Fisheries in the ESA-IO Region: Profile and Trends

COUNTRY REVIEW

2014

MADAGASCAR

SmartFISH

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MADAGASCAR

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This document was prepared as part of the activities of the Indian Ocean Commission (IOC)SmartFish Programme , under the FAO Fisheries management component, in the monitoring and analysis of major issues with implications for fisheries and aquaculture in the twenty countries from the Eastern Southern Africa-IOC region participating in the Programme. This has resulted in the preparation of twenty country baselines whose the purpose is to serve as easy-to-read and informative references for policy decision-makers, fishery managers, development partners and stakeholders. The baselines inventory and describe for each country the trends in status of fisheries, major social and economic dynamics of relevance to the fishery sector, policy, legal and administrative frameworks, and management regimes The present document relates to the baseline for Madagascar.

The preparation mainly involved Mr Christophe Breuil and Mr Damien Grima, FAO consultants, who made essential contribution in drafting the text and developing infographic for publication on the basis of the analysis of official and grey literature and vast field experience in the region. Much gratitude is due to all SmartFish experts who act as reviser. In particular, Ms Clotilde Bodiguel Chief Technical Adviser of IOC SmartFish activities implemented by FAO, who provided the initiative, was instrumental in the editing and Mrs Florence Wallemacq, Outreach Consultant, assisted in the formatting for publication. Lastly, the editor would like to thank National and Regional Focal Points of the IOC SmartFish Programme for providing complementary data and information.

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ACRONYMS AND ABBREVIATIONS

AMPA	*Agence Malgache pour la pêche et l'aquaculture*
APMF	*Agence Portuaire maritime et fluviale*
ARDA	*Association Réunionnaise de développement de l'Aquaculture*
ASH	*Autorité Sanitaire Halieutique*
ASP	Agricultural Sector Programme
CBO	Community-based Organization
CI	Conservation International
COMESA	Common Market for Eastern and Southern Africa
DFID	Department for International Development
DWFN	Distant Water Fleet Nation
EAF	Ecosystem approach to fisheries
EEZ	Exclusive Economic Zone
ESA-IO	Eastern and Southern Africa and the Indian Ocean
EU	European Union
FAD	Fish Aggregating Devices
FAO	Food and Agriculture Organization of the UN
FSC	*Fisheries Surveillance Center - Centre de surveillance des pêches – CSP*
FPA	Fishing Partnership Agreement
GDP	Gross Domestic Product
GRT	Gross Registered Tonnage
HDI	Human Development Index
HP	Horse Power
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, Unregulated and Unreported Fishing
LMMA	Locally Managed Marine Areas
MAP	Madagascar Action Plan
MCS	Monitoring, Control and Surveillance
MDG	Millennium Development Goals
MFFR	Ministry of Fisheries and Fishery Resources
MPA	Marine Protected Area
NCCMF	National Consultative Council for the Management of Fisheries
NGO	Non-governmental Organization
OEFC	economic observatory
PRSP	Poverty Reduction Strategy Paper
RDPU	Rural Development Policy Unit
SADC	Southern Africa Development Community
SEC	South Equatorial Current
SWIO	Southwest Indian Ocean
SWIOFC	Southwest Indian Ocean Fisheries Commission
UNCLOS	United Nations Convention on the Laws of the Sea
WCS	Wildlife Conservation Society
WIOFish	Western Indian Ocean Fisheries Database
WWF	World Wildlife Fund

BACKGROUND INFORMATION

1 Brief on the National Economy

Key figures on Macro economic data

2014- Source World data Bank - Latest reported data

Population
22.3 Million
2012

Employment to population ratio
83.5 %
2011

HDI ranking
151 /187
2012

External balance
-1,095 million US $
2011

GDP
9.98 Billion US $
2012

GDP annual growth
3.1 %
2012

GDP per capita
447.4 $
2012

Agriculture % of GDP
29 %
2009

Although Madagascar is well endowed with both renewable and extractive natural resources, the agricultural sector is the main contributor to the national economy, with a contribution to the GDP of approximately 30% during the last 20 years (28.7% in 2012). Other major sectors include financial intermediation (15% in 2012), manufacturing (13.7% in 2012), transport (17.6% in 2012) and tourism (12.3% in 2012). Mining sector contribution to GDP is still less than 1% but is expected to grow rapidly as a result of the recent implementation of major mining projects (ilmenite, nickel and cobalt) (Mehler A.; Melber H.; Van Walraven K. 2014).

The economic development of the country has been seriously affected by recurrent political crises over the last two decades. The current political crisis has led to significant deterioration in the business climate and greater loss of control in governance, and worsened the living conditions of the population (Mehler A.; Melber H.; Van Walraven K. 2014). Economic growth was negative (-4.1%) in 2009 and weak in 2010 and 2011 when compared with the average growth of Sub-Saharan countries, +0.5% and +1.6% respectively in 2010.

In 2012, total GDP in Madagascar was almost US $10 billion (World Bank). The GDP per capita was estimated at US $447 in 2012, showing a slight decrease by 4.2% as compared to 2011. The population was estimated at 22.3 million inhabitants, with an annual growth rate of 2.8%.

The business environment has deteriorated significantly in recent years due to political uncertainties. According to the World Bank report (World Bank. 2013) Madagascar ranked 138 out of 183 economies in its ease of doing business in 2012. Major factors affecting the business climate include irregular access to electricity and difficulties in protecting investors, enforcing contracts and registering property.

In addition to political instability, other factors have negatively impacted Malagasy's economy including recurrent natural disasters (hurricanes and floods) and increased fuel prices resulting from fluctuations in the international market. The organization of presidential and legislative elections in 2013 is believed to stabilize institutional situation to the benefit of the economy in the near future.

Inflation was contained at 7.4% in 2012, down from 9.5% in 2011 and 9.2% in 2010 (Mehler A.; Melber H.; Van Walraven K. 2014).

The deficit of the trade balance was about US $1.1 billion in 2012. According to African Economic Outlook, exports from the free-trade zone represent about 40% in value of total exports. Other main exports are cloves (12.4%), petroleum products (6.8%) and sugar (2.2%). The main imported products are petroleum products (23%), raw materials (18%) and food products (9.8%).

Madagascar belongs to COMESA, SADC and the IOC. The country has however been suspended from regional and continental organizations as a result of the unconstitutional change of government in 2009. Intra-regional trade remains poorly developed, with exports from Madagascar to the SADC and COMESA averaging 5% and 4% respectively in the period 2010-2011, and imports form the SADC and COMESA averaging 12% and 8% in the same period.

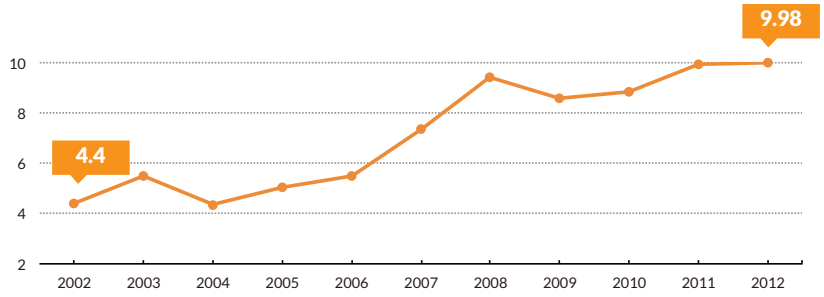
The active population in Madagascar was estimated at 10.4 million people in 2012 (Mehler A.; Melber H.; Van Walraven K. 2014). Agriculture remains the largest provider of employment, with about 80% of the country's workforce (OECD, et al. 2013).

Madagascar's Human Development Index (HDI) puts the country in the 'low human development' category. With an HDI score of 0.483, Madagascar ranked 151 out of 187 countries in 2012.

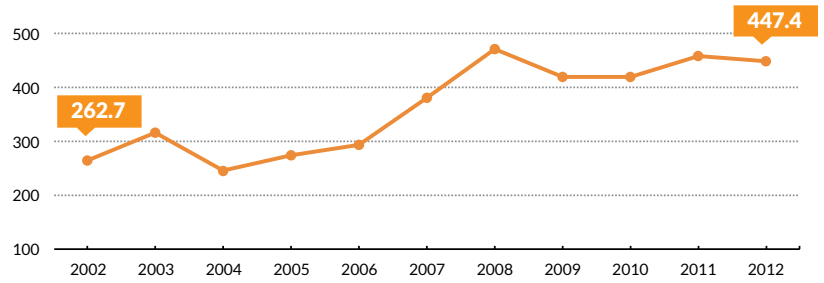
Trends

2014 - Figure 1-5 - Source World Data Bank - Last ten years

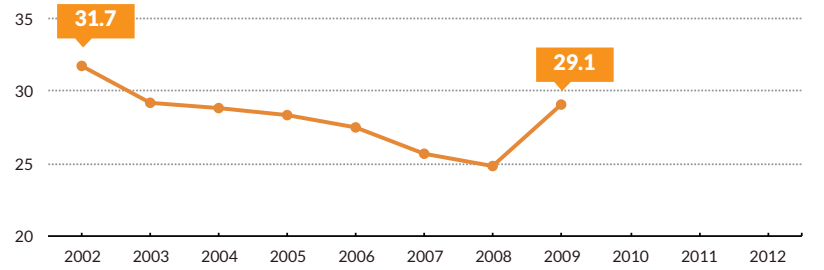
GDP (current billion US $)



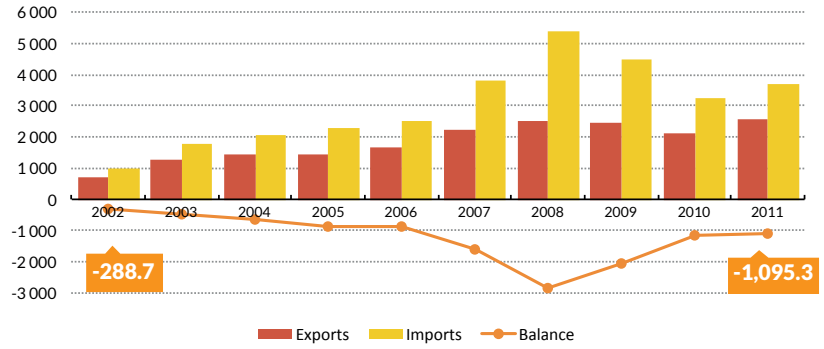
GDP per capita (current US $)



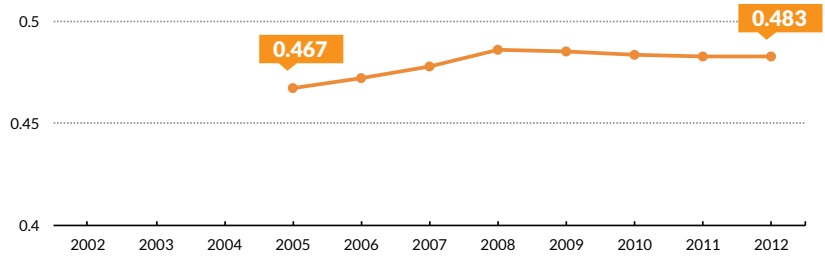
Agriculture % of GDP



Trade balance (current million US $)



Human Development Index



2. Policy and Planning Framework

2.1. General Framework

The Poverty Reduction Strategy Paper (PRSP), elaborated in 2003, used to be the reference document for the economic and social development of Madagascar until the end of 2006. During this period, a new decentralization policy was implemented with the setting-up of 22 Regions and the elaboration of related Regional Development Programmes.

Based on the vision, 'Madagascar Naturally' and the Millennium Development Goals (MDG) the Madagascar Action Plan (MAP) was prepared in 2006. The MAP then became the reference document for the development of the country for the period 2007-2011. The main thrust of the MAP was to promote the rapid and sustainable development of Madagascar (UNDAF. 2007).

Since the unconstitutional change of government in 2009, there has not been any reference document to serve as a guide for public policies. In the agricultural sector, the Rural Development Policy Unit (RDPU) has however been mandated to support decision-making in the sector, including fisheries and cattle breeding. The RDPU falls under the responsibility of the minister in charge of agriculture, but is mandated to intervene within the three technical ministries concerned (Agriculture, Fisheries, and Cattle Breeding) in accordance with a MoU signed in September 2009 between the three ministries.

The RDPU has been actively re-engaged in the preparation of an Agricultural Sector Programme (ASP) since early 2012, with the support of several partners including International Fund for Agricultural Development (IFAD), the EU, FAO, the French cooperation, the Japanese cooperation, and the World Bank. The first step of the process has consisted of launching stock-taking exercise in all the sectors concerned.

2.2. Food Security Strategy

The most recent policy document relating to food security is the Comprehensive Food and Nutrition Security and Vulnerability Analysis, 2010. In the analysis presented in this document by Kurien and Lopez Rios (Kurien, John, Lopez Rios Javier. 2013), it states in the chapter regarding food access on a household level, that fishermen are not analyzed given their relative small size (3% of total households, with an estimate of 77% of their income originated by fisheries). In the analysis of food consumption, the survey concludes that the diet is based on rice, while vegetable and animal proteins are rarely consumed (once and 2.3 times a week respectively). Fish is the most popular animal protein, with an average consumption of 1.3 days per week.

In addition to the national policy document, the Indian Ocean Commission (IOC) developed a Regional Food Security Strategy in 2012 covering its 5 members: Union of the Comoros, Madagascar, Republic of Mauritius, Reunion (France) and Seychelles. However this strategy did not properly integrate the contribution of fisheries to food security and related strategies for the region. Since then, IOC-SmartFish has started to support the IOC in its effort to update its Food Security Strategy as well as develop an action plan for fish and food security.

2.3. Fisheries in Public Policies

In terms of a macro-economic perspective, the reference document for the fishery sector would be the ASP, which is currently being prepared as mentioned above. The major policy orientations of the ASP, based on the preliminary draft, emphasize the development of agriculture while focusing on the following four pillars: (i) extension of cultivable surface; (ii) improved access of products to markets; (iii) increased food supply to reduce hunger; and (iv) improved research in agriculture and extension.

The RDPU plans however to take into consideration past and current initiatives that relate to policy and planning in the other sectors concerned by the ASP. In this context, the National Strategy on improved governance in the marine fishery sector (see below) that was recently prepared with the support of IOC-SmartFish is expected to be considered during the next stages of the preparation of the ASP.

3. Fishery Resources

General features

In Madagascar, marine fisheries dominate the fishery sector with a contribution of about three quarters to the national fish production, mainly from traditional coastal fisheries. The current national fishery production is estimated to be around 130,000 MT per year, including catches of tuna and tuna-like species by the Distant Water Fleet Nation (DWFN) in the Exclusive Economic Zone (EEZ). Inland fisheries and aquaculture contribute to about 30,000 and 10,000 MT per year respectively.

Marine fishery waters

As the fourth largest island in the world, Madagascar has one of the largest EEZ in the Indian Ocean with a surface area of 1.14 million km² (Barnes-Mauthe M. et al, 2013). The continental shelf area is estimated at 117,000 km², with a more pronounced extension in the northwestern and southern part of the island. The coastline is estimated to be 5,600 km long. Madagascar is thus endowed with a considerable maritime area that includes important fishery resources.

Marine and coastal ecosystems are influenced by a single current system derived from the South Equatorial Current (SEC) whose waters encircle most of the island. Upwelling occurs mainly off the southeast coast, north of Tolagnaro in the south. The west coast is characterized by many estuaries and bays, and colonized by dense mangrove forests covering an estimated area of 3,300 km². The eastern coast is comparatively straight and featureless, with few estuaries, capes and bays. The coastal habitats and shallow-water marine ecosystem are dominated by coral reefs, mangroves, seagrass beds, estuarine mud flats, steep beaches and rocky shorelines. Demersal fish, which are closely associated with these habitats, form the basis of traditional fisheries in Madagascar (S. Fennessy et al. 2009).

The potential of Madagascar's marine fisheries is not very well known. Significant inter-annual fluctuation also can be observed depending on changes in oceanographic conditions and migration patterns of tuna and tuna-like species. Recent work carried out in the context of a IOC-SmartFish initiative would suggest a total fishery potential of approximately 200,000 MT per year, of which about 52,000 MT of tuna and tuna-like species.

Coastal marine resources are composed of crustaceans such as shrimps (potentially 10 - 12,000 MT per year), lobsters (potentially 1,000 MT per year) and crabs (potentially 7,500 MT per year); molluscs such as octopus, squids (2,000 MT per year potential) and bivalves; a demersal fish (more than 50 commercial species, with potentially 45,000 MT per year); and small and medium pelagics (with potentially up to 100,000 MT per year). Demersal and small pelagic species are hardly distinguished in statistical systems; it is however recognized that *Lethrinidae*, *Lutjanidae*, *Sparidae*, *Carangidae* and *Mullidae* are the most represented families. Other coastal marine resources of significant commercial and ecological value include holothurians, sharks and congers.

The main species in the EEZ are the highly valued tropical tuna and tuna-like species that migrate seasonally in Malagasy waters. The main tuna species occurring in the EEZ and adjacent high seas are Yellowfin tuna, Skipjack tuna and Bigeye tuna. Large pelagic sharks in significant quantity also

are found in the Malagasy EEZ. Tuna and tuna-like species are principally caught by DWFN vessels. Current production is estimated at 15,000 MT per year.

Marine fishery resources are exploited by three national fleet segments (traditional canoes, artisanal boats and industrial vessels) and one foreign fleet segment composed of DWFN vessels targeting tuna and tuna-like fisheries.

According to the WIOFish classification, which is based on the type of gear used, there were 21 marine fisheries in Madagascar in 2012, of which 17 were artisanal, 10 small-scale commercial, 9 subsistence, 3 industrial and 1 tournament fishing. Fisheries are multispecies with catch composition data including 183 different catch items. Fisheries use a variety of habitats but the most frequented are the intertidal zone and estuaries.

Inland fishery resources in Madagascar are mostly based on lacustrine fisheries which cover a total surface area of close to 1,500 km^2. The main water bodies include the lakes of Kinkony (139 km^2), Anketraka, Ihotry (97 km^2) and Tsimanampetsostsa in the western part of the country, Lake Alaotra (220 km^2) in the east and Lake Itasy in the central region. There are also several small water bodies in the western region with high biodiversity.

43 species are endemic in Madagascar, of which 32 are freshwater species. Several exotic species were however introduced in the 1950's including common carp (*Cyprinus carpio*), trouts (*Salmo sp*), several species of tilapia, black-bass (*Micropterus salmoïdes*), fibata (*Ophiocephalus striatus*) and Heterotis niloticus. This has resulted in considerable changes of ecosystemic nature in the fisheries. The main species caught in Malagasy's inland fisheries are tilapias, carps, and black-bass.

The water bodies in Madagascar are faced with serious environmental problems such as siltation as a result of increased deforestation and agriculture development in the basin areas. Some water bodies also suffer from excessive fishing pressure and the use of damaging fishing gear and methods. The inland fisheries potential is still, however, estimated at 40,000 MT per year.

Freshwater fish production has averaged 30,000 MT per year for the last decade (FAO. 2008-2015).

KEY INFORMATION AND FIGURES ON THE FISHERY AND AQUACULTURE SECTOR

4. Marine Fishery Sector

4.1. Status of Resources

The lack of accurate data on fisheries in Madagascar does not enable a satisfactory assessment of the status of marine stocks, with the notable exception of shrimp stocks and the more important large pelagic species that are under the mandate of the Indian Ocean Tuna Commission (IOTC). The only information available on the status of marine stocks, apart from IOTC assessments, is therefore based on observations and expert judgment. Madagascar experts who participated at the Southwest Indian Ocean Fisheries Commission's (SWIOFC) scientific committee (Mahe, Seychelles, 2010) mentioned moderate to excessive exploitation and an unknown situation for several fisheries.

In the course of the work of technical commissions carried out in 2012 under IOC-SmartFish initiatives, more specific conclusions were formulated as follows:

- all penaeide species are fully exploited, although a steady decrease in shrimp catch has been observed over the last decade (7,900 MT in 2004 versus 3,700 MT in 2012) in spite of strong regulatory measures in the industrial component of the fisheries;
- demersal fish are fully exploited although some stocks are moderately exploited in remote areas;
- small pelagics are moderately to fully exploited
- other coastal stocks are fully exploited with the exception of crabs which are moderately exploited;
- tuna and tuna-like species are fully exploited.

4.2. Major Fishery Dynamics in the Small-Scale Sub-Sector

The fishery sector is dominated by a multi-gear and multi-species small-scale (traditional and The small-scale fishery sub-sector in Madagascar is composed of traditional and artisanal fishing. The distinction between both is based on technical criteria specified in the current legislation: traditional fishing refers to all fishing activities carried out on foot or using dugout canoes, motorized or not; artisanal fishing means all fishing activities using motorized boats with an engine under or equal to 50HP. The small-scale fishery sub-sector is confined to inshore waters within the reef ecosystem due to technological limitations.

Data on traditional fishing are only partially available and are characterized by a low level of accuracy in general. During the frame survey carried out in 1997, 42,000 traditional fishers were counted. It is however believed that the present number could be close to 100,000 fishers when considering the steady increase of the number of professional cards that are delivered by field administration amongst others. The bulk of traditional fishing is carried out on the west coast. The last frame survey was conducted in 2012 and will soon provide up-dated and more detailed information on the current situation.

Most of the dugout canoes use oars and sails. The most common gear used by traditional fishing are gillnets, traditional traps, long-lines, hand lines, harpoons and seine nets. Official statistics suggest that total annual catch from traditional fishing is about 56,000 MT, however this only includes

demersal and pelagic fish species. If other species are included (such as crabs, sea cucumbers, etc.) based on declarations from fish collectors, total catch from traditional fishing could be closer to 70,000 MT per year. This estimate would however be an under-estimation given the low level of accuracy of declarations. Based on the results of a recent case study on traditional fishing in the Velondriake area, Barnes-Mouthe et al., 2013, argues that "even Le Manach's (2012) recent estimate of 107,000 MT per year in 2008 (based on a readjustment of FAO statistics using available data), are likely [to be] far too low".

According to the current fisheries legislation, traditional fishing falls under an open access regime. In order to mitigate the general trend of increased fishing capacity, several initiatives aimed at improving producer organizations and professionalization have been undertaken, including in particular the introduction of a system of professional cards in 2009 (Ministerial Decree n°2056/2009 *portant établissement de la carte professionnelle de pêcheur pour la pêche traditionnelle maritime*). This system is similar to a system of having a local permit and is managed by the field administration. The main requirement for a fisher to apply for such a professional card is to be member of a producer's association. This system however, is not yet fully operational.

Artisanal fishing, whose development was encouraged in the 80's in the context of a shrimp fisheries (through gifts from the Japanese cooperation and then through industrial boat-owners), is mostly undertaken in Morondava, on the west coast. Formerly introduced in shrimp fisheries, artisanal fishers now target mostly demersal fisheries. Their number stabilized at around 12 up until 2009; their current number is now close to 20. Artisanal fishing is regulated through a licencing system.

A recent socio-economic study on FAD fisheries in SWIO (Failler et al. 2011) observed that in Madagascar, "as a result of a lack of economic diversification, especially in the coastal areas, fishing has become a last resort activity taken up in most cases to ensure the daily subsistence of the extended family. For want of anything better, young people engage into fishing hoping for better times; the average fisherman is thus relatively young (40 years)".

4.3. Major Fishery Dynamics in the Industrial Sub-Sector

The domestic industrial fleet was mostly composed of shrimp trawlers until 2005. Since then, the number of fishing licences has decreased from about 100 to 37 in 2011, as a result of diminishing shrimp stocks despite significant efforts in terms of regulation of fishing effort. The decrease in the number of trawlers has however been compensated for by the slight increase in the fishing capacity of vessels in terms of gross registered tonnage (GRT) and horse power (HP). It should be noted that according to current regulations, shrimp trawlers have to keep on board and land a part of their by-catch while respecting a ratio of 1:0.5. At the same time, the number of fishing licences for demersal and pelagic fish has increased from about 10 in 2005 to about 40 in 2011.

The domestic industrial fleet is also composed of tuna long-liners. In 2011, there were two 'private access agreements for tuna' with Malagasy companies. The same year, 3 more licenses for long-liners flying the Malagasy flag were issued. Domestic tuna vessels are allowed to fish beyond the 6 nm limit from the coast. Note that foreign tuna vessels must operate in the EEZ (beyond 12 nm).

Foreign industrial fishing, which is mainly specialized in tuna fisheries, is composed of European vessels operating under a Fishing Partnership Agreement (FPA) between Madagascar and the EU, and Asiatic vessels operating under agreements with private companies. Under the last FPA (2007-2012), the number of licences issued each year averaged 25 for purse seiners and 40 for long-liners, with a total production of approximately 12,000 MT per year (according to catch declarations). The current FPA protocol that covers the period 2013-2014 includes a reference tonnage of 15,000 MT per year.

Non-EU foreign tuna fleets operate under 'private access agreement for tuna' between Madagascar and foreign private companies. In 2011, there were nine agreements, and 10 licences for purse

seiners and 50 licences for long-liners were also issued. The annual licence fee for this kind of fleet is US $1,000. It should be noted that the catch estimates of the non-EU foreign fleets are very difficult to obtain. The recent adoption, by Ministerial Decree, of a standardized protocol for fishing agreements, which aims to improve the governance of private access agreements, should also be noted.

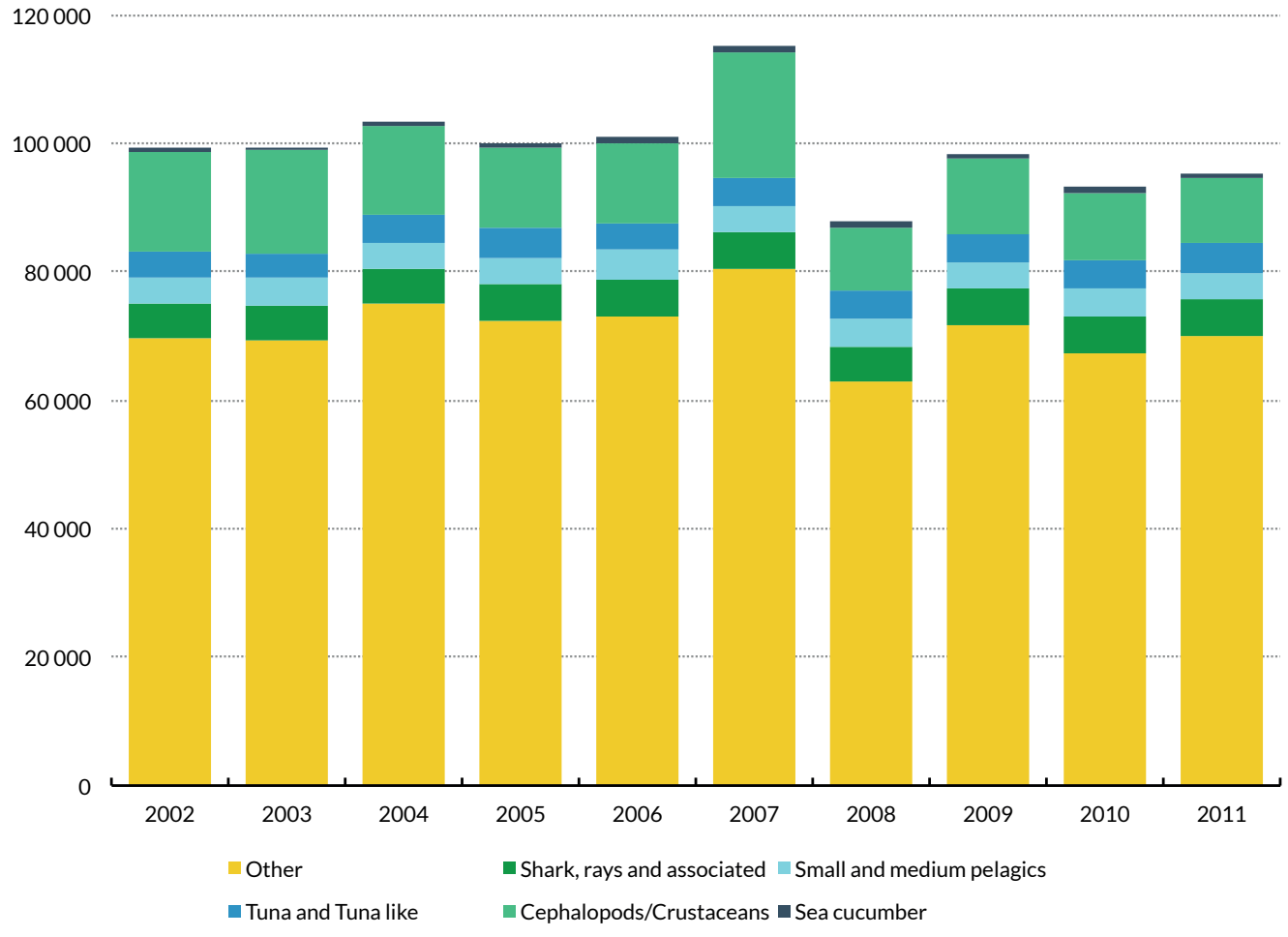
4.4. Fishery Production

The quality of fisheries statistics in Madagascar in general is poor. As an example, the overall official catch from traditional fishing was estimated at 56,000 MT for several years. Weaknesses of the monitoring system in the industrial fishery sub-sector also constitute a serious constraint for sound estimates of fish production, whether in territorial waters or the EEZ.

In the course of an IOC-SmartFish initiative carried out in 2012, an estimate of the current level of marine fish production was conducted based on a minimalist calculation hypothesis. This hypothesis consisted of considering the highest figure of declared or estimated catch for the last 5 years, in a context where existing data are believed to be largely under-evaluated. Results showed that the current level of catch in marine waters was closer to 85,000 MT per year, including notably 8,000 MT of shrimp, 13,000 MT of tuna, 49,500 MT of demersal and small pelagic fish, 2,000 MT of cephalopods and 6,800 MT of crabs.

Domestic marine fish production in Madagascar (in tons)

2014 - Figure 6 - Source FAO FISHTAT J (2002-2011)



The contribution of the three major fishing fleet segments to the total fish production was as follows: 28.7% industrial (domestic and foreign); 0.2% artisanal; 71.1% traditional.

4.5. Fish Utilization

The bulk of shrimp caught by industrial and artisanal fleets are exported to European and Japanese markets. The export price varies greatly depending on the destination, the species (five species), the size of the shrimp and the type of fishery product. Shrimps caught by traditional fishing are mostly sold on the domestic market.

The marketing and distribution of products from traditional fishing are subject to regulations. Fishmongers must have an agreement delivered by the field administration in accordance with Ministerial Decree n° 97-1455 dated 18/12/97. Fish collectors must possess an authorization that is delivered each year by the central fisheries administration, in accordance with Ministerial Decree n° 97-1455 dated 18/12/97. As a matter of example, the number of authorizations for the collection of fishery products delivered by the fisheries administration was as follows: 29 for octopus in 2011, 79 for crab in 2010, 77 for sea cucumber in 2010, 56 for shark in 2011. In some fisheries, the number of authorizations is steadily increasing.

In some fisheries subject to excessive fishing such as sea cucumbers, the number of authorizations for fish collectors may be subjected to limitation through administrative decision, which could contribute, in theory, to the control of fishing mortality. Such measures however have proved to be poorly respected in recent years. In general, the current system of permits/authorizations for fishmongers and collectors, which was redefined in 2003, mostly serves fiscal purposes with insufficient consideration of fisheries management concerns.

Most of the fishery products from traditional fishing are sold on the domestic market. Poor conditions of storage and lack of transportation infrastructure result in high physical and/or economic post-harvest losses, particularly in remote areas. For those products with outlets in export markets, such as mangrove crabs or octopus, fish export companies use processing plants and modern equipment for the collection of catch from traditional fishing, in line with, for the most part, EU standards.

It should be noted that a '*Centre de distribution des produits halieutiques*' was built and developed in Mahajanga with Japanese aid. The Centre is believed to have greatly contributed to the improvement of the quality of the fish that is sold on the domestic market as well as reducing post-harvest losses.

Significant improvement, in terms of value addition could be achieved through adequate measures. IOC-SmartFish has recently carried out value chain analyses on mangrove crab (Scylla serrata), sea cucumber and shark fisheries. The objective of these analyses is to identify measures aimed at improving the performance of the various fishing and related activities including export.

4.6. Infrastructures

Infrastructure in the traditional fishery sub-sector is poorly developed, in particular in remote areas along the 5,600 km of coastline. Basic facilities, such as running water and electricity, are often non-existent in the fishing villages. It should be noted however that there is a local taxation system whereby local authorities levy up to 3% of the turnover of fishmongers and fish collectors to contribute to local revenue. Such revenue could potentially be used to support investment in the fishing villages.

On the other hand, infrastructures in the industrial fishery sub-sector are relatively well adapted to the needs of the fishing industry and related activities. It is however believed that increased collaborative linkages between the fisheries administration and the port authority (*Agence portuaire maritime et fluviale*) would benefit the industry in terms of improved investment and management policies of fishing facilities.

5. Inland Fishery Sector

Information on the inland fishery sector in Madagascar, including the status of resources and major dynamics of fishing and related activities, is hard to find.

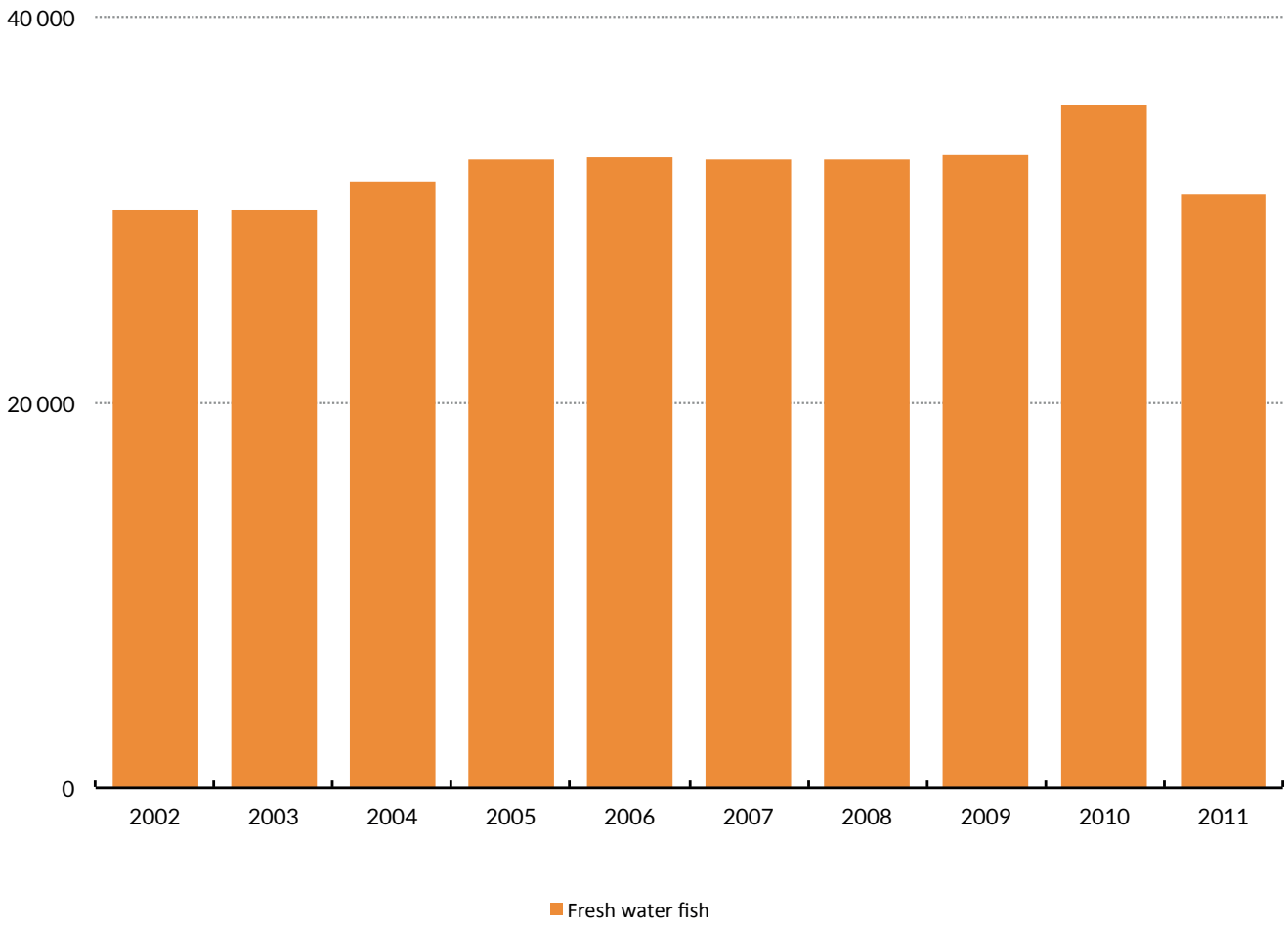
Some of the traditional inland fishers operate with non-motorized planked or dugout canoes. Dominant fishing gears include gill nets, cast nets and hand lines. According to the 1988/89 frame survey, there were about 17,800 inland fishers and 7,000 fishing craft in Madagascar at the end of the 1980's. Most fishers are also seasonally involved in agriculture. The frame survey carried out in 2012, which includes freshwater fisheries, provides an up-date of basic data on inland fishing capacity.

Freshwater fish production is estimated to be close to 30,000 MT per year. Official data collected by the fisheries administration at the district level indicated respectively 12,000 and 3,500 MT in 2010 and 2011.

Fish utilization involves fishmongers and fish collectors. Most fishery products are sold on the local markets. During the period 2006-2011, the fisheries administration issued about 800 permits for fish collectors and 1,000 permits for fishmongers every year.

Domestic Inland fish production in Madagascar (in tons)

2014 - Figure 7 - Source FAO FISHTAT J (2002-2011)



The administration and management of the inland fishery sector is under the responsibility of the Inland Fishery Section that vests in the Ministry of Fisheries and Fishery Resources (MFFR). However, this section is very weak in terms of human and financial resources. Generally speaking, services that could support the management of inland fisheries, such as monitoring, control and surveillance (MCS), are poor.

The development objective assigned to the inland fishery sub-sector in the (now outdated) fisheries policy, 2004-2007, was to increase fish production to satisfy local markets and to improve the revenue of the fishers. Major policy orientation is to promote a specific fisheries management plan for major water bodies while making use of decentralization mechanisms in support of the co-management of natural resources.

6. Aquaculture Sector

Marine aquaculture includes the culture of shrimp and seaweed. Some fisheries operations for the enhancement of sea cucumber have also recently developed by IOC-SmartFish on the west coast.

Freshwater aquaculture is dominated by fishpond systems for the culture of tilapia and carp. Two research units and several stations aimed at producing fingerlings and providing extension services were created in the 1990's to support the development of freshwater aquaculture as well as to enhance fisheries in freshwater bodies. Current fish production from freshwater aquaculture is estimated at 750 MT per year.

Furthermore, the culture of Spirulina on the coast is fast becoming an important activity in the fight against malnutrition.

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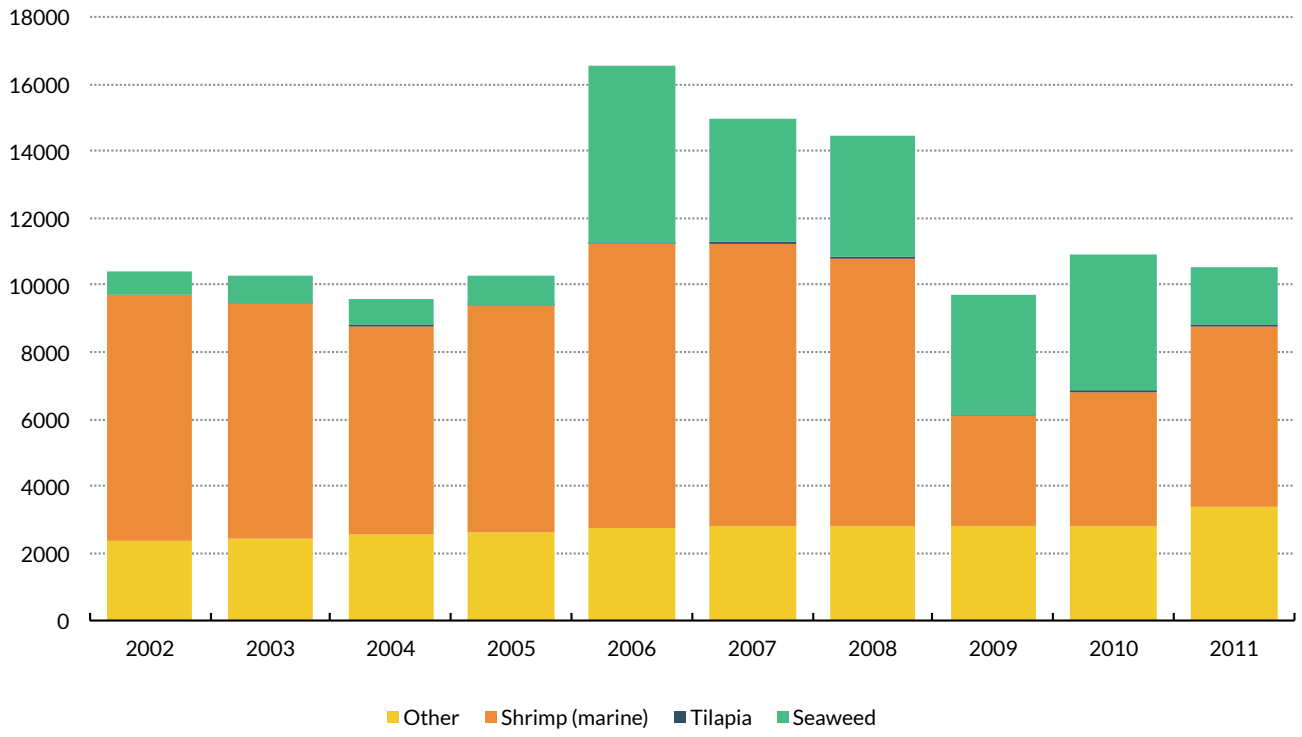
Fresh water Aquaculture production in Madagascar (in tons)

2014 -Figure 8 - Source FAO FISHTAT J (2002-2011)



7. Fish Import and Export

Import

Madagascar imports a significant quantity of frozen tuna that is then processed in canneries before being exported or sold on the local market. In 2009, Madagascar imported 15,300 MT of fish in total, of which approximately 14,300 MT was tuna, valued at US $19.1 million (FAO FishStat). More recent figures provided by Failler et al. 2011 indicate that Madagascar imports about 25,000 MT per year of frozen tuna of which 14,000 MT is then exported. The importation of frozen tuna therefore significantly contributes to national fish consumption.

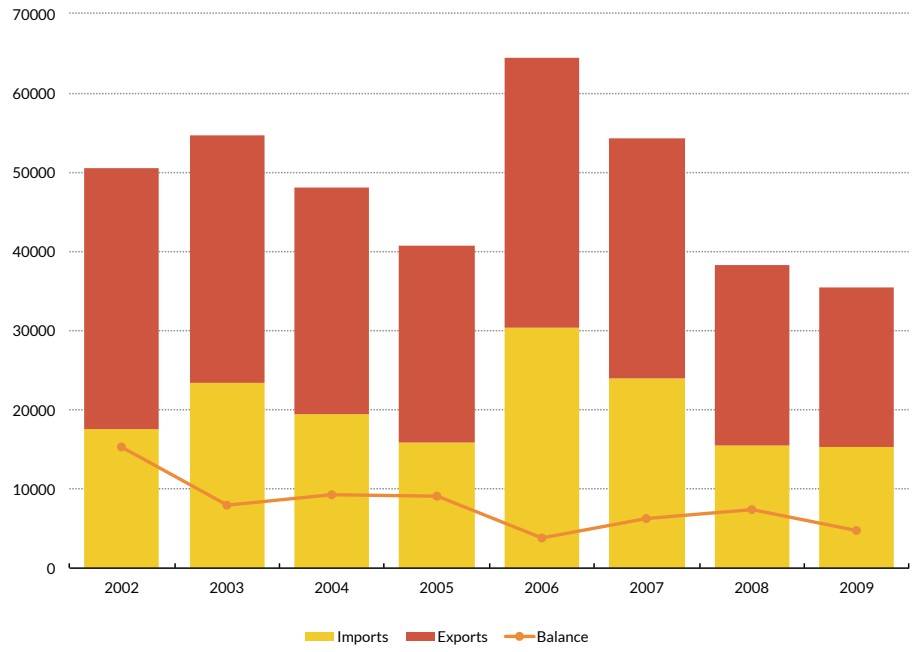
Export

Fish exports are mostly composed of frozen shrimp from industrial fishing and aquaculture, as well as processed tuna from canneries. The traditional fishery sub-sector targeting high-value species such as octopus, crabs, holothurians, however also contributes significantly to exports through systems involving fishmongers, fish collectors and fish export companies. About 85% of fish and fishery products are exported to EU markets.

According to statistics from the Fish Quality Agency (*Agence sanitaire halieutique* – ASH), Madagascar exported a total of 24,700 MT of marine fishery and aquaculture products in 2011, valued at approximately US $161.9 million. Aquaculture products were composed of shrimp for a total volume of 4,940 MT (20% total) and a value of US $ 4.7 million (40% total).

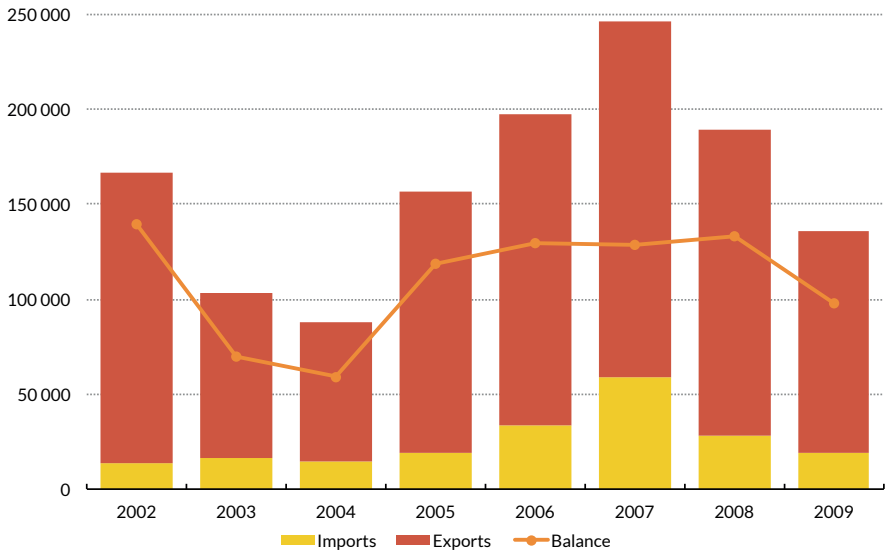
Fish trade balance in Madagascar in volume (in tons)

2014 - Figure 9 - Source FAO FISHTAT J (2002-2009)



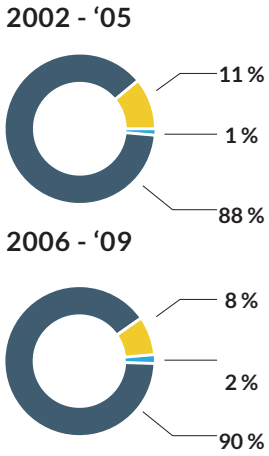
Fishtrade balance in Madagascar in value (in '000 US $)

2014 - Figure 10 - Source FAO FISHTAT J (2002-2009)



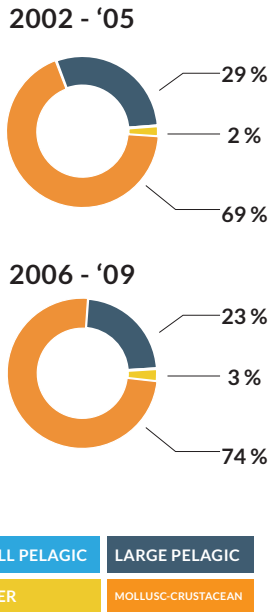
Fish Imports by category in Madagascar in value (% of $)

2014 - Figure 11 - Source FAO FISHTAT J (2002-2009) - Average period



Fish Exports by category in Madagascar in value (% of $)

2014 - Figure 12 - Source FAO FISHTAT J (2002-2009) - Average period

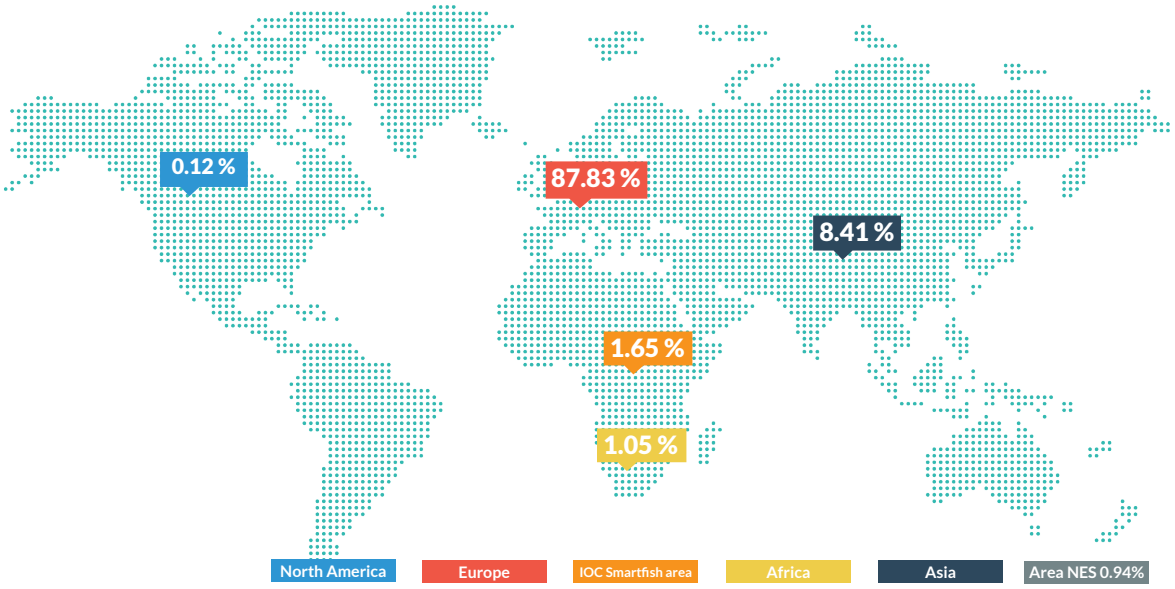


With regard specifically to the export of marine fishery products which totaled 19,760 MT (with a value of US $97.1 million), the composition of the main exports in 2011 was as follows: 53% in volume and 39% in value for tuna (cans); 19% in volume and 30% in value for shrimp; 8% in volume and 5.4% in value for 'fish' (demersal and pelagics); 8% in volume and 5.5% in value for cephalopods; 6.5% in volume and 5.6% in value for crabs. It should be noted that the export of tuna increased by about a third between 2010 and 2011, whereas the export of 'fish' decreased by approximately 50% between 2010 and 2011.

When considering the import of frozen tuna from DWFN vessels that are re-exported after processing, the quantity of fishery products exported to EU markets is currently about 42,000 MT per year (Failler et al., 2011).

Destination of fish exports from Madagascar (% of $)

*2014 - Figure 13 - Source UN comtrade (ref year 2011) - *NES : not elsewhere specified*

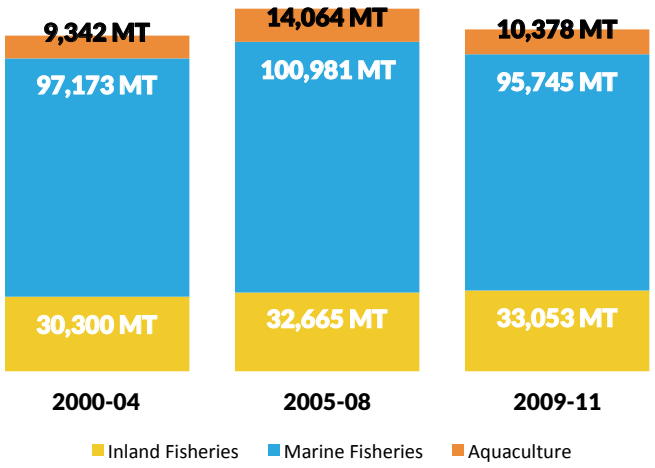


8. Contribution of the Fishery and Aquaculture Sector to the Economy

As mentioned above, statistics are difficult to come by in Madagascar, which hampers realistic estimates of the contribution of the sector to the national economy. The current **national fishery production** can be placed around 130,000 MT per year, including catches of tuna and tuna-like species by DWFN (12-15,000 MT), inland fisheries (approx. 30,000 MT) and aquaculture (approx. 10,000 MT when considering seaweed culture).

Total Fish production in volume in Madagascar (fisheries and aquaculture) (in tons)

2014 - Figure 14 - Source FAO Fishtat J (2000 -2011)



In the course of a recent IOC-SmartFish initiative on governance (2012), a technical commission worked specifically on assessing the role of the marine fishery sector (i.e. excluding aquaculture and inland fisheries) using bio-economic modelling. The performance of the marine sector was assessed in relation to the total catch by national fleet segments and the total fishery products marketed by national operators in 2010, by fishery. The table below indicates that the turnover of the marine fishery sector was estimated at US $250.7 million in 2010.

The contribution of the fishery and aquaculture sector to GDP was estimated at US $160 million in 2005, which corresponded to a contribution of 7% of the agricultural GDP (FAO country profile,

	Shrimp	Tuna	Fish	Cephalop	Lobster	Crab	Sea cucumb	Sensitive sp	Others	TOTAL
Production (t)	8 091	13 026	49 598	1 975	500	6 825	448	106	3 804	84 373
Turnover ('000 $)	49 978	45 877	112 465	5 963	6 497	19 517	3 950	128	6 300	250 674
Added value ('000 $)	32 861	30 164	73 945	3 921	4 272	12 833	2 597	84	4 142	164 818
- of which direct added value	24 989	22 938	56 233	2 982	3 248	9 758	1 975	64	3 150	125 337
- of which indirect added value	7 872	7 225	17 713	939	1 023	3 074	622	20	992	39 481

2008). More recently, it was estimated that the fishery and aquaculture sector contributes to about 10% of the agricultural GDP (Kurien John, Lopez Rios Javier. 2013).

The table above gives an estimate of the added value of the marine fishery sector in 2010 (US $164.8 million), which corresponds to approximately 2% of the GDP.

The contribution to budget revenue of the fishery sector is not negligible through the system of fishing licences, particularly in the industrial shrimp fishery with regards to the domestic fleet. The other major contributor is the tuna fishery. The EU's financial contribution from the FPA represented about US $1.5 million annually for the period 2007-2012, which does not include licence fees paid by private companies. Licence fees for the non-EU tuna fleet were estimated at US $1.3 million in 2011. In total, licence fees in the industrial fishery sector could therefore have reached a minimum of US $3.3 million in 2011, corresponding to about 0.5% of the total fiscal revenue of the government.

The EU's financial contribution through the current FPA 2013-2014 is EUR 1.525 million per year (about US $2 million). Based on a reference tonnage of 15,000 MT per year and a fee for ship owners of €35 per MT caught, total revenue from licence fees for EU ship owners could reach up to US $680,000 per year.

Marine fishery and aquaculture products play an important role in the national economy in terms of their **contribution to the national trade balance**. Shrimps and other fishery products accounted for 11.2% of exports from the free-trade zones in 2011 (exports from free-trade zones represented 40% of the value of total exports the same year), and their share of total exports was 4.5% in 2011 (Mehler A.; Melber H.; Van Walraven K. 2014). In terms of foreign currency, the marine fishery sector contributed to about 3.7% to the trade balance in 2011, according to studies carried out within the context of the IOC-SmartFish initiative on governance in fisheries.

Share of fish in trade balance (%)	Imports	Exports
2008 - 09	0.48	5.62
2004 - 07	1.17	8.37
2000 - 03	0.81	9.05

Direct **employment** in the marine fishery sector is estimated at approx. 100,000 people, of which approx. 2,300 work in the industrial sub-sector. When considering indirect employment in the sector and the poor level of development of many villages on the coast, it is likely that the marine fishery sector provides livelihoods for about 1 million people. Direct employment in the inland fishery sector might largely exceed 18,000 people, which was the figure derived from the 1988/89 frame survey.

The table below indicates that **fish consumption** per capita is low at 6.9 kg per year, far below the African average of 9.4 kg. At the same time however, fisheries products are said to be a favourite food item for Malagasy consumers and the main source of animal protein. The average consumption of fish in Madagascar's rural zones is 1.3 times per week (Kurien John, Lopez Rios Javier. 2013). Fishery products represent 17.4% of total animal protein intake, below the African average (19.1%) and well below some other countries in the region such as the Comoros and Seychelles (70.2% and 46.8% respectively).

Fish consumption in Madagascar (in live weight)

2014 - Figure 15 - Source FAO Fish and fishery product, world apparent consumption FAO STAT (2000 - 2009)

	Total fish supply quantity	Fish supply per capita	Fish protein per capita
2008 - 09	136,750 MT	6.9 kg/y	2.1 g/day
2004 - 07	125,280 MT	6.875 kg/y	2.1 g/day
2000 - 03	109,386 MT	6.675 kg/y	2.1 g/day

The current contribution of fisheries to **food security in Madagascar** is rather low, as indicated above. However, though fish consumption is stable among local households, the low consumption levels show that there is room for improved fish consumption, not to mention that current estimates may be well under-evaluated as a result of poor statistical systems. It is, also worth noting that the inclusion of fisheries in food security policies is high. Fishers also rely on their catch to provide food for personal consumption in 12 'fisheries' (of 21 'fisheries' as defined by WIOFish) while others send all their catches to markets.

Little information is available on **gender issues in fisheries**. Women are mostly engaged in fish processing and marketing activities. According to WIOFish, 2012, women participate in 14 fisheries while eight have only male fishers. Two fisheries do not have gender participation ratios, while there are no fisheries that have only women fishers.

POLICY, INSTITUTIONAL AND LEGAL FRAMEWORK OF RELEVANCE FOR THE FISHERY SECTOR

9. Fishery Policy and Planning

The last fisheries and aquaculture master plan, which covered the period 2004-2007, is now outdated. Key challenges addressed by the plan included several needs including increasing the contribution of the sector to the economic development of the country, promoting fisheries management plans, encouraging further involvement of stakeholders in the management of fisheries, integrating environmental dimension in management systems, and improving the governance of the sector.

A draft national action plan on illegal, unreported and unregulated (IUU) fishing was prepared in 2008 with the support of the SADC programme, 'Stop illegal fishing', and financed by DFID. The plan focusses on actions aimed at strengthening the Malagasy MCS system and also includes several recommendations that could be considered in view of the revision of the 1994 fisheries legislation. The plan has yet to be approved.

Several initiatives aimed at consolidating the planning capacities of the Ministry in charge of fisheries (Ministry of Fisheries and Fishery Resources - MFFR) have been undertaken in recent years. A National Consultative Council for the Management of Fisheries (NCCMF) was established in September 2010 (Ministerial Decree n°34.039/2010) as a subsidiary body of the General Directorate of the MFFR. This Council can be consulted in the context of the elaboration of public policies in the sector. The composition of the NCCMF includes representatives from the private sector and civil society. More recently, a specific planning unit (*Cellule de coordination de la politique sectorielle*) was established in 2011 by Ministerial Decree under the framework of the restructuring of the MFFR. Both structures however have proved to be barely operational, and the 2004-2007 master plan could not be revised.

During the first half of 2012, the MFFR elaborated a National Strategy for improved governance of the marine fishery sector, with technical and financial assistance from IOC-SmartFish. The rational of the Strategy was to tackle weaknesses and dysfunctions in the current governance system that are believed to affect the sustainability of marine fishery resources and hamper the expression of all economic and social benefits that could be derived from improved management of the fisheries. Moreover, due to the absence of a policy and planning framework, the Strategy proposes a vision and a list of actions that could guide public and private investments in the marine fishery sector for the next 5 years. The Strategy also provides guidance in view of the revision of fisheries legislation, considering the crucial need to revise this major policy instrument for improved governance in the marine fishery sector. The Strategy was presented by the Minister of Fisheries and Fishery Resources to the Prime Minister during an official validation ceremony that was held in June 2012

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Madagascar is also part of the Indian Ocean Commission who developed a regional fishery strategy and is engaged, supported by IOC-SmartFish, in strengthening regional strategic thinking beyond IOC and refining a regional strategic framework that defines short and mid-term working paths for fisheries management and governance.

10. Institutional Framework

10.1. Fisheries Administration

The institutional anchoring of the fisheries administration has been characterized by several changes for the last 20 years. Since 2010, there has been a specific ministry dedicated to fishery and aquaculture matters, namely the Ministry of Fishery Resources and Fisheries (MFRF).

The central services of the MFRF are based in Antananarivo. Several technical directions can be distinguished, including the Department of Fisheries and Fisheries resources, which deals with the exploitation of resources, and the Department of the Management of Fishery Resources, which deals with fisheries management.

According to the recent fisheries management plan on demersal fisheries, 2013, the objectives of the MFFR emphasize the need to increase fish production for food security, to maintain the quality of fish on the export markets, to ensure compliance with regulations for the sustainability of fish resources, and to encourage the professionalization of small-scale producers to reduce poverty within fishing communities.

At the field level, Regional Departments of Fisheries and Fishery Resources are mandated to implement the policy of the MFFR in each of the administrative regions of the country (15 regions concerned by marine fisheries in total). Regional Departments however are faced with a serious lack of resources and functional links with the central administration are weak. Consequently, their functions mostly consist of collecting data (notably commercial data) and providing technical and administrative support to fisheries stakeholders.

The recent socio-political instability is believed to have exacerbated weaknesses of the fisheries administration observed for the last ten years, resulting in particular from the lack of human and financial resources at both the central and field level. In this context, public action in marine fisheries has mostly focused on general administrative functions such as the issuance of fishing licences in the industrial sector and issuance of permits for the collection of fishery products, on the minimization of risks of IUU fishing and on the mitigation of social conflicts in the traditional fishing sector.

It should also be stressed that the renewal of staff in the fisheries administration will become a challenge in a context where a considerable proportion of staff will retire in the next 4-5 years.

10.2. Fisheries Research

Research capacity in Madagascar is significant thanks to the existence of several specialized institutions: the Fisheries and Marine Science Institute (*Institut Halieutique et des Sciences Marines - IHSM*) of the University of Toliara, the National Center for Oceanographic Research (*Centre National de Recherches Océanographiques - CNRO*), and the National Centre on Oceanographic Data (*Centre National de Données Océanographiques - CNDO*). Other public institutions indirectly engaged in fisheries research include training and research institutes in agronomic sciences (E*tablissement d'Enseignement Supérieur des Sciences Agronomiques*, *Centre National de Recherches et d'Application du Développement Rural*) and in environmental sciences (*Centre National de Recherche sur l'Environnement - CNRE*). Most of the above institutions belong to the Ministry in charge of higher education and research.

Moreover, two specific fisheries research institutions belong to the MFFR, namely the National Programme on Shrimp Fishery Research (*Programme National de Recherche Crevettière - PNRC*) and the Regional Center for Lobster Fishery Research (*Centre Régional de Recherche Langoustière - CRRL*).

Furthermore, some international NGOs such as Conservation International, World Wildlife Fund

(WWF), Wildlife Conservation Society (WCS) and Blue Ventures are supporting studies and applied research activities in relation to marine fisheries.

It is generally accepted that research capacities on certain fisheries in Madagascar are relatively satisfactory and include: shrimp, mangrove crab, cephalopod (octopus in particular), lobster, and holothurian fisheries. In the meantime, according to the 2012 WIOFish report, 76% of the fisheries have had some research conducted on them but none has been fully investigated. Stock assessments have been carried out to some extent on target species of 43% of fisheries.

The overall fisheries research system in Madagascar is however faced with several constraints of a financial and institutional nature. In particular, there is a need to improve coordination among several research institutes and to further develop collaborative linkages with the fisheries administration.

10.3. Fisheries Training

The Fisheries and Marine Science Institute (IHSM) has been involved for a long time in education programmes for fisheries specialists, including technicians, engineers and biologists (up to doctorate level). The IHSM is also engaged in refresher programmes for both public and private agents.

The IHSM is the only university with specialized curricula in oceanography and marine sciences. Other universities however have recently developed specific courses in relation to fisheries, marine science and aquaculture. These include the University of Antananarivo (*Etablissement Supérieur des Sciences Agronomiques*) and the University of Mahajanga (*Ecole d'Application des Sciences et Techniques Agricole – EASTA*).

Training and education capacities in Madagascar and their capacity to also serve regional interest were appraised by IOC-SmartFish with the view of strengthening their use in the region and to better match demand and offer.

10.4. Other Public Institutions concerned by Fisheries

The ***Agence portuaire maritime et fluviale (APMF)*** is mandated under the Maritime Code, 2000, to regulate, co-ordinate and oversee maritime affairs in Madagascar. The APMF is responsible for the registration and flagging of all vessels including fishing vessels. The APMF is also responsible for the management of port operations.

The ***Autorité Sanitaire Halieutique (ASH***) is the Competent Authority in Madagascar. The mandate of the Competent Authority is to inspect and ensure the safety of fish and fisheries products sold within Madagascar and to export markets.

The Ministry in charge of the environment is also concerned by fisheries development and management, through several initiatives aimed at developing a network of Marine Protected Areas (MPAs). The same Ministry is also supporting several collaborative mechanisms with technical ministries through a National Council for the Environment, an Inter-ministerial Committee for the Environment, and a National Environmental Office. The Madagascar National Park, which depends on the Ministry of Environment, also plays an important role with regard to the protection of marine biodiversity.

10.5. Private and Community-Based Institutions

The shrimp fishery is a strategic fishery in Madagascar in terms of economic returns. In the mid-1990s, irregular and discretionary licensing, exacerbated competition amongst fishing companies and loss of confidence between the State and the private sector resulted in overfishing and serious threats to the future of the fishery. In 1994, through a joint initiative of the shrimp industry and the

government, the GAPCM (*Groupement des aquaculteurs et des pêcheurs de crevettes de Madagascar*) was set up as a professional organization designed to represent its members' interests and develop a fair policy dialogue with public institutions (Rojat et al. 2004).

Since then, a series of management measures for industrial shrimp fisheries have been developed based on intensive dialogue between the MFFR and the GAPCM. Policy dialogue also has led to the establishment of specialized structures that are jointly managed by the MFFR and the GAPCM, such as the research programme (PNRC) and the economic observatory (*Observatoire économique de la filière crevettière*). The GAPCM has also dealt with compliance with EU sanitary regulations, monitoring and surveillance of the fishery, conflict resolution with traditional fishermen and eco-labeling. The GAPCM is also engaged in activities dealing with the promotion of shrimp aquaculture.

More recently, other producer organisations have emerged at national and regional levels. These include: a national association for fish collectors and exporters (*Groupement des collecteurs et exportateurs des produits de mer - GEXPROMER*), a national association for sea cucumber fisheries (Organisation nationale des exploitants des trépangs et holothuries – ONETH) and a regional association for lobster fisheries (*Groupement des opérateurs langoustiers du sud - GOLDS*).

At the same time, the field fisheries administration encourages the creation of fishermen associations at the local level.

10.6. Budget and Funding Mechanisms in support of Development and Management

The current funding mechanism in support of fisheries development and management in Madagascar is based on two complementary systems: regular budget expenditure which covers salaries of fisheries staff and only a minor part of operating costs, and a specific fisheries development fund, namely the *Agence Malgache pour la pêche et l'aquaculture* (AMPA). Interestingly, the management board of the AMPA consists of representatives from the main public and private fisheries stakeholders, which ensures a certain independence vis-à-vis the fisheries administration for the programming of 'projects' that are financed through this funding mechanism. It should be noted that a significant share of AMPA funds is allocated to MCS and fish quality control.

One of the major weaknesses of the current funding mechanism concerns the lack of sufficient and secure financing. AMPA, which ensure the financing of the majority of operating costs associated with management services, is highly dependent on EU financial contributions under the FPA and to a lesser extent on fishing licence fees.

11. Legal Framework

11.1. Fisheries Legislation

The current Fisheries Act (*Ordonnance 93-022 du 04 mai 1993 portant réglementation de la pêche et de l'aquaculture*) pre-dates all major international agreements relating to fisheries, except the United Nations Convention on the Laws of the Sea (UNCLOS), and needs to be updated and adjusted in light of regional and international obligations. Moreover, an in-depth analysis of the legal framework carried out in 2005 with the assistance of an EU financed project identified several gaps and weaknesses that hamper a proper MCS in the marine fishery sector. The weaknesses identified were in relation to vessel registration, technical inspections, observer systems, transshipment, compounding procedures, and categorization of infringements and penalties. Based on this, a process for the preparation of a draft Bill was launched the same year.

In the following years, a draft Bill, entitled '*Loi cadre sur les pêches*' was prepared with the assistance

of several international consultants. It should be noted that the final draft Bill, dated 2007, also included inland fisheries and aquaculture. In 2011, the process was reactivated by the MFFR and a revised draft Bill was prepared accordingly to include more recent developments in relation to IUU fishing including port state measures. The last version of the draft Bill, entitled '*Loi N°2011 portant refonte de l'Ordonnance n°93-022 du 04 mai 1993 sur la règlementation de la pêche et de l'aquaculture*', is being circulated since early 2012.

Furthermore, it should be noted that most fishing regulations are drafted as Ministerial Decrees. As a consequence of the socio-political instability faced by Madagascar for the last decade and the relatively important turnover of Ministers in charge of fisheries, many fishing regulations have been subject to revisions or have been abolished.

Unless a new fisheries Bill is drawn up, the current legal and regulatory framework is believed to constitute a major constraint for the improved governance of marine fisheries, with respect to the sustainability of fishery resources, the fight against IUU fishing and increased contribution of the fishery sector to the national economy.

In the course of the preparation of a National Strategy for improved governance in marine fisheries, several recommendations in view of the finalization of the draft fisheries Bill were formulated.

11.2. Other Elements in relation to Legal Aspects

Decentralization

With respects to texts on decentralization, local fisheries and aquaculture committees, entitled *Comités régionaux pêche et aquaculture* (CREPA), can be established with a mandate to provide advice to local authorities on fishing and related activities. Regional committees for integrated coastal zone management (*Comités régionaux pour la Gestion intégrée des zones côtières - CR-GIZC*), can also be set up with a mandate to advise local authorities in coastal development and management. Such committees however have proved to be poorly functional.

Environment

The Ministry in charge of the environment, based on texts relating to the local management of natural resources (*loi GELOSE de 1996*), has strongly supported the transfer or the sharing of responsibilities with community-based organizations (CBOs), including fishing communities, for the management of natural resources, through the establishment of local contracts. Several NGOs are supporting CBOs in the implementation of these contracts with emphasis on the elaboration and adoption of local by-laws (called Dina) which may include measures in relation to the regulation of fishing activities in the concerned zone. Dina can be legally recognized through local jurisdiction.

Participation in Regional Fishery Bodies

Major challenges for Madagascar in terms of fishing cooperation relate to tuna and tuna-like fisheries. Madagascar is thus an active member of the Indian Ocean Tuna Commission (IOTC). The level of cooperation of Madagascar with IOTC is however believed to be insufficient considering the weaknesses of the tuna fisheries monitoring system and the lack of means to fully comply with IOTC resolutions, in particular those relating to Port State measures. It should be noted that the MFFR is currently being supported by IOC-SmartFish to improve the effectiveness of its management functions and services in this regard.

Madagascar is also a member of the South West Indian Ocean Fisheries Commission (SWIOFC).

Fishing Agreement

The current protocol for the fisheries partnership agreement between the EU and Madagascar was signed on 6 December 2012 and covers the period 1 January 2013 – 31 December 2014 with a financial contribution of EUR 1.525 million per year out of which EUR 550,000 is dedicated to the support of the fisheries policy of Madagascar. This fisheries agreement allows EU vessels mainly from Spain, Portugal and France to fish in Malagasy waters and is part of the tuna network fisheries agreements in the Indian Ocean.

Apart from the FPA on tuna with the EU, Madagascar is not engaged in any other international fishing agreements.

FOCUS ON FISHERIES MANAGEMENT AND RELATED ISSUES IN THE MARINE FISHERIES

12. Administrative Functions

Fleet registration and management

The APMF is responsible for the registration of artisanal and industrial fishing vessels, in accordance with the Maritime Code, 2000. It should be noted that the Maritime Code has been under revision since 2008. This revision is believed to provide an opportunity to improve the current fleet registration and management system, which is characterized by several weaknesses with regard to fisheries management and the need to fight against IUU fishing.

In particular, there is no formal registry for national vessels authorized to fish either in Malagasy waters, international waters or in other EEZs in the region. There are also weak collaborative linkages between the APMF and the MFFR in procedures for the naturalization of fishing vessels. As a matter of consequence, the list of fishing vessels flying a Malagasy flag is believed to be incomplete since it does not consider those vessels which do not operate in Malagasy waters. Furthermore, the APMF service in charge of the registration of vessels does not systematically consult the history of vessels as well as the list of IIU vessels established by regional fishery bodies.

The registration of fishing canoes in the traditional fishery sector is the responsibility of the MFFR. However, the rate of registration of canoes is low, despite the launching of pilot campaigns in recent years with the assistance of the Fisheries Surveillance Center (*Centre de surveillance des pêches* – CSP).

Authorizations to fish

In the case of industrial shrimp fisheries, a Ministerial Decree dated 2000 introduced new fishing rights resulting from strong policy dialogue with the industry (represented by the GAPCM). Fishing rights are limited in number, valid for 20 years and transferable. Fishing licences are issued annually with fees calculated on the basis of effective fishing effort and economic performance reviews of preceding years. The economic observatory, OEFC, plays a major role in the procedure for the calculation of annual fees.

In the case of the other industrial and artisanal fisheries, the signature of an access agreement between the Malagasy State represented by the MFFR and a fishing company is a prerequisite to exert any type of fishing. Annual fishing licenses can then be issued to fishing companies by the MFFR through a procedure involving several structures including the CSP. This system presents some weaknesses including the lack of harmonization of access agreements, a lack of differentiation between licenses (for example, it is the same license for small pelagics and demersal fish) and sometimes unclear conditions attached to licenses. Furthermore, according to the Fisheries Act, 1993, the Minister in charge of fisheries must consult an inter-ministerial commission before issuing annual licenses; however such a commission has not met for a long time.

In the traditional fishery sector, access to fishery resources is open.

Fish quality

The ASH, which is the Competent Authority, is responsible for fish quality control. The system for fishery products sold on the export market has proved to be effective and is beneficial to both the industrial and traditional sub-sectors concerned. The system for fishery products sold on the domestic market needs significant improvements.

Furthermore, Madagascar has recently encountered problems with the 'white spot' disease, which affects shrimp products, found in particular in aquaculture farms. This disease does not present a sanitary risk for consumers. On the other hand, negative repercussions on value addition of shrimp fishery products are significant.

13. Fisheries Monitoring

With the exception of the industrial shrimp fishery and the lobster fishery that are satisfactorily monitored by the OEFC, current fisheries monitoring systems in Madagascar show several weaknesses. Statistical data that are produced can only satisfy part of the basic needs of the fisheries administration. It is generally accepted that data and information available in support of fisheries management, including research, are largely insufficient.

14. Fisheries Management Systems

The predominant management system in Madagascar, with the exception of the industrial shrimp fishery and the tuna fishery (through the IOTC), is a conventional system characterized by poorly regulated access to resources and the existence of classical technical management measures such as minimum mesh-size, size restrictions on catch, prohibition of certain gears or fishing methods and closed seasons. Moreover, the level of compliance with existing regulations is very low in the traditional fishery sub-sector. Traditional fisheries are indeed mostly controlled up-stream through inspections of the activities of fish mongers and fish collectors.

On the other hand, Madagascar's experience in the management of industrial fisheries based on effective public-private partnership mechanisms is often cited as an example for the African continent. This refers notably to the development of innovative methods aimed at ensuring recovery of shrimp stocks while ensuring equitable sharing of economic benefits from the fisheries among various stakeholders including the Malagasy State: limited number of fishing licenses, effort control based on technical characteristics of the trawl nets, introduction of measures to prevent any form of monopolistic situation, and specific methods for the calculation of license fees based on bio-economic modeling. The co-management system in industrial fisheries has also led to the establishment of joint public-private institutions aimed at delivering management services, such as the OEFC and the PNRC. Such efforts will not however prevent a global reduction of shrimp stocks as a result of difficulties encountered to regulate traditional shrimp fishing activities in spite of several initiatives including the development of collaborative managed area (*Zone d'aménagement concerté –ZAC*).

It should also be stressed that since 2003 Madagascar has promoted several initiatives in relation to the development of fisheries management plans on specific high-valued fishery resources such as crabs, octopus, lobsters and sea cucumbers. The sea cucumber fishery was for instance totally closed in 2004. Recent initiatives related to the management of the sea cucumber on the west coast aim to promote integrated fishery-aquaculture systems in close collaboration with fishing communities. It should also be noted that in April 2013 a management plan on demersal fish, that is consistent with Ecosystem approach to fisheries (EAF) in three regions (Toliara, Mahajanga and Toamasina), was adopted.

Participation in fisheries management

There is a long tradition of encouraging responsible systems for the exploitation of inshore fishery resources within traditional fishing communities all along the Malagasy coast. However, traditional practices tend to lose their legitimacy as a result of the increased migration of opportunistic fishers

who do not originate from the coast. Conflicts arising from these migrations are more and more frequent.

The current Fisheries Act, 1993, encourages the creation of local advisory fisheries councils bringing together representatives from fishing communities, fisheries administration and local authorities. In practice, such co-management mechanisms are barely operational.

In parallel, the fisheries administration has encouraged the development of other formal mechanisms derived from environmental texts, such as texts dealing with the GELOSE (transfer and co-sharing of responsibilities with CBOs for the management of natural resources) or with the promotion of integrated coastal zone management. Most of these initiatives have been supported by donors and NGOs and have led to the promotion of different concepts including the following: ZAC approach for traditional shrimp fishery; a 'reserve' or 'Locally Managed Marine Areas – LMMA' approach for octopus fisheries in the Northern Toliara area; a 'Mangrove reserve' approach for the crab fishery in Belo-sur-mer; 'participatory management' for multi-species fisheries in the Southern Toliara area.

All of these approaches are based on similar conceptual approaches which consist of setting-up consultative mechanisms among all public and private stakeholders, promoting consensus-building for the identification of local management measures (Dina), and facilitating the legal backing of such measures. Such approaches have produced significant results in some cases and for specific fisheries such as the octopus fishery (establishment of effective closed seasons) but are believed to produce limited impacts in the longer term unless the crucial issue of controlled access to fisheries is adequately addressed.

IOC-SmartFish has initiated similar process with the communities of St Luce, GOLD and AZAFADI (NGOs) for the local management of spiny lobster stocks.

15. Fisheries Control, Surveillance and Enforcement

The Fisheries Surveillance Center (*Centre de Surveillance des Pêches - CSP*) is a body of the MFFR, which was established in 1999 by Ministerial Decree. The mandate of the CSP is to ensure compliance with fishing regulations for the preservation of fishery resources and the sustainable development of fisheries. Until recently, the legal status of the CSP was assimilated to a project. Since October 2012, the CSP has been institutionalized through Decree n°770/2012. It is now a public administrative body benefitting from an autonomy status for financial management, belonging to three ministries: MFFR, the Ministry in charge of budget, and the Ministry in charge of public accounting.

The MCS system for industrial fisheries has proved to be quiet effective in recent years, thanks to several initiatives and projects aimed at building capacities of the CSP including staff, equipment and infrastructure. The current MCS system for industrial fisheries is composed of, amongst others, a vessel monitoring system facilities for the surveillance of both national and foreign vessels, 3 patrol boats (of which 1 is coastal) that are operational between 120 and 150 days per year, aerial means of surveillance totaling approx. 100 hours per year, on-board observers, and inspection systems at ports. The CSP also recently signed a MoU with the Malagasy Navy to synergize the use of governmental vessels for operations at sea, as well as with the military police (*gendarmerie*) to strengthen the surveillance system in inshore waters and on land.

Finally, it should be stressed that the CSP has actively participated in joint surveillance operations at the regional level managed through the IOC under the framework of its regional programme for tuna fisheries surveillance and IOC-SmartFish. In 2011, the CSP participated in regional operations for a total of 166 days at sea and 180 hours of aerial surveillance.

The major weaknesses of the current MCS in Madagascar includes the lack of effectiveness of the system of on-board observers for industrial fisheries, the lack of training of inspectors, and the deficiencies of the monitoring system of DWFN activities when entering the Malagasy EEZ. Moreover, the budget to cover MCS operating costs has steadily decreased since 2009, in spite of the establishment of the AMPA financing mechanism.

In the traditional fisheries, the level of compliance with existing regulations is poor in general as a result of several weaknesses in the MCS system. Major weaknesses include the lack of representatives of security forces in many fishing villages, the lack of authorized staff along the 5,600 km coastline, and a lack of clarity of legal texts in certain zones. Political interferences with local authorities are also believed to contribute to difficulties of MCS and enforcement in the traditional fishery sub-sector.

16. Major Issues relating to IUU Fishing

Despite considerable efforts developed in recent years in terms of the strengthening of MCS, the level of IUU fishing in Malagasy waters is still believed to be important. This refers in particular to the existence of illegal fishing both in territorial waters and in the EEZ, the under-declaration of tuna catches by seasonal DWFN present in the EEZ and the existence of illegal transshipment at sea of industrial catches.

In the traditional fishery sub-sector, major IUU fishing relates to poor compliance in general with existing fishing regulations, including in the traditional shrimp fisheries, the use of mosquito nets. The use of rudimentary and dangerous diving systems in the holothurian fisheries is also to be deplored.

It should be noted however that most official cases of IUU are related to the collection of fish (80% of a total of 217 cases in 2010, 75% of a total of 464 cases in 2011).

Furthermore, as mentioned above, several gaps in procedures for the registration of fishing vessels with regard to recent international developments may increase the risk of IUU fishing not only in Malagasy waters, but also in international waters and in the EEZs of other countries in the region.

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