information in public arena.	Wider dissemination of market information. Reduction in bottlenecks to trade for traders. Evidence based sectoral policy making.	

	Technical and material support to market observatories. Regional stakeholder workshops to strengthen capacity of managers implement regional trade agreements and policies			
A 4.3. Enhance services delivery in aquaculture production systems. This will entail strengthening extension services, implement supportive PPP models, and organize exchange visits.	Conduct a situation analysis and needs assessment of status of services along the value chain. Consultative workshops to discuss frameworks and appropriate standards and models for services and service delivery (notably training modules, PPPs, codes of conduct, company charters, etc.). Capacity building of extension service providers that comprising of short courses and study tours. Improve capacity of associations provide	Assessment reports. Consultative workshop reports. Training workshop reports Study tours, student exchange programs Technical support hired and reports. Material support delivered (ICT equipment, nets, etc.) SOPs and COPs.	Better quality services delivered. Improvement in performance of enterprises along the value chain	

	appropriate quality services to members (e.g. sampling, data management, marketing, finance, etc.). Improve capacity of seed and feed producers to produce quality assured products and advice clients on best practices for the use of their products. Technical support. Material support.			
A 4.4. Creating and enhancing awareness about aquaculture and its potential in order to sensitize stakeholders and national governments to prioritize aquaculture and allocate budgets for aquatic animal health activities.	Public awareness campaigns. Media events and publications Aquaculture shows and trade fairs Symposia Seminars Primary and secondary school awareness programs	Reports. Media events conducted. Publications. Films Appropriate syllabi and training materials Facilities for practical training demonstrations in schools and colleges	Better informed public. Increased number of new entrants into various aspects of the sector. Improved public and private sector funding.	

	Curriculum development (primary to tertiary levels). Training workshops for trainers (including school teachers) Development and production of school training materials and infrastructure.			