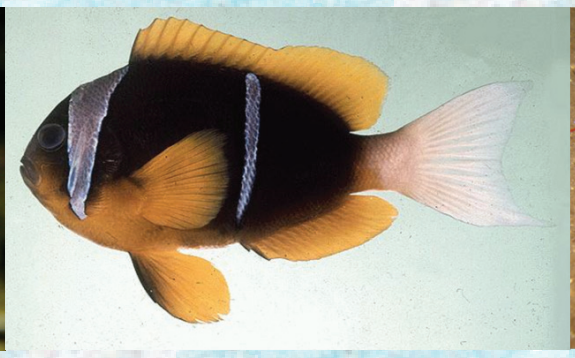
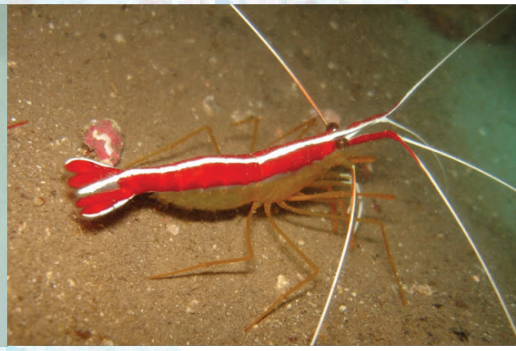
AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES

EUROPEAN UNION

REGULATORY FRAMEWORK AND MECHANISM FOR MONITORING THE EXPLOITATION AND TRADE IN ORNAMENTAL FISH SPECIES IN AFRICA

REGULATORY FRAMEWORK AND MECHANISM FOR MONITORING THE EXPLOITATION AND TRADE IN ORNAMENTAL FISH SPECIES IN AFRICA

Prepared by: Mohamed EL. Sayed Megahed, PhD

Edited by: Obinna Anozie, Mohamed Seisay and Simplice Nouala

Citation: AU-IBAR, 2019. Regulatory Framework and Mechanism for Monitoring the Exploitation and Trade in Ornamental Fish Species in Africa

Published by AU-IBAR, Nairobi, Kenya

ISBN 978-9966-1659-5-4

Requests for such permission should be addressed to:
The Director
African Union – Interafrican Bureau for Animal Resources (AU-IBAR)
Kenindia Business Park
Museum Hill, Westlands Road
P.O. Box 30786
00100, Nairobi, KENYA
Or by e-mail to: *ibar.office@au-ibar.org*

Acknowledgments

The Director of AU-IBAR wishes to acknowledge the contribution of African Union member states, Academic and Research Institutions:- Kenya Marine & Fisheries Research Institute (KMFRI), Oceanographic Research Institute of South African Institute of Aquatic Research, National Institute of Oceanography and Fisheries (NIOF) in the Ministry of Scientific Research Egypt, Ethiopian Institute of Agricultural Research, Water Research Institute of Ghana Association of Ornamental Fish Farmers & Exporters of Nigeria, Afrique Avenir Cameroun; Tunisian Society For Sustainable Fisheries (TSSF); The Private Sector:- Kenya Tropical Sealife, KOLBENSCHMIDT INTERNATIONAL LTD., NIGERIA, Green Algae Highland Fish Farm; Development Partners:- World Wide Fund for Nature (WWF) and Independent Experts. Special thanks go to the Consultant who prepared the document and the team at IBAR for the editorial work. This work was done 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 to whom we are grateful for the financial support.

Table of Contents

Acronyms

AFDB	African Development Bank
AU	African Union
AU MS	African Union Member States
AU-IBAR	African Union Interafrican Bureau for Animal Resources
BMPs	Best Management Practices
C & F	Cost and Freight
CAADP	Comprehensive Africa Agriculture Development Program
CBD	Convention on Biological Diversity
CCIF	Conservation and Community Investment Forum
CCRF	Code of Conduct for Responsible Fisheries
CGRFA	Commission on Genetic Resources for Food and Agriculture
CIF	Cost Insurance & Freight
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COFI	Committee on Fisheries
COMESA	Common Market for Eastern and Southern Africa
DNA	Deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms
DOA	Dead on Arrival
ECOWAS	Economic Community of West African States
EIA	Environmental Assessment
EMS	Environmental Management System
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FOB	Freight on Board,
GATT	General Agreement on Tariffs and Trade
ITC	International Trade Centre UNCTAD/GATT
ITMEMS	International Tropical Ecosystem Management Symposia
IUCN	International Union for Conservation of Nature and Natural Resources
IUU	Illegal, Unreported and Unregulated fishing
KMFRI	Kenya Marine and Fisheries Research Institute

LAR	Live Animal Regulation
IATA	International Air Transport Association
LEMIS	Law Enforcement Management Information System
MFI	Micro Finance Institution
MoUs	Memorandum of Understanding
MS	Member States
NGOs	Nongovernmental organizations
NPCA	NEPAD Planning and Coordinating Agency
OIE	The World Organization for Animal Health
QMS	Quality Management System
R&D	Research and Development
RECs	Regional Economic Communities
RFBs	Regional Fishery Bodies
RFMOA	Regional Fisheries Management Organization
SDGs	Sustainable Development Goals
SPS	Agreement on the Application of Sanitary and Phytosanitary Measures
SOFIA	State of World Fisheries and Aquaculture
SOP	Standard Operating Procedure
SWOT	Strengths, Weaknesses, Opportunities, and Threats
U.K	United Kingdome
UNCTAD	United Nations Conference on Trade and Development
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

Executive Summary

The extensive coral reefs and ornamentals stocks along the coastline of African member states are a valuable wealth of African natural resources. They have a potential to provide an important source of jobs, income, tourism, economic growth, livelihoods and food for a large proportion of the African's communities. Africa supports globally significant marine and freshwater ornamental fisheries biodiversity that is being challenged by random, unorganized fishing practices. Ornamental fisheries trade and market transformation through certification of African fish in the global trade arena can ensure the sustainability, biodiversity conservation, reef management, protected areas and reef restoration of African ornamental fisheries - thereby contributing to poverty alleviation, sustainable livelihoods and food security in the continent.

Currently, there is no overarching system for tracking species-level exploitation import/export data for the ornamental trade. The deficiency of a comprehensive and overarching data relating to the global ornamental fish production and trade hinders progress toward its effective management. We believe that access to more accurate data will allow for increased public engagement in trade sustainability and guide responsible trade management. These data can stimulate actions towards supporting consumer education, addressing challenges such as misidentification, and species management. Ideally this will result in greater sustainability. This is exacerbated by the lack of standardized record keeping between different countries. Coupled with this is the fact that existing data systems are either overly general, based on declaration forms (LEMIS), or specific to the trade of rare and threatened species (CITES).

The AU-IBAR, within the framework of Comprehensive Africa Agriculture Development Program (CAADP), the African Union Agenda 2063 and the Policy Framework and Reform Strategy for fisheries and aquaculture in Africa, has initiated a number of actions aimed at the promotion and exploitation of ornamental fisheries trade, sustainable management and conservation of these valuable resources. These initiatives include 1) capacity building of stakeholders to develop certified ecosystem management; 2) ensuring there is research and scientific assessment and monitoring of coral reefs and ornamentals stocks for management; 3) establishing no-take zones and reef and stock restoration; 4) capacity building of ornamental species collectors to become certified; 5) increasing the financial resources and business skills for collectors to participate in a sustainable trade; 6) increasing the participation of exporters,

importers, and retailers in certification; 7) control unregulated fish collection activities on large areas of coral reef in many African countries to ensure the long-term protection of the reef fish resources and sustainability of the trade, and 8) raising the awareness of, and demand for, certified ornamentals among consumers. These initiatives are very important and act as a baseline for the opportunity to formulate a framework for the exploitation and trade in ornamental fish species in Africa and thus will be acted upon quickly. In order to ensure the successful development of future ornamental fish trade in Africa, there is urgent need to develop a regulatory framework, effective management guidelines and to enforce regulation at a local, national and continental level to ensure long-term sustainability of the ornamental fish trade.

This consultancy report presents an investigation into the ornamental fish trade in Africa and its global potential. It includes a diagnosis of the African and global trade, gathering data about the current status and management of the ornamental fish trade and the socio-economic impacts associated with the trade. A preliminary field study of the biological and socio-economic impacts on coastal communities is also included.

Background

The ornamental fisheries sector is an extensive and global component of international trade, fisheries, aquaculture and development. The international trade in ornamental fish has been recognized as an important fisheries sector to provide employment opportunities for thousands of rural people in developing countries. However, in Africa, the scope of this sector and the impact on human and aquatic communities are often unappreciated and often not accurately known. Ornamental fisheries represent one of the major components of high economic value fish in international trade within the overall fisheries sector. The global ornamental fish trade includes more than 2500 species 60% of the freshwater fish caught in the wild. Freshwater fish species dominate the global market and constitute more than 60 %. The guppy and neon tetra species alone represent more than 25% of the market by volume and more than 14% by value. Marine fish species constitute more than 15% of the market by value, with about 98% collected from the wild while the rest are captive-bred. Technical and economic developments have also helped contribute to the popularity of marine aquariums, especially marine reef ecosystem aquaria complete with fish, corals, shellfish, molluscs and plants. The FAO (2014) global statistics indicates that ornamental fisheries recorded global exports and imports valued at over US$362 million and US$350 million respectively in 2011. Global exports of ornamental fish since 2000 rose steadily from US$177.7 million to a peak of US$364.9 million in 2011. Europe accounted for 27.6% of the total exports of ornamental fish valued at US$95.8 million. At US$25.9 million, South America shared 7.5% of the total exports while North American exports were to the tune of US$13.8 million, sharing 3.98% of the global supply. This was followed by African countries with US$7.6 million (2.2%), Oceania (US$ 4.9 million) and the Middle East (US$1.76 million). The import value for ornamental was US$299 million in 2014. Wholesale at an average of $2.43 per fish. Since 1985 the value of the international trade in ornamental exports has increased at an average growth rate of approximately 14 percent per year. Such a vast and important industry has the potential to contribute to the sustainable development of aquatic resources, but may face challenges due to increased attention to environmental and social issues. Furthermore, statistics estimate that over 1 billion ornamental fish are traded internationally on an annual basis comprising more than 4000 freshwater and 1400 marine species with two-thirds of the exported species originating in developing countries.

The international trade is championed by developing countries located in the tropical and sub-tropical regions. It is important for African countries to properly develop and manage their ornamental fisheries in order to appropriately benefit from its value worldwide. There is a high demand for African ornamental fishes in the region as well as in the international markets. Nevertheless, the potential to create employment is not fully developed although the majority of farmers prefer ornamental fish to food fish due to its high value hence the majority of trade is in the form of live animals (SOFIA, 2016). The industry for ornamental fish includes but is not limited to ornamental fish farmers, aquarium dealers, garden or fountain dealers, zoos or park centers and schools. The Heads of States and Government of the AU in the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods (Doc. Assembly/AU/2(XXIII) committed to boosting Intra-African trade in agricultural commodities (including ornamental fisheries) and services though harnessing markets and trade opportunities, locally, regionally and internationally, and resolved to create and enhance policies and institutional conditions and support systems in order to simplify and formalize the current trade practices. The African Union Interafrican Bureau for Animal Resources (AU-IBAR), responsible for providing leadership in the development of animal resources (including livestock, wildlife and fisheries) in Africa was urged by the Heads of State and Government to facilitate the above mentioned commitments. Its mandate is to support and coordinate the sustainable development and utilization of animal resources to enhance nutrition and food security and contribute to the wellbeing and prosperity of the people in the AU MS. The AU-IBAR in collaboration with the NEPAD Planning and Coordinating Agency (NPCA) is implementing a Fisheries Governance Project entitled 'Strengthening Institutional Capacity to Enhance Governance of the Fisheries Sector in Africa'. With support from European Union (EU), the project objective is to enhance the contribution of fisheries resources to food security and economic growth in Africa. The project has key activities aimed at enhancing the governance in ornamental fish trade and improving the sector's contribution to poverty reduction and economic development. Thus there is a need for conducting an assessment of the ornamental fish trade and the development of a regulatory framework to facilitate sustainable development of ornamental fisheries to optimize benefits for AU Member States. In line with the above, the AU-IBAR held a consultative meeting involving key experts in the field to elaborate on issues affecting the sector and to identify mechanisms for optimizing economic benefits by ensuring sustainable management and development among AU Member States.

1. Introduction

Africa has substantive resource base that supports the trade of ornamental fishes, and it is not surprising that African ornamental fishes are coloring the global ornamental market. If developed and management well, the trade in African ornamental fish has the potential to become an important revenue source for African nations at large who may be able to compete with countries such as Singapore, Czech Republic and Brazil. Advances in technology of ornamental fish collection and/or cultivation are expected to become a vehicle for accelerating the growth of the ornamental fish industry in Africa. Technology plays a role in improving fish quality, culture production and expansion of trade in unexploited endemic species.

Africa not only has a very high diversity of ornamental fish species as the main capital to become the largest ornamental fish producer in the world, but also has the potential of being a reliable source of cultured species. Besides the native fish of Africa, the small scale farmers are also contributing to the production and variation of ornamental fish by cultivating introduced (exotic species). In Egypt for example, more than 500 introduced species of ornamental fish are produced by fish farmers. The cultivation of exotic ornamental fish not only increases the variation and numbers produced which leads to an increase in economic value, but also provides an ecological value that benefits the conservation and domestication of fish in a controlled environment outside their habitat. However, the introduction of ornamental fish, whether for cultivation and/or trade, often receives criticism from environmentalists due to concerns over impacts on ecosystem integrity.

So far, research has contributed immensely towards advancing new culture technologies for ornamental fish. Thus, the ornamental industry stakeholders should adopt and embrace such new techniques in addition to the provision of information to policy makers to support the development of relevant and effective policies. The existence and adoption of this regulatory framework is expected to provide benefits of information and solutions to advance the African ornamental fish industry.

The ornamental fisheries trade currently is a highly valued provider of employment and income for coastal communities in developing countries. A responsible ornamental fisheries trade could provide a powerful incentive to conserve freshwater, marine water ecosystems

and coral reefs so that they could continue to serve as a sustainable source of community livelihoods. The demand for ornamental fish is increasing at national, continental and international market levels due to several reasons including aesthetics, the pleasure and belief that it brings luck; it helps ease stress and other factors. The earning potential of this sector has hardly been understood and it is not being exploited in a technology driven manner. The majority of the freshwater fish are reared in farms however some species are captured from the wild for trade. The majority of the marine fish are wild caught. Farmers are sourcing different kinds of broodstock for breeding and this is a factor for increased demand. While the fishers have discovered that they are able to earn much higher returns from ornamental species with far less effort, there are serious environmental concerns with regards to habitat destruction, pollution, introduction of alien species and the direct depletion of wild stocks. Ornamental fish farming is possible in all 54 African states, and can be a source of employment and a good foreign exchange earner. Coral reefs and ornamental fish stocks are of global significance with regards to marine biodiversity in Africa. They provide global subsistence and commercial food supplies (e.g. providing food to over 350 million people in Asia alone). Data from the Maldives show that aquarium fish sell for US$ 248/pound while food fish earn only US$ 4.5/kg. In Indonesia, aquarium coral sells for US$ 7,000/tonne, while only US$ 60/tonne is paid for coral harvested to make lime for construction. The sector is faced by a number of challenges such as:

- Lack of research into the availability of indigenous species which has resulted in increasing overdependence of exotic ornamental fish species as well as loss of benefits due to commercial culture of ornamental fish conducted overseas;
- High mortality;
- Biosecurity risks with the introduction of new species;
- Few quarantine procedures;
- No research into diseases and parasites and disease free trade;
- Lack of traceability;
- Lack of certification;
- Little sustainable management along the supply chain;
- No clear policy and regulations to develop this sector so investments are still concentrated on fish for food production;
- Uncoordinated market structure of ornamental fish and limited access to markets and value enhancing practices;
- No standardized transportation practices combined with high or expensive freight charges;

- Inaccuracies and/or unavailability of data on ornamental fisheries;
- Overharvesting of juvenile fish;
- Overall sustainability of the trade;
- The possibility of crossbreeding of ornamental fishes (gold fish and Koi carp); and
- Habitat degradation, etc.

Genetic conservation of wild and farmed relatives of ornamental fish is an emerging and very important issue to conserve African wealth and will play a vital role in the branding of African resources in international trade. One of the largest threats to African biodiversity is overfishing which is exacerbated by illegal and destructive fishing practices. Although there legislation in place, enforcement and education are in place to address illegal fishing, still occurs because these practices are widespread and overwhelm the capacity of government and conservation organizations to address them. The pressures exerted on marine biodiversity are attributed to population growth; poverty and limited economic opportunities; institutional and policy issues; limited enforcement of existing regulations; public and stakeholder awareness and involvement; and limited information for management. Unlike commercial food providing aquaculture ventures that require large investments and sizeable amounts of space with limited numbers of species that have long grow out periods, ornamental fish rearing can be undertaken in relatively small spaces with small investments, producing many diverse species that are sold off quickly as juveniles. This can make ornamental fish rearing very profitable.

Therefore, there is a need for market and trade transformation on a large scale using an approach that combines private sector incentives with government policy and regulation. Fortunately, in some African MS, the relevant policies and regulations are already in place. What is lacking is a system of sustainable private sector incentives that encourages and requires fishermen to comply with regulations for their own benefit. A public-private partnership is needed to solve the fundamental problems facing the sustainable exploitation of ornamental fisheries in Africa. This requires the development of government policies and regulations to assist the private sector to participate effectively in the exploitation of African ornamental fisheries for global trade. Lack of enforcement, combined with the lack of incentives to obey the law, has led to the dramatic and well-documented decline in the health of marine and freshwater ecosystems in Africa. Taking into consideration the valuable and diverse resources of Africa, countries can possibly explore the development of tourism to areas that are of importance to ornamental fish populations as an incentive to move away from destructive fishing practices. Marine protected areas (MPAs) are not only ecologically successful but

economically sustainable through user fees paid by tourists. Overall, though, there is a need to identify sites and collection areas for ornamental species in the African MS and quantify their sustainable harvest levels. Considerations on the potential ecosystem impacts of exploiting target species are needed to avoid ecosystem imbalances and overexploitation. The fishing method also needs to be considered to determine if there will be negative impacts in the primary productivity of the ecosystem.

For sustainable exploitation and trade in ornamental fisheries in Africa to take place, the following eight conditions should be implemented:

1. Research to assess the status and dynamics of wild caught populations including their distribution to guide the setting of sustainable harvest strategies; and on the cultivation of ornamental species including identification of suitable culture species as well as the improvement of husbandry practices;
2. Development of national/regional online database on Ornamental Biodiversity and Trade Flow (includes; species name, species quantities, country of origin, port of entry, and city of import destination) and), which will act as a public portal offering anonymized live ornamental fisheries trade data.
3. Dissemination of data and information on the volume and diversity of marine and freshwater fishes and invertebrates imported and exported on country, region and continental level;
4. Establishment of minimum standards on best practices along the ornamental fishery value-chain for both wild capture and culture;
5. Establishment of certification scheme for ornamental fishery products, so that consumers can chose responsible operators and sustainable products and thereby create private sector incentives that encourage and require collectors to shift to sustainable production and handling practices;
6. Development of a traceability system to track ornamental fishery products from source sites and to verify collectors and companies that comply with best practices. Effective tracking systems for tracking CITES and non-CITES-listed ornamental animals to produce meaningful data that can move the trade toward sustainability and conservation. Monitor ornamental trade pathways (electronic monitoring system) in real-time, as this is crucial to effectively assist the management of the trade of ornamental wildlife for the home ornamental industry. This allows monitoring the trade and will be a huge step toward driving positive change in the trade;
7. Provide sufficient and timely resources to support the implementation of proposed actions; and

8. Thus it is important that policies and regulatory frameworks are put in place for sustainable development and management of the sector and most importantly for the ornamental fisheries to be incorporated in the overall fisheries management frameworks.

The main focus of this consultancy report is transforming the ornamental fisheries trade through certification in areas where ornamental fish harvesting is already being undertaken for the market demand that already exists.

1.1. Objectives

The overall objectives of the consultancy were to carry out an assessment of the ornamental fisheries and develop a regulatory framework to facilitate sustainable development of ornamental fisheries to optimize benefits for AU Member States. Also, to transition the ornamental fisheries trade of the African MS towards ecological and economic sustainability using conservation, management measures and rehabilitation to ensure the health of ecosystems and their contribution to poverty alleviation and food security. The specific objectives are to:

i. Identify priority actions at national and sub-regional levels to improve the contribution of ornamental fisheries to the African Accelerated Agricultural Transformation goals; and
ii. Identify and consolidate critical issues that would constitute the measures in a regulatory framework and monitoring mechanism for exploitation and trade in ornamental fisheries.

2. The status of global ornamental fisheries trade

The trade in live ornamentals has grown into a major global industry. Millions of ornamentals fishes and invertebrates are harvested from natural habitats each year. A considerable and stable market exists for ornamental fisheries and pond fish in the global market. In comparison with the food fish market, the ornamental fish market is small. However, the distribution of benefits runs much deeper than most branches of the fishery industry as collectors and small and medium scale breeders form the backbone of this industry in many developing countries, including Africa. Due to relatively higher costs of land and labour and seasonally occurring sub-freezing temperatures, developed countries in the West find it cheaper import these species from the tropics. With year round tropical temperatures, reasonable costs of intelligent and trainable labour, African countries have the opportunity to create employment opportunities and earn much needed foreign exchange for their economies. In many countries, which were reliable internal markets for tropical fish have started re-exporting tropical fish

to already established markets in the same region. The most important markets for tropical ornamental fish are the countries of the Western developed world. Fifty percent of the global market is held by just 7 countries, with the United States of America being the largest single importing country covering 12% of the global imports. The United Kingdom comes close behind with 10% of the global imports. It is interesting to note that Singapore, which is the largest exporter of this product also accounts for 6% of the global imports. Within the European continent, Germany, France and the Netherlands are the leading markets for this commodity. Italy, Hong Kong (China) and China are the three countries coming into this group of ten largest importers of tropical fish. .Singapore, the largest exporter of tropical fish to the global trade, caters to about 17% of the total global business in tropical fish. Though Japan comes second with 10% of the market value, it is yet to be understood whether it ships a corresponding volume of fish as per the industry average or whether it is due to the high value of selected carps being exported. As expected the Czech Republic has grown to be the third largest exporter of tropical fish. The Czech Republic is not competing with other exporters, but plays the role of a gateway to the major markets. While Indonesia is well known for its marine fish and invertebrates (including cultured corals), Thailand, Malaysia and Israel are the major suppliers of freshwater bread and butter varieties of the trade. Brazil has become well known for its wild caught cardinal and neon tetras, discus fish and many of the specialties from the Amazon.

3. *The status of African ornamental fisheries trade*

Despite the recent growth and diversification of the ornamental fisheries trade, to date, data collection is not mandatory, and hence comprehensive information on species volume and diversity is lacking. This lack of information makes it impossible to study trade pathways. Without species-specific volume and diversity data, it is unclear how importing and exporting governments can oversee this industry effectively or how sustainability should be encouraged. Example of African countries exporting ornamentals to the United States (US) presented in Table 1.

Table 1: *African countries exported ornamental fishes and invertebrates to the US*

Countries	Year	Number of exported fish		Number of exported invertebrates	
		Species	Individuals	Species	Individuals
Egypt	2011	20	953	-	-
Eritrea	2008	52	9,506	-	-
	2009	44	3,986	-	
Ghana	2008	19	509	3	2,395
	2009	-	-	3	35
	2011	22	708	3	768
Kenya	2008	173	144,211	18	13,955
	2009	210	139,129	17	44,426
	2011	186	101,910	1	14,750
Mauritius	2008	63	823	1	198
	2011	41	680	-	-

4. SWOT analysis of African ornamentals fisheries trade in Africa

In the trade dealing with live ornamental fish, the producer should make themselves familiar with all opportunities and threats in order to be able to take advantage of the visible and less visible opportunities and to avoid the hidden pitfalls with which every entrepreneur, be it a breeder, exporter or wholesaler, has to deal with some day or other. The SWOT analysis is reproduced in Table 2.

Table 2: *Policy related emerging issues must be addressed by the capacity development program*

Strengths	Weakness
• The strength and success of the wild caught ornamental fish sector lies in careful handling of the catch from the fishermen to the exporters, giving the fish the opportunity to recover from the change in their environment; • The strengths in the industry in general as changing social structure in the industrialized countries, freshwater species that can be introduced for commercial production, regular supply of up to date pricelists complete with exact scientific name of fish species and varieties, knowledge of winter and summer period in importing countries, etc; and • The strengths of the ornamental fish industry of Africa as favorable year round climatic condition, excellent geographic location, recognized international reputation for quality fish and widely distributed financial institutions.	• Backwardness in competitive position, obsolete facilities, lack of quality product, falling behind in research and development, weak market image, missing key skills or competencies, small cultured fish species portfolio, lack of an association among the channel members; and • Lack of technology transfer, poor knowledge on diseases, poor knowledge on advanced breeding techniques and insufficient air cargo facilities.
Opportunities	**Threats**
Opportunities that are in store for the marketing of indigenous ornamental fishes include, entry to new markets or segments, enhancement of species portfolio, faster market growth, culture of threatened or vulnerable ornamental fish species, increased awareness of environmental issues and consistent quality among international buyers; and	The possible threats in supporting and maintaining the sector over a long term include over-exploitation of the natural populations of commercial species, destructive collection methods, high post-harvest mortalities, introduction of chemicals, price cutting among domestic producers and importers, introduction of non-native organisms, adverse government policies;

Opportunities	Threats
• There are opportunities in African ornamental fish industry as international buyers are aware of African fishes and the wide variety of wild collected fish species and breeding of indigenous fish species.	• Some African fisheries have over-exploited wild resources, lack of expertise on disease identification and treatment, rapid urbanization and environmental degradation, chemical pollution and quality control and various types of predators; and • Restrictive import barriers to Africa for ornamental fishes do not facilitate the breeding of large varieties of exotic fishes even though there are good breeders on the continent.

5. *Marketing of indigenous ornamental fish*

In the global ornamental fish trade, the importers place orders for bulk quantities and look for standard, uniform sized fishes. Marketing of indigenous fishes can be enhanced, only if there is a recurring supply of standard sized fishes for which breeding of species has to take place.

5.1. Channels of distribution in indigenous ornamental fish marketing

It is necessary to identify the channels of indigenous ornamental fish marketing in Africa. This requires, study the profile of the marketers, compare some of the infrastructural facilities of the marketers, observe the methods adopted by marketers for gaining market information and examine the major constraints faced or anticipated by the marketers in the exporting of indigenous ornamental fishes. Identified issues of channels of distribution in indigenous ornamental fish marketing were:

i. The resources of some African countries are very great, but the country with the most limited resources has been the most successful in ornamental trade viz., Singapore and has been achieved a fair degree of success in the export trade;

ii. The factors which determine a successful enterprise in ornamental fishes as skilled collectors or fishermen, good supply lines, adequate and cheap transport, proper technology, investments and airfreight facilities to the target markets;

iii. The Singapore's excellent logistics hub played a pivotal role in elevating the country's position as the world's major ornamental fish exporter;

iv. The commodity number '1024' of IATA (International Air Transport Association) gives a detailed description of what could be carried as live tropical ornamental fish which also includes ornamental plants and invertebrates; and

v. Live animal regulation (LAR) of international air transport association (IATA) (LAR IATA, 1993) put forward the packing methods of ornamental fishes for export. Detailed the shipping practices in the ornamental fish industry and provided guidelines for growers

on choosing an airline carrier, selecting shipping bags and boxes and determining how densely to pack fish, by species.

6. *Value chain of the ornamentals fisheries trade at global and African MS levels*

Ornamental fish markets received supplies from domestic producers and external sources. Since the domestic production is unorganized and scanty, ornamental fish traders in most African MS depended heavily on external supply. Therefore, the market dynamics becomes complex and demands active involvement of various intermediaries to facilitate market transactions between sellers and final consumers. There is a need to conduct study and analysis on the value chain domains in African MS. The study would also unearth constraints that influence the production and trade of ornamental fishes. This study and analysis together would determine the social adaptability of ornamental fisheries in African MS, including the need to:-

- Conduct detailed enquiry into the factors influencing the demand for ornamental fishes in Africa;
- Examine the bio-technical and social organization practices of different ornamental fishery systems; and
- Conduct detailed analysis of various modes of marketing and their economic viability. The analytical framework for understanding economics of ornamental fisheries in African MS must involve rich picture of the demand and supply of ornamental fishes in Africa.

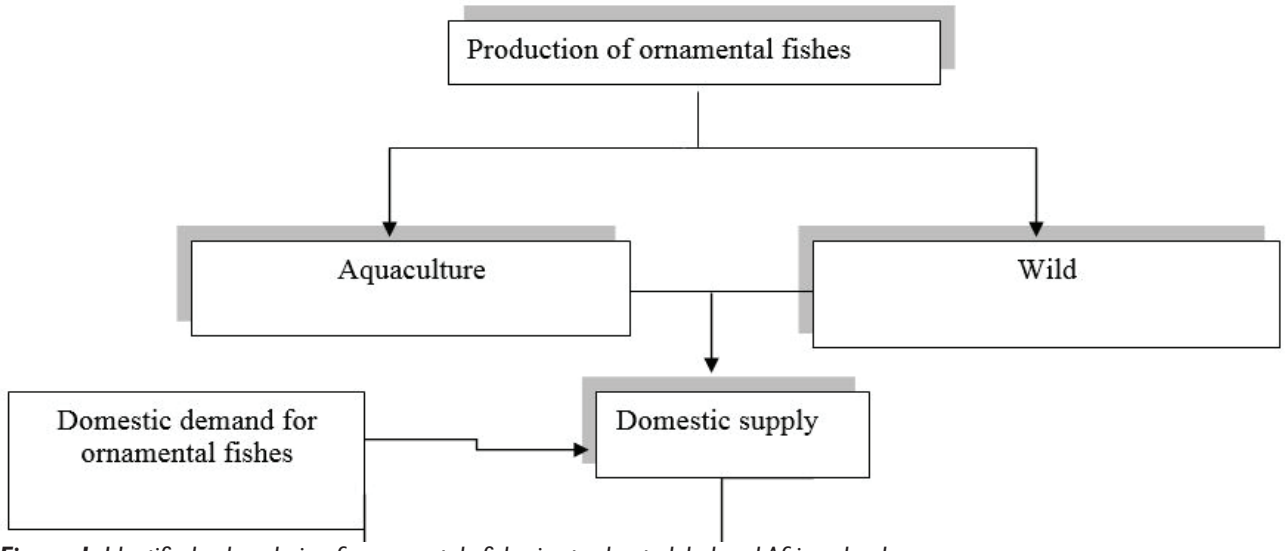


Figure 1: *Identified value chain of ornamentals fisheries trade at global and African levels*

6.1. Interventions in the value chain

This intervention matrix suggests different areas along the value chain that could be entry points for government or potential investors into the ornamental fisheries industry. The intervention matrix along the value chain is reproduced in Table 3.

Table 3: *Intervention matrix along the value chain in the ornamental fisheries industry*

Area of strengthening	Suggested interventions	Responsibility
Human resources	• Countries should hire enough technical persons to assist farmers/collectors with extension work.	• Country Chairperson, District Production Officer.
Technical capacity	• There is need for setting up a propagation center or hatchery in the districts to enhance capacities of ornamental fish farming centers; • Utilization of extension services to enhance sustainability by ornamentals collectors.	• Ministries of Agriculture and fisheries; • Research Institutes.
Marketing of ornamentals	• Local and exporting governments have to provide all technical assistance to enable farmers/collectors produce enough to sustain the demand on the existing and new markets; • Strengthening of already existing farmer co-operations.	• Ministries of Agriculture and fisheries; • Farmers/Collectors.
Farmers/Collectors groups	• Establishment of collector/farmer groups or associations to ease the process of obtaining financial assistance and marketing of collected/farmed ornamentals; • Farmers/Collectors could join the already existing farmer groups.	• Farmers/Collectors.

6.2. Profile of the indigenous ornamental fish marketers

- High percentage of indigenous ornamental fish marketers supplied fishes in the domestic market itself and very low percentage exported the fishes; and
- The marketers of indigenous ornamental fishes of Africa preferred marketing in the domestic market reasons for which may be attributed to the lack of awareness of the export market potentials or hesitancy in taking the risk of exporting.

6.3. Infrastructure, quality and regulations in marketing

It is important to study the channel aspects relating to infrastructure (transport and storage), quality (quality problems and precautions) and regulations affecting the indigenous ornamental fish marketing. The following items were identified:

i. Transport facilities must be used by the marketers

- Fast delivery in order to reduce the mortality rate should be the prime aim of the channels of the trade in perishable products such as fishes, keeping in view always the

need to reduce the transit time to the barest minimum as delay cause oxygen scarcity resulting in suffocation and death of fishes.

ii. Storage or holding facilities

- Larger exporters particularly those who have regular weekly shipments to the same buyer maintained a stock of key species as they had sufficient holding facility;
- Post-harvest survival and post-shipment survival can be maintained only if infrastructural facilities are improved and marketers maintain a specified holding area for the quarantine and holding of the fishes; and
- Due to the lack of sufficient holding space the marketers were compelled to dispose the fish that reached them at throwaway prices which in turn result in the crashing down of the price of the indigenous ornamental fishes of Africa.

iii. Quality of indigenous ornamental fishes

- Quality has been defined as perceived superiority or excellence in a product as compared with the competing alternatives from the perspective of the market place. International markets have started demanding evidence of quality standards or an assurance through certificates from quality standards organizations of international repute and governments of respective countries, through ISO 9000 or similar quality systems;
- Singapore possesses progressive fish farms which are certified by ISO 9002 Quality Management System (QMS) and ISO 14001 Environmental Management System (EMS); and
- In the ornamental fish industry there were standards for acceptable losses during air transport and the exporters were expected to compensate their customers when the dead on arrival (DOA) rate exceeded 5%. DOA and its claims varied depending on importers. Loss of fish in transit up to 5-10% were ignored but above that it had to be generally borne by the trade i.e., exporter, even if the responsibility may sometime be of the airlines or any other sources.

iv. International regulations in the marketing of ornamental fishes:

- CITES formed in 1973 (CITES, 2000) is an international treaty that protects endangered and threatened species of animals and plants from overexploitation by regulating their international trade and operates through an import - export permit system. Species are listed according to their conservation status as Appendix I, Appendix II and Appendix III. Appendix I involves species in danger of extinction and all commercial trade is prohibited. Appendix II comprises species vulnerable to overexploitation for which commercial trade should be regulated so that they will not become threatened

with extinction;

- The marketers must deal with Appendix II listed fish of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Most of the marketers had not dealt with any CITES regulated fishes. Apart from Scleropages formosus, none of the fresh water fishes of the world or Africa were listed in CITES.
- Regulated trade is allowed the exporting country has issued a permit that includes a finding that the trade will not be detrimental to the survival of the species or its role in the ecosystem;
- The marine species whose trade is regulated by CITES are included in Appendix I and II. All great whales, all marine turtles, seal species and coelacanths are included in Appendix I. The freshwater Sclerophagus formosus is the ornamental fish included in Appendix I. All dolphins, basking shark, whale shark and all sturgeon species. Queen conch, all giant clam species, seahorses, all stony coral species and all antipatharian (black coral) species are included in Appendix II. Appendix III includes species for which a country needs the cooperation of other countries in order to control international trade to complement domestic regulation, from all other countries; and
- International Union for Conservation of Nature and Natural Resources (IUCN, 2004) listed 1500 species of the world's fishes (both freshwater and marine) as having been assessed for their conservation status. In the list, 1135 fishes are fresh water fishes and 477 were marine fishes.

v. Methods adopted by marketers for gaining market information

- To increase the fishes in the product line and to formulate better marketing strategies, marketers need to equip themselves with the latest market information (to find the purchaser, for demand assessment and for deciding the quantity to be collected).

vi. Methods adopted in finding purchaser for indigenous fishes

- Through websites;
- Through personal contact; and
- Trade fair attending.

vii. Methods adopted for demand assessment

- Marketers generally adopt a number of methods for demand assessment such as past sales pattern, market research, consumer survey and own judgment; and
- A market research survey prior to such investment would represent a small increment in cost, yet yield significant information to reduce the risk of the new species not being capable of establishing itself in the marketplace against other competitive products. Market research and customer surveys are indispensible before beginning~ business

venture, particularity fish and live fish marketing. Since any fault or incorrect decision can lead to large financial losses.

viii. Major constraints in exporting indigenous ornamental fishes

- Lack market information;
- Difficulty in consignment filling;
- Institutional finance;
- Language problem;
- Lack flight facilities;
- Mortality risk;
- Cargo rate high;
- Export barriers and tough export procedure; and
- The non availability of breeding stock, lack of scientific training on breeding techniques, feeding and health care, inadequate transport facilities and poor marketing strategies which affect the ornamental export from Africa;
- Approximately 40% of the total cost is contributed by freight.

6.4. Price of indigenous ornamental fishes of African MS

- Pricing of the products is influenced by the market demand, cost of production and the competition prices. In the case of ornamental fishes, prices are quite variable for different body sizes and colour varieties;
- In the domestic market, indigenous ornamental fishes are priced as (whole sale) and per pair (retail). Export prices for ornamental fishes are always quoted in US dollar per fish. This requires finding the pricing factors and pricing methods employed by the indigenous ornamental fish marketers and listing the average unit value (FOB price) fetched by the indigenous ornamental fishes of Africa in the international market and to classify the indigenous ornamental fishes of Africa based on FOB price;
- FOB (Freight on Board), CIF (cost insurance & freight) and C & F (cost and freight) are price quotation terms used when the prices in international markets are offered or quoted;
- The pricing methods are (cost plus; market price/competitive price; premium price; penetration price);
- Indigenous ornamental fishes of Africa were classified into high priced (FOB price equal to 2 or above 2 dollars per fish), medium priced (between 0.6 to 2 dollars) and low priced fishes (less than 0.6 dollars). The fishes fetching an were classified as high priced, as medium priced and as low priced fishes.

6.5. Promotion of indigenous ornamental fishes

- Promotion is concerned with telling the target market about the right product and promotional activities contributed to higher export sales levels;
- Promotion tools in indigenous ornamental fish marketing were (Trade journals; Brochures; websites; Hoardings);
- Sale promotions (Trade fair; Price discounts; Trade fair & discounts; Trade fair & samples free gifts);
- Promotion by public relation (Publications; Events; identity media and events & identity media);
- Promotion by providing centralized infrastructure facilities to promote ornamental fish breeding and marketing of exportable varieties of ornamental fishes by setting an aqua park with research and development units near International Airports; and
- The School and faculties of fisheries and aquaculture must take the pioneer attempt in ornamental fish promotion through exhibition, websites, compact disc, public relations through, classes, and trainings, to create awareness among the people on the prospects of marketing the indigenous ornamental.

6.6. Prospective export markets for indigenous ornamental fishes

- The marketers of the indigenous ornamental fishes of Africa cater their products to both domestic and export markets. Firms move beyond the domestic market into the international trade due to the strong demand for wide variety of consumer products in the developed countries. ITC, UNCTAD/GATT report stated that, when domestic breeding costs in principal markets raised sharply since 1973-74, many developing countries got the opportunity to increase their ornamental fish export; It is essential to understand the areas of consumer benefits (values) in terms of the physical characteristics of the live good (i.e., different species and types of fish and their characteristics and so on.), ideas or image characteristics and related services etc.; and
- In Africa the lion's share of the trade in the market is in exotic fishes and the demand for varieties kept changing over time due to changing preferences and attitudes of consumers made the domestic ornamental fish market a dynamic one;

7. Demand for ornamental fishes and factors influencing household demand

Ornamental fishes are purchased by households and non-households like educational institutions, hospitals and hotels. The demand for ornamental fishes has been influenced by its own price, price of substitutes, income, age, sex, occupation and living conditions of consumers, events like exhibitions, holidays, area of living, population, climate, different fish characteristics such as variety, size, colour etc.

7.1. Factors influencing demand for ornamental fishes

The analysis of socio economic features revealed that majority of consumers were new to this hobby and they belonged to middle income group. The analysis of qualitative factors like colour, size, and variety confirmed that these factors influenced demand for ornamental fish, other than the price of individual varieties. Factors influencing demand for ornamental fishes were identified as follow:

- Social factors: family, events, holidays, trade fairs, exhibitions, psychological influence;
- Consumers taste and preferences: colour, variety, size of fish, shape compatibility, movement, feeding habit;
- Characteristics of traders: price of fish, price of substitute, marketing strategies and advertisement expectation;
- Demographic features: degree of urbanization and climatic features;
- Government policy: development programme, loans, and subsidies/tax; and
- Socio-economic characteristics of consumer: income, age, experience, sex, living conditions, aesthetic sense of buyer.

8. Classification of ornamental fish producers

Ornamental fish producers in Africa could be classified into three broad categories: fish collectors, breeders and rearers (Table 4). Individuals who collected ornamental fish from local water bodies, fresh, marine and brackish water are indigenous fishers. Breeders can be engaged in on a full time basis and knew breeding techniques of almost all fishes or part time breeders who are usually non-professionals engaged in the fishery on part time basis, who knew only the breeding techniques of limited variety of fishes, mainly livebearers. As breeding was a risky and required skill, most of the ornamental fish producers concentrated on rearing.

Table 4: *Classification of ornamental fish producers*

Ornamental fish producers				
Indigenous fish collectors	**Breeders**		**Rearers**	
Full time collectors / part-time collectors	Full-time breeders	Part-time breeders	Seed from local producers	Seed from traders

9. Social organization of ornamental fish culture

The industry has been traditionally organized by local communities, in extremely diversified ecological and economic conditions. Social organization of ornamental fish production has been influenced by ownership patterns, modes of granting and regulating access to the production systems, involvement of family members in fishery operations, occupational mobility, and educational level of farmers and modes of payment.

9.1. Occupational shift

Based on structured questionnaire undertaken by the consultant Dr. Mohamed Megahed between 2008-207 in the Northern Africa region and work experience in Indonesia, the ornamental fish industry being a cottage industry employs large numbers of people directly and indirectly for the production of feed, medicine and net making. Ornamental fish culture was also the best means of alternate livelihood for fishermen. Some people undertook ornamental fish farming during peak season as a sub occupation and they shifted back to their occupations (agriculture, quarry mining, wage work, livestock, own family business etc.) as and when such activities resumed. Majority of ornamental fish farmers are those who have shifted from food fish culture or due to business failures or unemployment. Education level of the farmer played a major role in the development of ornamental fisheries. Most farmers require training to gain maximum knowledge and to gain the capacity to face risks in production.

10. Distribution of quantity and value of different varieties of ornamental fishes under various production systems

- Livebearers, angels, Tiger barb, Oscars and gold fish were the major ornamental fish varieties cultured by the farmers in Africa;
- The major production costs in ornamental fish culture were for construction of farm, stocking seeds and brooders, labor, feeding, electricity and fuel;

- The costs varied from country to country because of the differences in climatic and topographical conditions, differences in technology, distance from markets and input prices; and
- Lack of technology know-how, breach of sales contract and price cuts dictated by traders restricted producers from experimenting with new varieties.

11. Organization of ornamental fish markets

Most of the aquarium shops in Africa are multi-product outlets selling ornamental fishes, aquarium plants and related accessories, birds and other pet animals. Ornamental fishes traded in various markets in Africa arrived from local producers and from exotic species.

11.1. Classification of traders

- Local ornamental fish traders are classified into wholesalers, wholesaler cum retailers, consolidators and retailers;
- Wholesale trader (wholesaler) procured ornamental fishes in bulk quantities both from local and outside sources and supplied to sub agents like wholesaler cum retailers and retailers;
- Wholesale cum retail traders (wholesaler cum retailers) sold more quantities to retailers and few quantities to consumers; and
- The consolidators are a special category of wholesale cum retail traders, who purchased ornamental fishes in bulk according to the needs of a group of retailers.

11.2.Marketing strategies

Even though seasonal factors, ethical considerations, income, status of consumers, market intermediaries, risks, uncertainties, legislation and governmental pressures affected pricing, the most relevant among them was the competition from fellow traders. Different marketing strategies like price cuts, diversified product mix, introduction of new variety and improved quality were adopted by traders.

12. The needs and opportunities for ornamental fisheries trade, market and industry transformation

- Harnessing private sector incentives to complement government policy and regulation;
- When undertaken responsibly, harvesting ornamentals alleviates poverty and supports sustainable livelihoods by providing one of the few potentially sustainable local industries in rural coastal villages that have few other options for generating income;
- Capacity building and training of ornamental fish collectors and companies will help them to employ responsible practices; and
- Conserving and protecting critical habitats and ecosystems for ornamental fisheries, especially those from the wild.

13. Strategic priority areas

Strategic priority areas were identified by participants from different African MS at the meeting of the task force on African ornamental fisheries to formulate regulatory framework for the exploitation of ornamental fisheries in Africa 18-20 July 2018, Kigali, Rwanda. These priority areas were detailed in Table 5.

Table 5: *Strategic priority areas for transformation of ornamental fisheries sector in Africa*

Constraints/Issues	Opportunities	Priority strategic actions	Objectives	Geographical scale
• Lack of adequate research and information sharing • Limited information and identification on available species in Africa. • Lack of public awareness on ornamental fisheries • Lack of adequate stakeholders engagement	• Presence of adequate human capital (operators) in ornamental fisheries in Africa. • Presence of research institutions and institutes of higher education in Africa. • Existing relevant RFBs, RECs, national institutions and networks in ornamental fisheries management. • Existing private public partnerships in ornamental fisheries industry.	• Undertake research and capacity building in ornamental fisheries. • Build capacity of AU member states to carry out research on ornamental fisheries and disseminate the findings/ information/ results and publish the same. • Establish of a data base for ornamental fisheries by MS and the same shall be harmonized at the African level by the AU.	• To provide adequate information to inform policy making, planning, development of legal support and sustainable management of ornamental fisheries in Africa. • To create awareness about ornamental fisheries and its contribution to socio-economic growth • To foster and enhance more collaboration and partnerships among the stakeholders along the	• Continental Level • Regional Level • National Level

Constraints/Issues	Opportunities	Priority strategic actions	Objectives	Geographical scale
	• Existing fisheries cooperatives/ associations. • Existing awareness.	• Establish/ Strengthen strategic partnerships in the ornamental fisheries sector. • Allocation of adequate funds by MS for ornamental fisheries development. • Popularize and train, raise awareness about the merits of the existing potential of the ornamental fisheries sector in Africa.	ornamental fisheries value chain. • To improve the knowledge of the sector.	
• Governance issues • Lack of a comprehensive legislative framework on ornamental fisheries trade. • Anti-ornamental fish trade legislations/ regulations in Africa • Absence of specific governance of the ornamentals sector	• Existing agencies in Africa that guide in the provision of legislative framework on ornamental fisheries in Africa. • Existence of international legal instruments and institutions that govern ornamental fisheries (CITES, FAO Agreement on Port State Measures, FAO CCRF, WTO /SPS etc.) • Existence of a Taskforce mandated to develop the regulatory framework of the ornamental fisheries in Africa. • Existence of the policy framework and reform strategy for fisheries and aqua-culture in Africa (the process of alignment of national policies in ornamental	• Enactment of legislation/ regulations that promote ornamental fisheries trade in Africa. • Domestication of international legal instruments on ornamental fisheries by MS. • Strengthen the capacities of institutions and actors Organize professionals and actors in the sector.	• To provide a comprehensive legislative framework that governs ornamental fisheries in Africa. • Coordinated decision making. • Harmonization of policies.	• Continental Level • Regional Level • National Level

Constraints/Issues	Opportunities	Priority strategic actions	Objectives	Geographical scale
	fisheries in Africa.) • Setting up participatory decision-making structures			
• Environmental pollution and degradation	• Existence of national and international institutions and legislative framework that govern environmental issues.	• Political will to enforce existing environmental laws by MS • Strengthening of existing environmental institutions, tools and laws. • Adopting and applying best practices in environmental conservation and protection including EIAs, spatial planning, protected areas, precautionary approach and polluter pays principle.	• To secure, protect and conserve the ornamental fish habitat in Africa	• Continental Level • Regional Level • National Level
• Trade Issues • Lack of a level playing field in the intra-Africa ornamental fish trade. • Fiscal barriers to trade(double taxation) • Lack of standardized procedures/ specifications (quality of fish/ health standards, packaging materials)of operation in the ornamental fish industry • Weakness and inadequacy of the regulation of the ornamentals sector.	• Existence of experienced players in the ornamental fisheries industry • Existence of varies species of ornamental fish. • Existence of markets for the ornamental fish trade. • Harmonization and regulatory coherence	• Enforcement of continental and regional trade agreements that guarantee free trade and movement of ornamental fish • Inclusion of ornamental fish trade in inter-country trade laws by AU • Establishment of a Continental and regional trade information system. • Harmonized certification, packaging and standards of procedure at the national, Regional and continental regions. • Legislate, regulate and harmonize the regulation of the sector by taking	• To promote free and fair trade of ornamental fisheries. • Create an environment conducive to the activity.	• Continental Level • Regional Level • National Level • According to regions

Constraints/Issues	Opportunities	Priority strategic actions	Objectives	Geographical scale
		into account the existing regulations system.		
• High operational cost in the fish industry.	• Existence of agencies to support	• Elimination of multiple taxation by relevant national agencies. • Provision of soft loans to operators	• To promote ornamental fish trade in Africa	• Continental Level • Regional Level • National Level
• Lack of adequate capacity in ornamental fisheries • Taxonomy • Infrastructure • Veterinary health services • Awareness creation	• Availability of research institutes • Existence of new methods of identification of fish species (DNA, Barcoding)	• Funding for research institutes. • Undertake inventory of available ornamental species. • Development of species identification guide. • Capacity building on fish health. • Technology transfer/ knowledge • Sharing on ornamental fisheries.	• To develop and enhance capacity, facility and infrastructure of ornamental fisheries in Africa	• Continental Level • Regional Level • National Level
• Ornamental Fisheries conservation (sustainable fishing, precautionary approach)	• Existence of national, regional and continental management and conservation bodies. • Good understanding of the value and importance of ornamental fisheries among the industry players • Existence of tools and best practice for conservation • Existence of aquarium facilities that is an opportunity for ex-situ conservation. • Existence International legal instruments that govern	• Establish data base on ornamental fisheries at national, regional and continental level. • Applying relevant tools that promote conservation of ornamental fisheries(e.g. protected areas,) • Conduct baseline assessment of endemic species. • Promote captive breeding of ornamental fish species. • Training of the ornamental fishers on responsible fishing and best practices. • Establishment of gene banks.	• Provide management options for sustainable utilization of ornamental fisheries resources.	• Continental Level • Regional Level • National Level

Constraints/Issues	Opportunities	Priority strategic actions	Objectives	Geographical scale
	• conservation (CITES ,CBD,FAO CGRFA,CMS)			
• Bio-security issues • Traceability and certification	• Existence of quarantine and veterinary services and custom bodies. • Existence of traceability systems.	• Enhance veterinary service infrastructure • Enhance capacity of fish veterinary doctors on fish diseases. • Strengthen monitoring mechanisms of introductions and escapes to ensure that there are no invasions.	• To promote the health and quality of ornamental fish • To promote conservation of indigenous ornamental species	• Continental Level • Regional Level • National Level
• Inadequate aqua-culture based means of production in ornamental fisheries • Production • Production losses • Marketing	• Availability of facilities of hatchery and fish farms. • Existence of aqua-culture institutions in Africa. • Existence of breeding techniques. • Existence of expertise in aqua-culture. • Tradition of production • Valorization of the value chain • Wealth creation	• Encouragement of aqua-culture based ornamental production in Africa • Enhance research on potential culture candidate species. • Training in aqua-culture of ornamental species • Provide adequate equipment (fishing, transport and breeding) Improve statistics and domesticating species for breeding. • Protection and biosecurity of production • Labeling of African species • The movement of people and goods	• To promote culture based ornamental fish production • To ensure adequate supply of quality ornamental fish for all markets. • To promote foreign exchange earnings on ornamental fish. • To promote conservation of ornamental fish. • Improve production • Ensuring sustainable development • Optimize added value	• Continental Level • Regional Level • National Level

14. Priority actions to improve /enhance the contribution of ornamental fisheries trade to livelihood, economic development and wealth creation

The following priority areas were identified by participants from different African MS at the meeting of the task force on African ornamental fisheries to formulate regulatory framework for the exploitation of ornamental fisheries in Africa 18-20 July 2018, Kigali, Rwanda. These priority areas were detailed in Table 6.

Table 6: *Priority actions to improve /enhance the contribution of ornamental fisheries trade to livelihood, economic development and wealth creation*

Priority Actions	Ongoing Key Actions/initiatives	Geographical Scale
• Undertake research and capacity building in ornamental fisheries. • Build capacity of AU member states (AU MS) to carry out research on ornamental fisheries and disseminate the findings/information/results and publish the same. • Establish of a data base for ornamental fisheries by MS and the same shall be harmonized at the African level by the AU. • Establish/Strengthen strategic partnerships in the ornamental fisheries sector. • Allocation of adequate funds by MS for ornamental fisheries development. • Develop a status of fisherman / breeder of ornamental fish • Build capacity through training • popularize the results of scientific research • Make production inputs and accessories available with customs investment (subsidy) tax benefits • Create an incentive business framework and facilitate access to credit and access to property, • Development of a master plan for the installation of breeding centers including the geographical identification of the land to be allocated, • Expose the psycho-social benefits linked to the aquarium's virtues • Lobbying action for the benefit of the sector.	• Ongoing consultation between the Association of ornamental fish farmers and exporters in Nigeria and Institute of Fresh Water Fisheries Research in Nigeria to conduct demand driven research • Monitoring and research on ornamental fisheries including risk assessment, biology and ecology of the species by KMFRI. • The Kenya Fisheries Services has established a data base for all the fisheries including ornamental fisheries • Ongoing process for the registration of an association of fresh water ornamental fish farmers • Carrying out some studies on the behavior ecology of some ornamental cichlid. • Carrying out assessment of ornamental marine species in captivity • Biology and ecology assessment of fresh water ornamental species. • Creation of a professional committee in charge of issuing professional cards (among others) • Submit professional status to training (fishing, export procedure, shipping standards, biosecurity, etc.) • Make an ornamental fisherman's guide available and the creation of an African exchange and information platform with an evaluation committee, • Put in place an incentive code for investment • Create an African fund for the promotion of the sector and ensured the guarantee of the State • Aquarium creation in public places including hospitals and schools,	(Nigeria; Kenya; Egypt; Zambia; South Africa and Ethiopia) , also applies to the rest of all MS.

Priority Actions	Ongoing Key Actions/initiatives	Geographical Scale
	• Advocacy with relevant institutions facilitate the participation of the ornamental fish working group in the preparatory work for ministerial conferences.	
• Enactment of legislation/regulations that promote free ornamental fish trade in Africa. • Domestication of international legal instruments on ornamental fisheries by MS.	• Developing regulations on fisheries in line with the enacted Fisheries Act. • Ongoing review of the Fisheries and Ocean policy. • Reviewing of Inland and Sea Fisheries Act and the Fisheries policy. • Preparation of the policy and legal framework of aqua- culture. • Review of fisheries law with a provision to develop regulations on ornamental fisheries. • Developing of the national fisheries policy that infers ornamental fisheries. • Developed the Fisheries and aqua-culture policy. • Well established laws that inform ornamental fisheries. • Alignment of MS national policies with the policy framework and reform strategy of aqua-culture in Africa	(Kenya; Nigeria; Ghana; Mozambique; Zambia; Rwanda; South Africa and Egypt), also applies to the rest of all MS.
• Political will to enforce existing environmental laws by MS • Strengthening of existing environmental institutions, tools and laws. • Adopting and applying best practices in environmental conservation and protection including EIAs, spatial planning, protected areas, precautionary approach and polluter pays principle.	• The existence of civil society and lobby groups that advocate for environmental conservation. • Existence of national agencies that enforce enacted environmental laws. • Creation of marine protected areas, community conservation areas, no take zones, marine reserves, closed areas • Existence of a national park for fresh water fisheries • Existence of protected areas • Existence of protected areas and community conservation areas • Existence of marine and fresh water protected areas • Existence of fresh water protected forest areas. • Existence of restricted fishing activities (non-trawling zone) to protect breeding grounds.	(Kenya; Kenya; South Africa; Malawi; Zambia; Rwanda; Ethiopia; Mozambique; Ghana; Nigeria and Egypt) , also applies to the rest of all MS.
• Enforcement of continental and regional trade agreements that guarantee free trade and movement of ornamental fish. • Inclusion of ornamental fish trade in inter-country trade laws by AU. • Establishment of a Continental and regional trade information system. •	• Facilitation of capacity building on trade agreements(SPS) by COMESA • ECOWAS Trade Liberalization scheme(need to focus on ornamental fisheries) • Some MS have their own certification procedures but there is need for the harmonization of these certification procedures.	(COMESA MS ; ECOWAS MS and All MS)

Priority Actions	Ongoing Key Actions/initiatives	Geographical Scale
• Harmonized certification, packaging and standards of procedure at the national, Regional and continental regions.	• Some MS have their own packaging procedures but there is need to harmonize and conform to minimum standards. • Existence of IATA regulations on air transport of ornamental fish.	
• Elimination of multiple taxation by relevant national agencies. • Provision of soft loans to operators	• Signage of Avoidance of Double Taxation Agreement between Kenya and other States in an effort to protect investments. • Existence of JAIZ bank that give interest free loans	(Kenya; Nigeria and Egypt) , also applies to the rest of all MS.
• Funding for research institutes. • Undertake inventory of available ornamental species. • Development of species identification guide. • Capacity building on fish health. • Technology transfer/knowledge • sharing on ornamental fisheries • Create a partnership with international and regional partners to achieve: • Studies and information gathering, • Development of information and extension support • and an informative and informative electronic platform that includes all the necessary resources for the benefit of the sector's stakeholders (ornamental species guide, breeder's manual, research results), • Organization of fairs at continental, regional and sub-regional level • Make knowledge available by all means for the benefit of actors, starting with trainers and extension workers, • Encouraging investment: set up research centers, pilot project of infrastructure at the national and sub-regional level under AU-IBAR supervision, • Promote the financing of the sector by the AFDB and the World Bank and other international financial institutions • Highlighting the potential of the sector	• Availability of funding opportunities at national, regional and global level to support ornamental fish research. • Environmental services of all types • Agent specializations • Public and private actors • The creation of a strong governance body • preservation of production capital • Environmental Protection • Sustainability of the activity over time • availability of fisheries resources • Availability of competent human resources • Availability of water bodies and favorable environment	All MS

15. Conservation of ornamentals genetic resources (farmed species and their wild relatives) in African MS

There is an urgent need for better management – meaning fully integrated use and conservation – of aquatic genetic resources. This will require increased investment in the management of ornamentals genetic resources, commensurate with their high and growing contributions to world food security, keeping representative, free-living wild populations of farmed fish species undisturbed in their natural habitats. Therefore, unless there is equitable sharing of costs and benefits among the stewards and potential users of such aquatic genetic resources, the conservation element in their management will not be achieved. Establishing and maintaining ex situ, in vivo and/or in vitro, fish gene banks is also expensive and will require public and private sector investment and partnerships.

15.1. Documentation of the current status and future prospects for the ex situ conservation of ornamentals genetic resources of farmed ornamentals species and their wild relatives

Specifically;

- Identify existing ex situ conservation of ornamentals genetic resources of farmed ornamentals species and their wild relatives, culture collections and gene banks, research facilities, zoos and aquaria;
- The contributions that various stakeholders are making to the ex situ conservation of ornamentals genetic resources of farmed ornamentals species and their wild relatives;
- Capacity building of personnel working in the ornamentals genetic resources in African MS through training, awareness and knowledge;
- Collection and conservation of valuable and threatened ornamentals genetic resources;
- Documenting the state and trends of the African's ornamentals genetic resources ornamentals genetic resources;
- Identifying major drivers and their direct and indirect impacts on ornamentals genetic resources; and
- Identifying key technologies that can enhance the contribution of ornamentals genetic resources to food security and livelihoods;

15.2. Exchange of ornamental genetic resources and trade flow

i. Top live ornamental fish species exported to the US from each exporting country by year.

- Egypt (2011: Zebrasoma xanthurum); Eritrea (2008 & 2009: Zebrasoma xanthurum);
- Ghana (2008, 2009 and 2011: Balistes punctatus);
- Kenya (2008, 2009 and 2011: Labroides dimidiatus); and
- Mauritius (2008: Amphiprion chrysogaster and 2011: Macropharyngodon bipartitus).

ii. Top live ornamental invertebrate species exported to the US from each exporting country by year.

- Ghana (2008 and 2009: Actinia tenebrosa; and 2001: Lysmata grabhami);
- Kenya (2008, 2009 and 2011: Lysmata amboinensis); and
- Mauritius (2008: Heteractis magnifica).

16. Development of African plan of action for ornamental fisheries genetic resources

In recognition of the tremendous opportunities to increase food production and improve livelihoods from the responsible use, management and conservation of aquatic genetic resources and technologies, the AU-IBAR advise African MS on matters concerning ornamental fisheries genetic resources, and enhance international cooperation on ornamental fisheries genetic resources management. It is necessary to acknowledge the essential role of the AU-IBAR in supporting country-driven efforts in implementing the global plan of action for ornamental fisheries genetics resources. The strategic priority areas and action for ornamental fisheries genetic resources illustrated in Table 7.

Table 7: *Suggested priority areas on ornamental fisheries genetic resources*

Strategic priority area	Actions
1. Inventory and characterize ornamental fisheries genetic resources, and establish country-based early-warning and response systems	
• Develop technical standards for characterization, inventory, and monitoring.	• Encourage the establishment of institutional responsibilities and infrastructure for monitoring of trends in ornamental fisheries genetics resources (population size and genetic diversity). • Develop research and technical standards and protocols for phenotypic and molecular characterization.
2. Sustainable use and development	
• Establish and strengthen national sustainable use policies.	• Review existing national policies and develop, as necessary, that incorporate the contribution of ornamental fisheries genetic resources; including mechanisms, to support wide access to, and the fair and equitable sharing of benefits arising from the use of genetic resources.
3. Conservation	
• Establish national conservation policies.	• Establish or strengthen information systems on breeding approaches as well as on different gene banks, as they affect animal genetic diversity. • Establish institutional structures and policies, as appropriate, including specific measures to conserve species at risk of extinction.

Strategic priority area	Actions
4. Policies	
• Establish or strengthen national educational and research facilities.	• Identify the short-term, medium-term and long-term needs for research and education, and formation of the relevant cadres of experts, nationally or through international training to build the national skill base.
• Raise national awareness of the roles and values of ornamental fisheries genetic resources.	• Provide targeted, effective information through media, public events to raise awareness about the important roles and values of ornamental fisheries genetic resources. • Target audiences include policy-makers, all major stakeholders within the sector and related sectors, and the general public.
• Strengthen efforts to mobilize resources, including financial resources, for the conservation, of ornamental fisheries genetic resources.	• Strengthen coordination of conservation of ornamental fisheries genetic resources at national and regional levels, including through ex situ backup systems for the protection against the risk of emergency or disaster scenarios.
5. Information and databases	
• Information on ornamental fisheries genetic resources in country/region, • Accurate and accessible information on ornamental fisheries genetic resources will facilitate many of the elements of the framework.	• Directory of ornamental fisheries genetic in fisheries and aquaculture including non-native species. • Distribution map of native and non-native ornamental fisheries genetic resources in the wild and on farms. • List and map of significant native ornamental fisheries genetic resources to be protected.
• Information on genetic technologies.	• Directory of acceptable technologies and any restrictions on their use.
• Information on the impacts of farmed ornamental fisheries genetic resources have on society and the environment.	• Monitoring programme on number of farms using a species (or farmed type). • Monitoring programme on impact (positive and negative) of farmed-type on the human well–being and on the environment.
• General information	• Directory of laboratories, institutions and centers of excellence working on ornamental fisheries genetic resources. • Communication plan for dissemination of information to stakeholders and the public. • Single easily accessible database or information system on ornamental fisheries genetic resources.
6. Governance and policy	
• • Effective governance will involve private industry, civil society and consumers and will provide for human and environmental well-being	• • Designation of competent authority to manage and oversee ornamental fisheries genetic resources and the framework and its implementation. • • Ornamental fisheries genetic resources specifically included in national aquaculture/fisheries strategy. • • Incorporate, as appropriate, international instruments that relate to ornamental fisheries genetic resources (such as CITES, CBD, Nagoya Protocol, CCRF) into national legislation. • • Effective and transparent engagement between government departments, private industry and other stakeholders, for among other things, exchange of policy and technical information.
• Infrastructure and equipment – consideration should be given to developing partnerships and take advantage of economies of scale.	• A development plan (including networking and cost sharing arrangements) for access to all required infrastructure that is linked to national strategy. • Research, extension and training centers.
• Capacity building and training.	• Governance, policy and planning. • Enabling the private sector. • Extension service – government and/or academic.

Strategic priority area	Actions
• Enabling the private sector – the private sector will be the long term driver of the development and sustainable use of ornamental fisheries genetic resources.	• Extension service from government, industry, NGO or academic extension agencies. • Forum for industry to be involved in government decision and policy-making,
• Rresource availability in proportion to fishing effort,	• Research on available stock for all species with commercial potential,
• Well developed applied research.	• A multidisciplinary operational research unit at least in each sub region under the aegis of AU-IBAR.
• Put in place a participatory governance structure.	• Establish stakeholder discussion platform.
• Fair trade	• Encourage and facilitate exporting and trade facilities.

17. Veterinary and diagnostic services of ornamental fish diseases

Disease is one of the major impediments to the economic production of intensively reared ornamental fish, finfish, and shellfish and on occasion can lead to the un-sustainability of fishery enterprises. Change in disease incidence is one of the suggested indicators for assessing the performance of the PFRS in the policy area of sustainable management. The following interventions are needed:

- Development of veterinary and diagnostic services and mapping diseases of ornamental fish manual is essential.
- Strengthen the capacity of regional and national veterinary and fisheries services to supervise and implement fish disease prevention and control measures.
- The need to improve the sharing of information on ornamental fish diseases between fisheries departments, veterinary departments and other relevant stakeholders.

18. Intervention activities and outputs for development of ornamental fisheries trade in Africa

The objectives and outputs will be achieved through targeted intervention activities, as described below in Table 8.

Table 8: *Intervention activities and outputs for development of ornamental fisheries trade in Africa*

Intervention	Description	Specific Activities	outputs	Performance indicators	Expected change
Capacity building of stakeholders to develop and implement certified ecosystem management plans.	Baseline socio-economic conditions of the collectors and the community should be documented at the site before interventions begin, including assessing the critically important interest, resources and political will of the local leadership to support and implement reform of the ornamental fisheries trade.	• Gather information on possible sites from national and local government agencies, development assistance agencies, collectors, exporters, and international organizations. • Screen potential sites using preliminary screening criteria, including identification and evaluation of existing marine protected areas (MPAs).	• Initial site descriptions/ profiles. • Report on socio-economic conditions of the collectors and community. • Report on conditions of reef use, including illegal practices. • Report on conditions of ornamental fisheries trade activities in the area.	• Local collectors trained in sustainable fish collection techniques. • Collector trained in business development, logistics, inventory management and community relations. • Communities trained in multi-stakeholder ecosystem management and development of collection area management plans. • Exporters trained in integrated inventory management.	• Significant number of sets of education / certification materials published / distributed in local languages. • Educational workshops conducted at number of cooperatives. • Significant number of communities trained in multi-stakeholder ecosystem management. • Significant number of communities is implementing certified collection area management plans (CAMPS). • Significant number of hectares of collection areas sustainably managed and certified.
Capacity building for management, enforcement and surveillance of collection areas.	The AU-IBAR will provide training for authorities relevant to each collection area to catalyze and develop the capacity and experience of the agency personnel. This will also include capacity building in the legal framework for monitoring, control, surveillance and paralegal training to empower local stakeholders, and community members through workshops in law enforcement.	• Identify national, provincial and local authorities appropriate for management, enforcement and surveillance. • Implement capacity building through support for surveillance and training. • Paralegal training that will include: Enforcement and early warning techniques.	• Increased management, enforcement and surveillance of collection areas. • Improved compliance with the collection area management plan (CAMP) and relevant laws and regulations. • Collectors and CAMP committee members deputized as fish wardens.		

Intervention	Description	Specific Activities	outputs	Performance indicators	Expected change
Ensuring scientific assessment and monitoring of coral reefs and ornamentals Stocks, with results contributing to management	For sites to be suitable for potential certification, a detailed baseline survey will be carried out to collect and document information on baseline conditions of the reef and fishery resources as the basis for management recommendations and ongoing monitoring. Training to local monitoring groups to continue to monitor each collection area.	• Conduct assessment of the collection areas. • Training of local monitoring groups. • Annual monitoring, i.e. re-survey, of certified collection areas.	• Baseline assessment data. • Local groups capable of collecting data. • Monitoring data.	• All collection activities based on sustainable principles and explicit management plans. • All collection areas rigorously monitored.	• Sufficient monitoring completed in each area to assess ecosystem and stocks of key species.
Ensuring the health of certified ornamental fisheries harvest areas through no-take zones, marine protected areas and reef enhancement or restoration	A precautionary approach must be taken to ensuring the sustainability for the ornamental fishery. Every collection area will include at least one and typically, several, no-take areas off-limits to all ornamental fishing to act as reseeding sources for the surrounding collection areas.	• Identify potential no-take areas. • Conduct workshops with collectors and community stakeholders though the CAMP committee to finalize no-take areas • Develop maps, informational materials and boundary markers.	• CAMP with no-take zones established. • Maps and informational materials on location and reason for no-take areas. • Marked boundaries of reserves.	• Effective and well-placed no-take zones established. • Effective and well-place marine protected areas established. • Reef enhancement and restoration accomplished where feasible.	• Significant number of hectares of no-take zones/marine protected areas delineated and established in certified collection areas. • Increased surveillance and enforcement of protected areas. • Reef enhancement / restoration activities conducted at all feasible location. • Significant number of fishermen's village cooperatives participating in conservation, management and rehabilitation activities.
Develop reef enhancement / restoration program for each collection area	If the status of ornamental fisheries stocks is low then the need and opportunity for enhancement of the stocks must be evaluated.	• Evaluate status of stocks and need for enhancement/ restoration. • Evaluate and determine appropriate type of rehabilitation. • Develop and implement site enhancement/ restoration plan.	• Increased reproduction inside and outside collection area. • Increased juvenile and adult fish inside and outside collection areas.		
Facilitate certification of collectors and collection area	At the end of the site capacity building activities, the readiness of the site and collectors for formal third-party certification must be evaluated through a pre-assessment. A gap analysis will be conducted and a series of corrective action	• Undertake pre-assessment visit with Certification checklist. • Conduct gap analysis. • Develop list of corrective actions recommendations and work plan. • Implement corrective actions and re-evaluate readiness.	• Pre-assessment report and corrective actions recommendations. • Site and collectors fully ready for formal Certification assessment. • Certified collection area and collectors.		

Intervention	Description	Specific Activities	outputs	Performance indicators	Expected change
	recommendations produced.	• Certification assessment by independent accredited certifier.			
Monitor standards compliance and provide extension services	Conduct extension work through periodic field visits to monitor compliance for a year. Indication of non-compliance is the basis for possible detailed on-site investigations and extension efforts to correct problems, e.g. through refresher training or on-going skills improvement.	• Conduct periodic site monitoring visits for 12 months. • Monitor collector shipment and delivery records for 12 months. • Provide targeted extension work, e.g. skills and business training, where needed. • Conduct field investigations if necessary.	• Report of 12 month monitoring and compliance record. • Continued and consistent compliance by certified sites.		
Ensuring collectors have sufficient financial resources and business skills to participate in a sustainable trade, and fisher folk livelihoods are enhanced determine short-term cooperative-level capital needs.	The need to provide initial capital to finance infrastructural and working capital start-up costs of the cooperatives, as adopting sustainable practices requires investment on the part of ornamental fish collectors.	• Quantify specific and standard infrastructure needs relative to certification process. • Develop needs assessment framework. • Conduct interviews with collectors once local community organizer has been hired. • Write needs assessment survey for each cooperative to be reviewed and authorized by members / local community organizers.	• A needs assessment document for each collector cooperative. • Detailed information on: collectors, current revenue, current costs, investment needs and available capital sources.	• Collectors have sufficient financial resources to participate in a sustainable trade. • Microfinance providers are linked to certified collector cooperatives to address sustainable livelihood needs.	• Infrastructure and working capital funding needs assessments (e.g., nets, collection stations, local office space, communications needs, transportation, etc.). • Start-up costs for collector cooperatives financed by ending organizations. • Other sustainable livelihood needs are assessed. Microfinance providers (local and international) are integrated into community organizing effort/team. • Substantial microfinance funds available to cooperatives. • Significant number of collectors trained in co-op development and business skills.
Conduct collector training for co-op and business skills	Provide training to assist the collectors to understand and implement the process of forming a working association or cooperative and to develop their business skills, such	• Conduct training and follow up assistance in co-op development.	• Report on the training program and co-ops developed and operating in target sites.	• Ornamentals collectors are fully trained to become certified.	• Significant number of sets of training materials developed, translated into African union languages and distributed.

Intervention	Description	Specific Activities	outputs	Performance indicators	Expected change
	as quality control in developing and maintaining reliable communications and interactions with their buyers and implementing sound and well documented financial transactions. This enhances the understanding of these collectors groups to access and use credit.	• Conduct training and follow up assistance in business skills development, especially in relation to achieving certification. • Conduct training seminars to introduce microfinance, explain steps to obtaining business credit, appropriate use of funds and repayment terms, provide capacity relative to savings facilities, introduce concepts for optimizing cash flow streams relative to cooperative fish market and loan repayments, etc.	• Report on the training of collectors to achieve business skills to engage in market transformation. • Reports detailing cooperative level capacity for engaging in business borrowing.		• Significant number of training workshops conducted. • Significant number of collectors trained in certifiable collection techniques. • Significant number of collectors certified.
Creating awareness of, and demand for, certified ornamental organisms among exporters, importers, and retailers Expand industry awareness of certification and demand for certified products	Work with importers and retailers in major market countries to improve their understanding of certification, by: developing materials targeted to inform the industry about the environmental as well as the business benefits of certification and participating in industry conferences and trade shows to disseminate information.	• Develop and disseminate communication materials targeted to industry operators. • Participate in trade shows and conferences to raise awareness and demand.	• Communications materials for industry operators. • Increased industry awareness of certification.	• Participants throughout the ornamental industry chain are aware and supportive of certified products. • Demonstrable trend toward industry-wide certification of exporters, importers and retailers.	• The majority of ornamentals exporters, importers and retailers aware of certification. • Significant number of exporters, importers and retailers reached by awareness raising materials. • Approximately half of all exporters and importers and a quarter of retailers certified. • Significant number of growth in certified ornamental fisheries from African MS (from approximately number of export boxes per year to number of export boxes per year)
Facilitate industry understanding and application for certification	Identify exporters, importers and retailers interested in finding out more about and in becoming Certified. Consultations with exporters, importers, retailers must be	• Identify industry members interested in Certification. • Develop implementation manuals. • Undertake consultations and	• List of exporters, importers and retailers signing statement of commitment to be certified. • Implementation manuals for exporters,	• Demonstrable trend towards consumer acceptance of certified organisms.	• Significant number of ornamentals hobbyists reached by awareness raising materials and aware of certification.

Intervention	Description	Specific Activities	outputs	Performance indicators	Expected change
	undertaken to understand their information and communications needs with emphasis will be placed on the linking of demand in the market countries with supply chains.	pre-assessment visits with interested industry operators.	importers and retailers.		• Significant number of growth in sales of certified ornamental fisheries from African MS.
Develop legal and policy context and business model for implementing site-level certification and collectors Co-ops	Develop a detailed for the transformation of the ornamental fisheries trade at the site level that packaged into informational and training materials used to introduce and implement the rollout of the model in each area. Develop an understanding of the legal and policy context at the site and provide appropriate government agencies and NGOs with information on possible changes to the legal and policy situation to create a climate more favorable for the transformation of the ornamental fisheries, and link this with broader integrated coastal management policy developments.	• Develop model as template for site level work with the collectors. • Build cooperative-level business finance and economics model and tailor village-level business strategies accordingly. • Develop material that describes village-level benefits of the ornamental fisheries trade. • Conduct detailed research on legal and policy context relevant to the ornamental trade transformation. • Provide information to government agencies and NGOs on the legal and policy context favorable to industry transformation and mainstreaming.	• Business model and guidance on developing local adaptations. • Cooperative-level finance and economics model. • Report on legal and policy context relevant to the ornamental trade transformation. • Information and recommendations on possible changes to the legal and policy context.		

To measure the success in implementation the interventions in ornamental fisheries development programs, a quality assurance have to be developed. Quality assurance will apply at the Ministry, Directorate, and Department levels. Quality assurance at the Directorate level will cover all aspects of the implementation plan and intensive evaluations, including indicator and protocol development; data collection, management and analysis; and reporting, reviewing and approval processes. Table 9, below summarise the monitoring and evaluation milestones and deliverables for the proposed interventions.

Table 9: *Monitoring and evaluation matrix for intervention activities in the development of ornamental fisheries trade in Africa*

Milestone/Activity	Deliverable
Procurement of consultants for technical designs for the development of ornamental fisheries trade in Africa.	• Drawn Terms of Reference and prepared other biding documents for the consultancy; • Advertisements of the consultancy work; • Selection criterion of the consultants; • Minutes of the project management committee.
Mobilization and sensitization of local and beneficiaries communities.	• Mobilization and sensitization report.
Committee's setup to support the sustainable ornamental fisheries trade, mainly comprising of the local/beneficiaries communities.	• Report indicating the committee members selected, their roles and responsibilities.
Detailed technical and cost designs for the commercial ornamental fisheries sites and parks.	• Document/report on detailed technical and cost designs for the commercial ornamental fisheries sites and parks infrastructure.
Procurement of contractors.	• Drawn Terms of Reference for the contractors and preparation of other tendering documents; • Selection criterion of the contractors; • Minutes of the project management committee.
Constructions and installations of commercial ornamental fisheries parks infrastructure to enhance ornamental fisheries trade.	• Technical report for construction and installation works for the commercial ornamental fisheries parks infrastructure; • Field visit supervision report; • Quarterly progressive reports.
Training of beneficiaries for capacity building on operation and maintenance of commercial ornamental fisheries sites and parks infrastructure.	• Training reports.

19. Capacity building and development

The main objective of the capacity development program is to address all policy and institutional related constraints in addition to addressing capacity development needs (human resource and infrastructural capacity) for implementing developmental stages of the ornamental fisheries trade. Also, to address all legal and policy frame requirements for operationalising including legislations, strategies standards, guidelines and institutional framework. The major components of the capacity development program are therefore: (i) policy support (ii) capacity development; (iii) Research and development (iv) support best management practices (BMPs) and sustainable utilization of ornamental fisheries resources. The issues must be addressed by the capacity development program are reproduced in box 1.

Box 1: *Policy related emerging issues must be addressed by the capacity development program*

- Lack of integrated planning for ornamental fisheries programmes;
- Inadequate guiding principles to operationalising ornamental fisheries programmes;
- Inadequate guidelines on cost sharing and funding based interventions in ornamental fisheries;
- Lack of clarity on institutional arrangement structure, roles and responsibilities for effective implementation of ornamental fisheries trade;
- Lack of a time-bound action plan for implementing proposals on ornamental fisheries trade;
- Lack of national guidelines for appraisal and design of small-scale ornamental fisheries trade schemes;
- Lack of training materials/ facilities and technologies for various stakeholders.
- Inadequate economic evaluation of ornamental fisheries trade interventions for technical and cost effective selection;
- Insufficient understanding, awareness, limited or no knowledge and experience in establishment and operation of ornamental fisheries interventions;
- Misuse of government incentives and inadequate capacity to follow up has resulted in reluctance of pprivate sector to invest in ornamental fisheries trade.

The main objective is to eenhance ccapacity development of stakeholders for sustainable exploitation of ornamental fisheries in Africa.

Specific Objectives

i. To develop policies, legislations, standards, strategies, guidelines, and institutional frame work for sustainable exploitation of ornamental fisheries in Africa;
ii. To enhance capacity development to stakeholders in ornamental fisheries sector;
iii. To develop appropriate technologies for ornamental fisheries exploitation and management for small to large holder collectors/farmers;
iv. To support best mmanagement ppractices (BMPs) in sustainable exploitation of ornamental fisheries in Africa.

Expected Output (s)

The expected outputs are listed based on the capacity development:

i. Policy Support to sustainable exploitation of ornamental fisheries in Africa

a. The National ornamental fisheries policy developed as stipulated in the national aquaculture and fisheries policy.
b. The Strategy and framework implementation plan of ornamental fisheries interventions developed and operationalized.
c. Institutional framework for sustainable exploitation of ornamental fisheries in Africa developed, validated and supported.
d. The National guidelines on sustainable exploitation of ornamental fisheries in Africa developed.

ii. ***Research and development for sustainable exploitation of ornamental fisheries in Africa***

a. Appropriate technologies for sustainable exploitation of ornamental fisheries in Africa developed.

iii. ***Support Best Management Practices (BMPs) in sustainable exploitation of ornamental fisheries in Africa***

a. Best Management Practices (BMPs) for improved interventions in sustainable exploitation of ornamental fisheries developed and promoted in a participatory manner.

b. Completed comprehensive feasibility studies for sustainable exploitation of ornamental fisheries.

c. Supported ornamental fisheries conservation practices.

d. Supported Internship training and collaboration with research and teaching institutions

iv. ***Advocacy***

Advocacy to key audiences, such as policy makers, donors, program planners, and the general public improved for ensuring adequate attention is paid to the ornamental fisheries development needs. Also, the relevant information is communicated to the right audience in a timely manner.

v. ***Resource mobilization***

Resources toward effective ornamental fisheries programs and policies developed.

vi. ***Research priorities***

Research priorities in development of the ornamental fisheries trade identified more in-depth knowledge of effective interventions.

20. Conformity with AU, AU-IBAR and CAADP operational strategy

The operational strategy to support long-term protection of the transformation of the ornamental fisheries trade and globally important biodiversity and ecosystems, directly addresses the AU, AU-IBAR and CAADP objectives of conservation and sustainable use of biological resources for coastal, marine and freshwater ecosystems. The transformation of the ornamental fisheries trade operations strategy's priorities and activities, inter alia:

- Establishing long-term funding mechanisms for long-term biodiversity protection;
- Creating participatory schemes for natural resource management;

- Developing demonstration projects linked to alternative livelihoods for local and indigenous communities;
- Promotion of sustainable production and use of natural products, including the development and implementation of sustainable harvesting and marketing regimes; and
- Integrated pilot projects to provide alternative livelihoods to communities, consistent with biodiversity conservation and sustainable use.

21. Global benefits of adherence to national and international instruments

a. Environment and sustainability

Without the intervention of AU and AU-IBAR, the barriers to mainstreaming the transformation of the ornamental fisheries industry will not be overcome. Unsustainable collecting practices and poor husbandry of ornamental fisheries will continue to damage coral reefs and a unique opportunity to realize globally significant levels of conservation and sustainable management of the world's most diverse coral reef ecosystems will not be fulfilled.

The AU, AU MS and AU-IBAR are consistent with the guidance of the Convention on Biological Diversity (CBD) will:

- Provide for the long-term protection and conservation activities by generating sustainable conservation financing from the private sector;
- Enhance equitable sharing of the benefits of genetic resources by enhancing capacity of local stakeholders in implementing sustainable livelihoods, providing employment and other economic opportunities, and supporting practices to secure food resources, such as fish; and
- Catalyze sufficient market forces so that additional industry players will be compelled to adopt ecologically and socially responsible practices.

Also at an international level, the AU, AU MS and AU-IBAR will contribute to achieving commitments and targets of important international agreements, including:

- The CDB Mandate on Marine and Coastal Biological - in relation to the sustainable use of marine and coastal areas and resources, the establishment of marine protected areas and achieving sustainable fisheries;
- The World Summit on Sustainable Development (WSSD): especially targets for sustainable fisheries and marine protected areas;

- The Framework for Action of the International Coral Reef Initiative (ICRI); and
- The recommendations of the International Tropical Ecosystem Management Symposia (ITMEMS).

b. Social benefits

The AU and AU-IBAR will facilitate a community-based management and decision making process based on local norms and values that encourages local stakeholders to take a wider and longer term view of resource management and use. The AU and AU-IBAR will alter the actions of collectors away from destructive practices and provide the skills and knowledge to engage in sustainable, environmentally sound fishing practices.

c. Institutional benefits

The major focus of the AU and AU-IBAR is creating the capacity within the target groups to assume responsibility for continuing to ensure that their fisheries are well managed and sustainable and provide the motivation for community stakeholders and collectors to continue to undertake and manage the trade according to the standards.

d. Stakeholder involvement benefits

Addressing the challenge of mainstreaming certification in Africa requires innovative, multi-stakeholder efforts that bring together key players with common interests. Reef Check and CCIF have an extensive interaction with a wide range of stakeholders in the global ornamental fisheries trade. A strong participatory mechanism in intervention planning, implementation, and monitoring and evaluation must be built. Community organizing, awareness raising and capacity building with the target beneficiaries and other stakeholders will involve them in ongoing interaction.

e. Gender issues benefits

Transforming the ornamental fisheries trade and ensuring that it is based on sustainable livelihoods, communities and resource use brings together the gender, governance and environment dimensions of poverty alleviation and sustainable development. At the community level, both men and women are involved in the civil society, multi-stakeholder process for resource management planning. Women's participation in this process is essential and encouraged as part of increasing the potential for positive outcomes in transforming the ornamental trade. This creates equal opportunities to make choices about the future of the community's aquatic resources and income generation and mainstreams the opportunity for

the community's men and women to work in partnership to achieve agreed upon goals. These include the quality control (screening and packaging activities) and documentation aspects (organizing and updating log book entry, order processing, meeting minutes) of certification. This results in greater gender balance and women's participation in the economic, social and environmental decision-making process and benefits of a sustainable marine ornamental trade.

22. Stakeholders roles and responsibilities

The roles and responsibilities are detailed here below:

a. National level– Ministry of Agriculture & Fisheries

i. Developing policies, legislation and regulations.
ii. Coordinating sector ministries' plans and projects for production activities.
iii. Identifying capacity gaps in promotion of ornamental fisheries industry.
iv. Planning, budgeting, and designing of national strategic for development of ornamental fisheries trade.

b. Local government level

The local government should form a District Committee, to include: chairperson, and Farmers' representative etc. Its functions will be:

i. Forming inter-district committees to guide and to supervise the operations of the ornamental fisheries sector.
ii. Coordinating local government staffing in the area.
iii. Approving plans and budgets for the development of ornamental fisheries trade.
iv. Ensuring that each collector/farmer/community has appropriate design for the required facility.
v. Approving and enforcing laws governing operation and environmental issues related to the ornamental fisheries trade.
vi. Ensuring that the finances are managed prudently.

c. User management committees

These committees will be responsible for the following:

i. Managing, operating and maintaining private and public ornamental fisheries production facilities.
ii. Assisting in setting up and enforcing laws governing ornamental fisheries trade operation.

The responsibility of the government and stakeholders (Table 10) will entail the following:

1. Ensuring that the policies, priorities and strategies identified are implemented by relevant public institutions;
2. Ensuring coherence of various national and sectoral policies that affect implementation;
3. Ensuring that a sound regulatory framework for effective coordination of implementation is in place and adhered to;
4. Establishing a mechanism for coordination of inter and intra-sectoral linkages in implementing the different ornamental fisheries projects and programs; and
5. Ensuring that the institutions required to deliver have the requisite capacity and the institutional arrangements are operating effectively.

Table 10: *Summary of roles and responsibilities of actors in the ornamental fisheries sector*

Actors	Roles	Responsibilities
Public sector (Ministries, and Departments)	• Policy formulation, regulation and standards; • Demonstration of small scale ornamentals farming and harvesting technologies at research stations and farm level; • Rehabilitate ornamental fisheries sector and establish co-management with the private sector; • Establishment partnership with the private sector; • Capacity building for ornamentals farming, propagation and collection; • Guiding the private sector on ornamentals farming, propagation and collection and marketing.	• Provision of political and technical guidance; • Formulate policies, regulations/ laws, and set standards; • Develop guidelines for ornamental fisheries propagation and assist with infrastructural development; • Develop appropriate technologies in ornamentals propagation and collection and demonstrate these to farmers/ collectors for adoption.
Private sector (including Farmers/Collectors)	• Provide input into policy formulation; • Farmers/Collectors adopt the technologies; • Supply the technologies, demonstrate use and provide after sales services; • Participate in management of the rehabilitated ornamental fisheries sector;	• Supply technologies and participate in implementation of interventions for ornamental fisheries production; • Mobilize resources for investment in ornamental fisheries production.
Government	• Provision of political and technical guidance; • Formulation and review of appropriate policies, laws, regulations, standards and guidelines in ornamental fisheries sector; • Mobilization of resources and oversee implementation of sustainable exploitation of ornamental fisheries in Africa;	• • Formulate, review and oversee implementation of appropriate policies/laws; • • Responsible for on-site management works including technical assistance; • • Design and establish management structures and provide assistance in operation and management.

Actors	Roles	Responsibilities
	• Provision of regulatory services and technical back stopping and support supervision to districts and other stakeholders; • Overseeing implementation of sustainable exploitation of ornamental fisheries policy; • Provision of training and capacity building to the stakeholders; • Supervision, monitoring and evaluation including compliance to relevant standards.	
Research institutes	• Spearhead research and development (R&D) aspects of sustainable exploitation of ornamental fisheries; • Participate in the development of national standards of sustainable exploitation of ornamental fisheries.	• Develop appropriate and tested technologies, and participate in their dissemination; • Participate in the formulation of policies, laws, regulations and standards.
Extension agent	• Support implementation of the sustainable exploitation of ornamental fisheries through the provision of agricultural advisory services to all farmer /collectors categories; • Ensure that the strategic relationship established with private sector always takes into account the lessons and experiences from provision of the said services.	• Provide extension services for the appropriate tested technologies; • Assist farmers/collectors to sustainable exploitation of ornamental fisheries.
Environmental agencies	• Important stakeholder in the assessment of the environmental impact of sustainable exploitation of ornamental fisheries;	• Responsible for management of the environment in accordance with the National Environment Management Act and its subsidiary regulations.
Funding agencies	• Mobilizes funds and allocates them to ornamental fisheries sectors; • Coordinates development partner inputs.	• Reviews sector plans as a basis for releasing allocated funds, and reports on compliance with sector objectives.
Development Partners	• Share good practices and alternative approaches to sustainable exploitation of ornamental fisheries and development; • Provide financial and technical support when required; • Contribution to policy formulation and reviews; • Involvement and contribution to research and development; • Training of various private institutions; • Co-financing activities of investments; • Provision of private services and goods; • Involvement in regulatory and control activities.	• Support investment in sustainable exploitation of ornamental fisheries; • Participate implementation of sustainable exploitation of ornamental fisheries interventions on a sector wide approach planning; • Provide technical assistances on the sustainable exploitation of ornamental fisheries.
NGOs and Community Based Institutions	• Participate in provision of sustainable exploitation of ornamental fisheries; • Participate in capacity building programs through training of farmers/ collectors communities;	• Support sustainable exploitation of ornamental fisheries interventions.

Actors	Roles	Responsibilities
	• Participate in mobilization of farmers/ collectors communities and resources for sustainable exploitation of ornamental fisheries; • Undertake advocacy to promote sustainable exploitation of ornamental fisheries; • Link farmers/collectors to microfinance institutions;	
Farmer/Collectors associations and/groups	• Participate in capacity building programs; • Participate in site identification for sustainable exploitation of ornamental fisheries; • Participate in monitoring and evaluation; • Assists the sector in gender responsive policy development; • Supports local governments to build staff capacity to implement sustainable exploitation of ornamental fisheries programmes.	• Participate in all processes regarding sustainable exploitation of ornamental fisheries from Planning to Implementation. • Responsible for gender responsiveness and community development and mobilization.

23. Development of logical framework for development of the ornamental fisheries trade in Africa

The objectives and outputs will be achieved through targeted activities, as described below in Table 11.

Table 11: *Logical framework for development of the ornamental fisheries trade in Africa*

	Target	Strategy	Action plan
I	• Increasing production and quality of national ornamental fishes.	• Strengthening production centers of ornamental fishes.	• Improvement of cultivation facilities and infrastructure at fish production centers.
		• Application of standards and certification of ornamental fishes collection/ cultivation	• Preparation of standards for ornamental fishes collection/ cultivation • Training programs in standards and certification for collectors/ cultivators.
		• Development of African native ornamental fishes.	• The addition of new fish types and innovative formation new strains of ornamental fishes • Improving the quality of African ornamental fishes through genetic approach, environment and nutrition • Provision of superior ornamental fishes. • Exploration and domestication of African native ornamental fish. • Conservation of ornamental fish habitat.

	Target	Strategy	Action plan
		• Development of African native ornamental fishes.	• Recovery of ornamental fish stocks which is in endangered condition. • Control overfishing from nature water bodies.
2	• Availability of database and information on national ornamental fishes.	• Accuracy of ornamental fisheries data. • Publications and digitizing ornamental fish data.	• Training on collection methods of ornamental fisheries data.
3	• Availability of promotions for fish sales/marketing of African ornamental fishes.	• The establishment of facilities and promotional activities of African ornamental fishes through exhibition.	• Organizing exhibition event of ornamental fishes on a national and international scale. • Participate actively in the ornamental fish's exhibition organized on international regular basis. • Organizing business forum of fishing Expo on ornamental fish's trade in Africa. • Strengthening ornamental fishes branding In Africa
		• Publishing encyclopedia of African ornamental fishes. • Publishing a directory on business people traded in African ornamental fishes. • Strengthening associations of ornamental fishes in Africa.	• Production of book publications on African ornamental fishes. • Establish directory of business people traded in African ornamental fishes. • Involving ornamental fishes associations in coaching activities on promotion of ornamental fish's trade.
4	• Availability of trade system for ornamental fishes.	• System formation (one-door service).	• Reduction of bureaucracy permissions. • System formation (one-door service).
5	• Increase fish trade volume inside and outside the country.	• Increased trade volume outside the country.	• Opening new trade route for ornamental fishes with new countries. • Registration of exporter to country of destination. • Audit quarantine system by country of destination.
		• Increased trading volume with new countries.	• Encourage government agencies, public services office, schools, universities, hotels and hospitals for using ornamental fishes as room decorative.

23.1. Time Lines

The suggested time lines for transformation of ornamental fisheries trade in Africa are presented in figure 2.

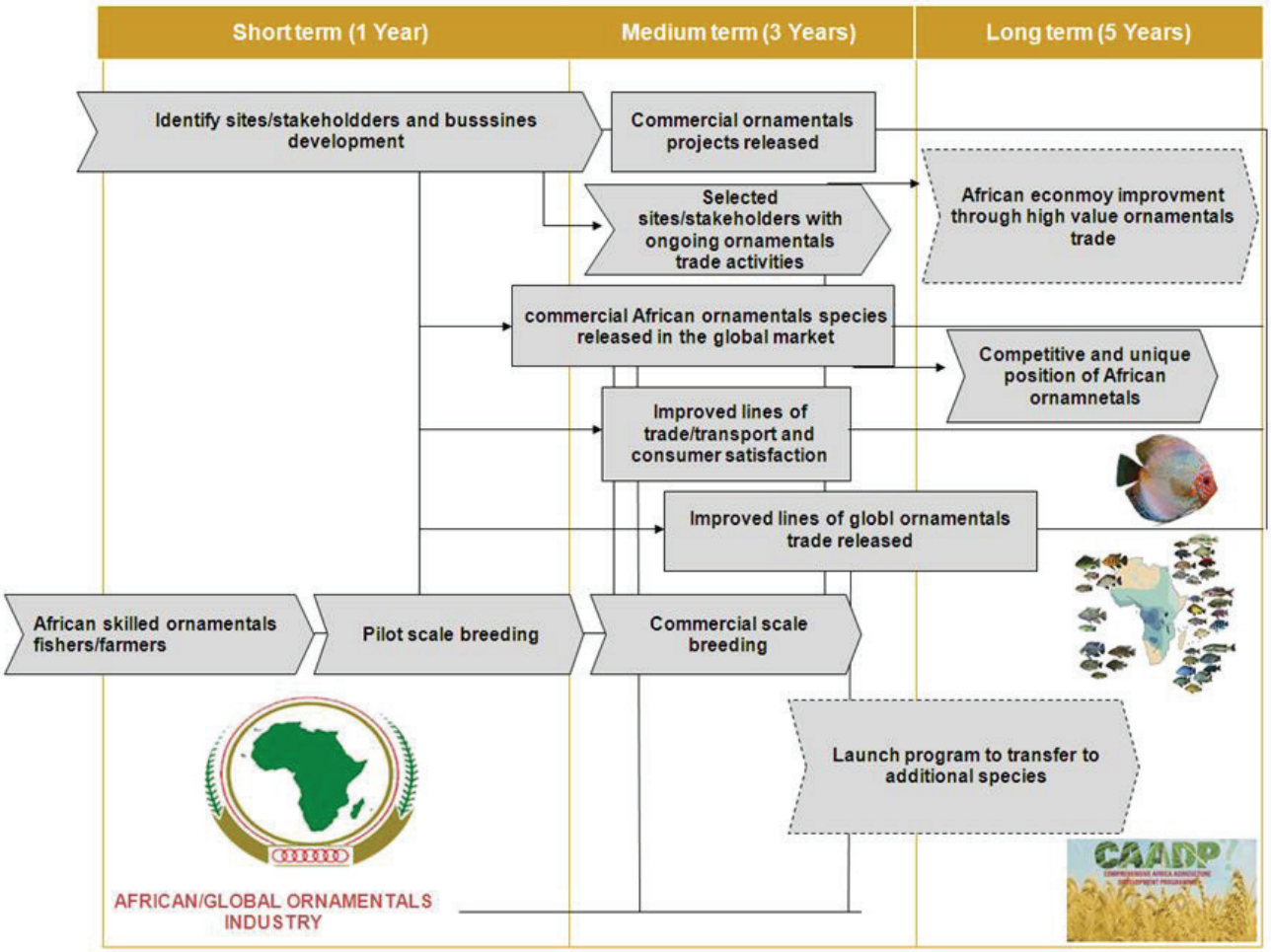


Figure 2: *The time lines for development and transformation of African ornamental fisheries trade*

24. Risk assessment during implementation of action plan to develop ornamental fisheries in Africa

The risk assessment in transformation of ornamental fisheries trade analyzes what can go wrong, how likely it is to happen, what the potential consequences are, and how tolerable the identified risk is. This is clearly described in Table 12.

Table 12: *Risk assessment during implementation of action plan to develop ornamental fisheries in Africa*

Issues	Risk	Mitigation strategies
Regulatory and legal	• Legal context does not support of ornamental fisheries trade. • Legal structure slows development of resource management plans. • Regulation enforcement capacity insufficient amongst local authorities. • Political instability.	• Invite higher-ranking government officials to widen the stakeholder group until sufficient satisfaction is reached. • Work with local government agencies to build enforcement capacity. • Political stability is one of the criteria must be used in the development plans.
Environmental	• Environmental impacts (e.g. bleaching and pollution) degrade potential for coral reefs or stocks to support sustainable ornamental fisheries harvest.	• Strengthen traceability/documentation systems. • Strengthen

Issues	Risk	Mitigation strategies
Economics and financing	• National or regional economic climate degrades so as to make exploitation of ornamental fisheries trade implementation impossible. • Exporters do not cooperate with direct payment and inventory control methods. • Microfinance institutions are not interested in and capable of working with the ornamental fishing industry.	• There is obviously a risk of widespread economic degradation that would directly impact ornamental fisheries trade. It is very difficult to assess the likelihood of such a risk, but the magnitude of the risk would be mitigated by the fact that the economics of the transformation project (AU - or EU funded projects) will be conducted largely inside of the 5 regions of Africa, and funds will originate in historically stable currencies such as the US Dollar.
Markets	• Demand amongst hobbyists for certified ornamentals proves to be insufficient. • Industry (importers, exporters and retailers) interest in certification is insufficient.	• Developing relationships with exporters that align with the overall goals of the transformation of the ornamental fisheries trade.
Stakeholders and community	• Interest in ecosystem management plans amongst stakeholders, communities and government proves to be insufficient. • Regulation enforcement capacity insufficient amongst local authorities. • Collectors do not respect no-take zones / MPAs and not interested in certification.	• Use the AU-IBAR efforts as a platform to lobby industry opposition; and • Devote substantial resources to build hobbyist awareness (advertise at trade shows, in magazines, and at retail locations).

25. Conclusion

The value and optimization of the potential of African ornamental fisheries trade can be further seen on the number of production/value of ornamental fish exports in the world's ornamental fish market. Africa is blessed with so much potentials both natural and human resources so, it is an advantage for Africa to become a leading country in the export of ornamental fish. Various efforts needed to reach the target:

- Mapping of regional production centers of ornamental fishes;
- Promotion and development of various local ornamental fishes trade ;
- Increase production of various ornamental fish through propagation and cultivation;
- Research on the cultivation to support national production activities;
- Increasing variety of traded ornamental fishes;
- Developing cultivation technology of various local ornamental fishes;
- Increasing export volume with expanding the market to various countries in the world, especially America and the United Kingdom; and
- Restocking various endangered ornamental fishes.

26. Consultant suggestions to the AU-IBAR

The AU-IBAR should support the production of the following documents in support of the transformation of the ornamental fisheries trade in Africa:

i. Development of standard operating procedure (SOP) for ornamental fish collection from the wild. This is an urgent need of a country such as Nigeria, who has hug resources for marine ornamental fishes and is not exploited yet.
ii. Development of standard operating procedure (SOP) for ornamental fish propagation and cultivation.
iii. Development a business and an economical viable model for the transformation of the ornamental fish trade.
iv. Implementation manuals for exporters, importers and retailers.

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
Website: www.au-ibar.org