

# **ASSIGNMENT: COST-BENEFIT ANALYSIS OF THE SOUTH WEST INDIAN OCEAN FORUM FISHERIES AGREEMENT [SWIO-FFA]**

**Sponsored by:**

**WORLD BANK SOUTH WEST INDIAN OCEAN FISHERIES PROGRAMME (SWIO-Fish 1) implemented by the INDIAN OCEAN COMMISSION**

**DRAFT FINAL REPORT**

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## Preface

*The consultant was invited by the SWIOFC and the World Bank SWIO-Fish 1 Project to present the Draft Report of the Cost-Benefit Analysis and Financing modalities of the project options for the establishment of a Regional Fisheries Framework Agreement for SWIO States to the MTCTF and WPCCTF at Maputo, Mozambique from the 17 to 21 September.*

*The consultant is thankful to the sponsors and delegates for the positive interactions during these above-mentioned meetings and for their most constructive inputs which have been integrated judiciously in the final version of the report. Despite of the paucity of reliable fisheries and financial data at the national level for conducting the study, the consultant has left no stone unturned to paint a realistic scenario of the SWIO shared tuna fisheries and its development potentials for the achieving the Global SDG 2030 and the Blue Growth Initiatives. This project can be a game changer for developing coastal and small island states of the SWIO basin. It is to be fuelled by compassionate regional solidarity and political leadership inspired by the ideals of the regional economic integration and South-South Cooperation.*

*Many thanks to the previous consultants who have worked on the institutional and organisational aspects of the SWIO-FFA that have paved the way for this economic study. Despite their tight schedule, they find time for a physical meeting during my short visit to Seychelles. Their insights and guidance have been very useful indeed. The consultant is also grateful to Mr. Vivian Fernandes, Policy Officer of the South Pacific Forum Fisheries Agency for the virtual discussions and sharing of selective documents.*

*The consultant is also indebted to the Permanent Secretary of the Seychelles Ministry of Fisheries and Agriculture, Mr Jude Talma and his professional staffs at the Seychelles Fishing Authority for the facilitation of my mission, including the excellent logistic supports.*

*Finally, I wish my gratitude the Coordinator of SWIO-Fish 1 Project and the representative of the African Chapter of WWF for giving me the opportunity to serve their constituencies through the implementation this study.*

*Sincerely,*

*Dr Soobaschand Sweenarain  
Fisheries Economist  
1<sup>st</sup> October 20158*

## **Executive Summary**

### **Exposition**

The purpose of the study is to conduct a Cost-Benefit Analysis of the project options related to the operationalisation of a Regional Fisheries Framework Agreement for the shared tuna and tuna-like fisheries resources in the South-West Indian Ocean basin. Inspired by the hallmark achievements of South Pacific Forum Fisheries Agency (SP-FFA) and its affiliates in enhancing the profitability and sustainability of the world single largest regional tuna fisheries in the Pacific Ocean, the SWIO states are weighing different institutional arrangements for adapting an analogous zone-based management system that fits in their specific socio-ecological needs and aspirations. On the backdrop of a legal consultancy on the institutional and organisational aspects of the project, this assignment is asked to examine two suggested alternatives namely: i) Establishment of an independent inter-governmental agency with autonomous financial and administrative management capabilities outside the institutional ecosystems of the South West Indian Ocean Fisheries Commission (SWIOFC) but with strong ties with the latter as a parent body and ii) Transformation of the legal structure of SWIOFC from Article VI (Advisory and Facilitation functions) to Article XIV (Autonomous administrative and financial management with binding powers) within the FAO Constitution to accommodate SWIO-FFA. The consultancy was also asked to look in the prospective financing modalities.

The Cost-Benefit Analysis (CBA) is an economic tool which is commonly used by institutional and business stakeholders for assessing policies and projects by comparing the planned costs (resources consumed) and potential benefits or values in monetary terms. A Social Cost-Benefit Analysis relevant to welfare economics is applied to the proposed two project options of the SWIO-FFA to determine their respective value-for-money against the projected public expenditures. The objectives of the study are clear, but its implementation is complicated in the absence of well-documented project alternatives which is exacerbated by the lack of transparency and availability of the needed fisheries and financial data. To overcome these major short-comings, the consultancy has designed a conceptual framework of an optimal agency based on the existing technical guidelines and expert judgement. The model is used to assess the Cost Estimates of the project. During the preliminary research it was evidenced that the two projects options are not alternatives per se but complement each other to unfold development potentials of the inshore and offshore fisheries resources of the SWIO basin in an integrative and holistic way. The rationale for proposing an institutional reform of the SWIOFC through the lenses of the intended SWIO-FFA is not well-understood. The study has attempted to do justice to the SWIOFC within its own socio-ecological ecosystem.

The SWIO tuna fisheries are a significant segment of the global multi-billion-dollar industry which is still dominated by the DWFN and multinational corporations. The economic penetration of the SWIO states is still marginal. The pathways through which the coastal states extract financial and economic benefits from their tuna and tuna-like resources, including the sale of fishing licenses / opportunities to foreign vessels, onshore transshipment and associated services, tuna processing, value-addition and marketing operations. However, this study falls short of a foregoing Economic Impact Assessment and a Regional Tuna Industry Strategy. The Regional Minimum Terms and Conditions of fisheries access, also known as the Maputo Declaration 2014 is used as a benchmark for assessing the potential license revenue gain upon the operationalisation of the SWIO-FFA.

### **Analysis**

'Binding powers' are illusionary without strong commitments on the part of the signatories to the common goals and objectives irrespective of good intentions. The root causes of the problems of underdevelopment of the fisheries sector in the SWIO basin are the predominance of the open-access regime, informal and potential unethical activities coupled with non-policy factors such as population growth, environmental pollutions, including the impacts of the climate change. These negative loops are exacerbated by policy failures, poor management and market distortions. The gist of the challenge for setting the fisheries sector on the path of sustainability is to operationalise the right enabling environments to connect it to the political economy and pushing a change of mindset of the stakeholders. By taking these bold initiatives, the sector is bound to generate potential wealth and financial resources to support its shared growth and prosperity. Therefore, a new type of thinking is necessary to bring out the desired

transformation of the common good. Development aids and grants can kick-off the engine but can substitute national endeavours.

Since the thinking of the sponsors is focused on the regional Minimum Terms and Conditions for foreign fisheries access, the study has mined the fisheries and market data of the SWIO tuna fisheries to calculate the catch value to differentiate the actual and potential license revenue. Surprisingly, the aggregated landed value of the tuna and tuna-like species in the WIO is estimated at US\$ 2.0 Billion per annum during 2007-16. However, the aggregated catch value estimates in the national waters of the SWIO states were US\$ 674 million, i.e. 34 %. It implies that 76% of the harvest is still made from the adjacent pocket of international waters. The share of SWIO states consists of one third of the industrial fisheries, US\$ 231.3 and the remaining two thirds, from the coastal tuna fisheries (US\$ 442.3 million). The annual turnover of the Distant Waters Fishing fleet in the surrounding international waters of the WIO is about US\$ 1.4 billion. Only 32% for the purse seine and 18 % for the industrial TLL fisheries occurred in the national waters of the SWIO states.

In 2016 the fisheries and market conditions of the global and regional tuna fisheries improved significantly, and the aggregated landed value was US\$ 2.6 billion. The catch value harvested in the EEZ of the SWIO states rose from US\$ 230.2 to US\$ 306.8, an increase of 25 %, but still low. The actual license revenue estimate is US\$ 20.4 million and its can be potentially increased between US\$ 16.3 and 21.6 million by implementing the Maputo Declaration 2014, and the gap of US\$ 5.3 million is about the ambiguity related to the sector support or development aid which is part of the EU Fisheries Partnership Agreement. The consultancy has also elaborated on the Catch Value per Fish Day for the industrial PS and TLL fleet to guide policy makers on a regionally coherent foreign fisheries access strategy. So, business-as-usual will not help the SWIO-states to leverage the development potentials from shared tuna resources to contribute to the global SDG 2030 and their Blue Economy Strategy.

The coastal and island states of the African Sub-Saharan region account for 40% of small-scale and 80% of industrial fisheries of the WIO – FAO Zone 57. The landed value of the total catch, including the inshore fisheries is estimated at US\$ 3.5 billion. Over 60 million peoples living in the coastal areas are directly or indirectly dependent on these coastal fisheries for their livelihoods, food and nutrition, security and cultural diversity. The gross value added (wealth creation) generated in the regional economy is assessed at US\$ 1.6 billion per year and the number of direct and indirect employment is estimated roughly at 7.5 million. The untapped economic rent from the inshore fisheries is estimated at US\$ 180 million. The missed economic opportunities of the SWIO states in the marine fisheries sector are estimated at US\$ 5 Billion annually. This is a paradox of socioeconomic poverty amidst plenty of natural renewable capital.

The operating cost of the SWIO-FFA at its full capacity is estimated at US\$ 3.0 million and the gestation period is 15 years, scheduled over 3 consecutive phases of 5 years namely: Installation, Consolidation and Cruising / Centre of Excellence. The preliminary and pre-operative expenditure is US\$ 500,000 that includes a budget of US\$ 200,000 to finance some critically important techno-economic studies to roll out the SWIO-FFA. They include a comprehensive economic impact assessment of the regional segments of the global tuna value chains, formulation of a Regional Tuna Strategy and a business plan to roll out SWIO-FFA. The recurrent budget for the first year is US\$ 1.5 million and increases gradually to attain US\$ 3.0 of the 15<sup>th</sup> anniversary. The major part of the operating cost is the pay-roll. A team of managerial and professional staffs will consist of regional experts with international exposure and will be guided by blue ribbon consultants in specific fields. The annual membership is earmarked at US\$ 10,000 per year with an increment of 5% per annum. The host country's support for the office space, basic equipment and utility services is assessed at US\$ 50,000 annually. Overall, it represents 3 to 5 % of the recurrent budget, which is relatively as compared to current practices of 10%. It is yet to be decided on the internal clustering of the member states in groups of common interest – Group 1: those offering foreign fisheries access and Group 2: those who are not within the broad spectrum of the SWIO-FFA. A cost recovery strategy is designed to the mobilisation of the financial resources within the industry. The agency is to adopt a zero-budget principle whereby any surplus of the annual income over expenditure is transferred to a reserve account or a Trust Fund. The cost recovery tools consist of: a) A Register Fishing Vessel Registry that will raising approximately US\$ 1 million (500 vessels @ US\$ 2000); A 5 % levy on top of the License fees charged to the foreign fishing and associated vessels that

will enable to raise another US\$ 1 million over the first quinquennium. A conservation fee is also envisaged to raise funding for major Work Programmes, such as the Regional MCS operation and the Regional Observers Programme. The project does not mean to increase the financial burden or to reduce the revenue inflow of the member-states, instead it encourages national fisheries revenue and savings on management costs. The afore-mentioned Trust Fund is to be levered judiciously to mobilize external financing for management and development projects. The suggested financial strategy is based on the political capital to transfer systematically the intended management cost to the industry.

A projection of the potential benefits to be derived from the operationalization of the SWIO in the short-medium and long run is also simulated. The aggregated revenue is to increase from US\$ 468.6 million to US\$ 732.6 million over its first 15 years based on the 2007-16 fisheries and market data. The focus is on the enhancement of the value of the tuna stocks and an equitable sharing of the gross value added between the DWFN and the SWIO coastal states. The simulation could not be extended to the national level due to lack of refined fisheries data. The coastal states will have to do this homework.

## **Integration**

In keeping with the above findings, the study concludes that the expected Potential Benefits from the operationalisation of the SWIO-FFA exceed by far its cost estimates. However, this project does not beg for a pre-feasibility study or CBA because it is supposed to be fuelled by high level political vision to be embedded into effective regional solidarity and leadership. It aims at maximising the profitability and sustainability of the shared tuna resources of the SWIO states that cannot be achieved by a single coastal state irrespective of its politico-economic muscles. It is acknowledged that the sovereign rights of the coastal states on their national waters are inviolable since regional cooperation is a must for harnessing the underlying shared natural wealth. The regional leaders are to take the driving seat to promote a zone-based management system in the SWIO basin to capture the full development potentials of their shared blue gold to advance the global SDG 2030 and Blue Growth Initiative. The region is lagging by nearly one generation in making such a bold decision as compared to the Pacific Island Countries. The maximisation of the license revenue is to be considered as a low hanging fruit in the regional tuna fisheries while the impetus is to be on the sustainable development of coastal and small-scale tuna value chains to maximise their economic impacts. It is to be coveted into a regionally integrated and holistic marine fisheries strategy.

## **Recommendations and Way forward**

The consultancy makes the following recommendations:

- i) To prepare a blue-print, including a policy brief and the final draft legal document and business plan of the project for high level consultation and multi-stakeholder dialogue in the SWIO-member-states. A communication and awareness building support are also necessary.
- ii) Undertake a comprehensive economic impact assessment of the regional segments of the global tuna value chains to develop baseline socioeconomic indicators for informed policy-making and management decisions a building block towards performance Monitoring & Evaluation.
- iii) Formulation of a Regional Tuna Strategy and budgeted Action Plan that reflects the development needs and aspirations of the member-states.
- vi) Negotiation with the IOC / SWIO member-states regarding the institutional anchorage of the Regional Fisheries Surveillance Programme that fits in the SWIO-FFA agenda and objectives.
- v) A Strategic Alliance with the SP-FFA to benefit from its learning investments and best practices
- vi) Talk with supporting development agencies and NGO to mobilise the necessary technical and financial assistance during the preliminary and pre-operational phase
- vii) Conduct a comprehensive feasibility study and business plan regarding the institutional transformation and financing of the SWIOFC.

## Section 1 - Introduction

The purpose of this consultancy is to conduct a Cost-Benefit analysis of the Regional Fisheries Framework Agreement<sup>1</sup> for the shared marine fisheries resources with primary emphasis on the tuna and tuna-like species in the SWIO basin. The initiative is sponsored by the World Bank's SWIO-Fish 1 project, which is implemented by the Indian Ocean Commission in collaboration with the SWIOFC and allied regional institutional and non-governmental stakeholders<sup>2</sup>. Inspired by the hallmark achievements of South Pacific Forum Fisheries Agency and its affiliates in enhancing the profitability and sustainability of the world single largest shared tuna fisheries in the Pacific Ocean, the SWIO states are weighing different institutional models for adapting an analogous zone-based management system that fits in their own socio-ecological environments. On the backdrop of several technical studies, particularly two recent ones supported by the SWIO-Fish 1 and WWF-African Chapter<sup>3 4</sup>, this assignment is asked to examine two project options more fully described at Article 2.1.1 of the Terms of Reference<sup>5</sup>, which are summarised as follows:

- i) To conduct Cost-Benefit Analysis (CBA) of the proposed options for the institutional development of the SWIO- Forum Fisheries Agreement. These alternatives are:
  - a) Establishing of an independent Inter-Governmental Agency outside the institutional ecosystem of the SWIOFC, but with strong linkages with the latter
  - b) Transformation of the legal structure of SWIOFC from Article VI (Advisory and Facilitation functions) to Article XIV (Autonomous administrative and financial management and binding powers) within the FAO Constitution to accommodate SWIO-FFA.
- ii) To identify sustainable financing modalities for the operationalisation of either options of the SWIO-FFA in the short, medium and long-term perspectives.

In other words, the modus operandi of this work is to tell apart the expected additional Cost and Benefits involved in these two pre-selected project options to inform the key stakeholders on the best choice in terms of direct financial and economic impacts as well as the cost effectiveness for the operationalisation of the SWIO-FFA. It intends to demarcate the ex-ante or business-as-usual status and the ex-post scenario for showing the potential net benefits of the contemplated RFB in the short-medium and long-term prospective.

### 1.1 Conceptual frameworks

The Cost-Benefit Analysis (CBA) is an economic tool which is commonly used by institutional and business stakeholders for assessing policies and projects by comparing the planned costs (resources consumed) and potential benefits or values in monetary terms. A Social Cost-Benefit Analysis relevant to welfare economics and public finance is suggested to weigh the

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<sup>1</sup> Also referred to as the Forum Fisheries Agreement in the technical reports, including the present one.

<sup>2</sup> Regional Economic Communities – COMESA, EAC, IGAD, SADC; AU-IBAR; Regional Fisheries Management Organisation / Fisheries Bodies: IOTC and SOFIA and Non-Governmental Organisations namely, WWF engaged in the maritime façade of the East-Southern African region.

<sup>3</sup> An assessment on Options to render SWIOFC more effective in meeting the needs of its member-countries performed by the same above-mentioned consultant which performed on the backdrop of its Performance Review Report 2011;

<sup>4</sup> Technical discussions on the framework Agreement for cooperation on fisheries of common interest for the South West Indian Ocean (SWIO) countries and fisheries Accord for shared fish stocks under the common process and driven by the SWIOFish1/SWIOFC, 2017.

<sup>5</sup> The Terms of Reference of Assignment and the approved Technical Proposal of the Consultant is given at Annex 1

proposed two institutional scenarios to ascertain the value-for-money of the projected public investments in two alternatives, in terms of least cost or maximum social benefits. The objectives of the study are clear, but its implementation is complex in the absence of well-documented project alternatives or blue-prints<sup>6</sup> which is exacerbated by the lack of transparency and availability of the needed fisheries, financial and market data. To overcome these major short-comings, the consultancy proposes to design an optimum SWIO-FFA based on the existing technical guidelines and expert judgement. However, it is cautioned that a CBA cannot substitute a feasibility study, or a SWOT Analysis and its outcomes are reliant on the inputs of the key stakeholders. Also, it is an ex-ante analysis that has no control of future externalities<sup>7</sup>. The cost and benefit centres of the SWIO-FFA are discussed below.

### **1.1.1 Cost Factors**

The social cost is assessed in terms of financial expenditure involved in the implementation of the project as well as the opportunity cost or foregone benefits due to business-as-usual or inaction. The study creates a baseline scenario or counterfactual to enable an assessment of the foregone benefits or missed opportunities. It is assumed that a dedicated business-oriented FFA is required by the SWIO states to unleash the full development potentials of the shared Multi-Billion-Dollar tuna fisheries for their common good<sup>8</sup>.

SWIO-FFA is a strategic and service-oriented platform which is to be fuelled by an inspiring regional solidarity or collective political capital and leadership. It is not capital-intensive and therefore, flexible in terms of organisation and functional growth<sup>9</sup>. The project concept<sup>10</sup> comprises 3 main cost centres namely, the upfront or preliminary cost, the recurrent budget, including the one-off installation expenditure and selected Work Programmes. These Work Programmes are generally supported by external or extra-budgetary funding. The inhouse professional team is to be responsible for the key advisory and facilitation functions as well as for project-cycle management of relevant projects, including resource mobilisation and partnership development. Some of these regional tuna management programmes<sup>11</sup> exist and may have to be reorganised under the intended mechanism at no additional costs.

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<sup>6</sup> *The previous consultancies have researched extensively the subject-matter to deliver valuable information on the possibilities and processes for the project designs, but we were not required to formulate a finite project or project options. It is understandable that ultimate decision is not simply technical but strategic as well. However, it is a missing part of the puzzle for an effective CBA.*

<sup>7</sup> *The future externalities include positive as well as negative effects of non-policy factors such as population growth and market as well as economic factors influencing the global supply and demand of tuna and tuna products; technological innovations in the fishing and processing operations, cost effective artificial intelligence and machining learning in MCS activities; the impact of climate change on the migratory patterns of the tuna stocks, changes in the governance of the high seas which are still open-access of the Wild West...*

<sup>8</sup> *SWIO-FFA is to be backed by a realistic theory of change or logic framework that converges the needs and inspiration of the coastal states in a common but differentiated vision in line with their socio-ecological environments. However, as true as the sovereign rights of the coastal states are inviolable, the regional solidarity is a prerequisite for strengthening regional political capital to maximise the profitability and sustainability of the shared tuna fisheries in the SWIO basin.*

<sup>9</sup> *In the 1970s, the SPFFA started with an initial budget of about US\$ 100,000 and 3 professional staffs to grow steadily over the past 3 years to attain an annual budget of US\$ 30 million and 300 staffs which is financed predominantly by external sources. (SPFFA Annual Report 2016/17).*

<sup>10</sup> *The SWIO-FFA itself can be considered as a programme, which is made up of multiple projects enabling it to thrive the development needs and aspirations of its member-states within the complex and dynamic regional environments.*

<sup>11</sup> *The Harmonised Minimum Terms and Conditions, the Regional Observers Programme and particularly, the IOC-Regional Fisheries Surveillance Programme which is a one-stop-shop for the Monitoring, Control and Surveillance tools, including a Regional VMS and AIS; a Regional Fishing Vessels Register, a Real Time Fisheries*

There is no significant cost differential between the proposed two project options. In fact, they are not alternatives but complementary or synergetic in many ways<sup>12</sup>. Both necessitate an independent political process for seeking the high-level approval related to their institutional anchorage or reform. The project upfront cost is estimated in the range of US\$ 200,000 – 300,000 depending on the schedule that may take up to 2 years in an optimistic scenario. The expenditure can be shared by engaging common techno-administrative processes through the SWIOFC Secretariat.

It is recommended by the previous legal and organisational consultancies that the upcoming SWIO-FFA should not be lodged inside the present or reformed institutional ecosystem of the SWIOFC<sup>13</sup>. It is mandatory for the latter to be an independent regional fisheries body with an autonomous administrative and financial management system based on international standards and best practices. This requisite does not undermine the synergies with its parent agency and the external fisheries, economic and donor organisations. The rationale for proposing an institutional reform of the SWIOFC through the lenses of the intended SWIO-FFA is not well-understood. This study may fail to do justice to the strategic significance of the latter in the regional marine fisheries landscape.

### **1.1.2 Benefit Estimates**

The SWIO tuna fisheries are a significant part of the global Multi-Billion-Dollar industry which is dominated by the DWFN and multinational corporations<sup>14</sup>. The level economic appropriation of the tuna fisheries by the SWIO states is still marginal. Compared to the WCPO, the sub-region is lagging by nearly four decades in ascertaining their collective ownership with regards to the sustainable management and responsible development of the tuna fisheries resources in their national waters and the adjacent pockets of international waters.

The pathways through which the coastal states can extract financial and economic benefits from their tuna and tuna-like resources, including the sale of fishing licenses / opportunities to foreign vessels, onshore transshipment and associated services, tuna processing and value-addition operations as well as marketing and sale of raw tuna, semi-processed and processed tuna products. The regional tuna stocks are unevenly distributed across the SWIO basin based on the geo-ecological factors which are quite well documented. The coastal states are to acquire in-depth understanding of the techno-economic, operational strategies of the fishery types; the regional segments of the global tuna value chains and governance as well as the bio-economic interactions among them to develop a regional strategy. However, this study falls short of a foregoing Economic Impact Assessment and a Regional Tuna Industry Strategy to conceptualise the SWIO-FFA project.

#### **1.1.2.1 License Revenue**

The license fee is a financial reward to the coastal states for granting fishing opportunities to foreign vessels inside the national waters under specified rules of harvest. This payment

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*Management Information System, a Participatory mechanism for Sea and Air patrols and so on. The SWIO-FFA is to capitalise on its existing organisational infrastructure, including a fully operationalised Regional Networks of High-Level National Coordination Units in 8 participating states of the SWIO basin.*

<sup>12</sup> *The development potentials of the marine sedentary fisheries resources are as more significant than the highly migratory and straddling fish stocks to the SWIO States and they should not be traded-off against each other. A holistic and integrated fisheries management approach is required to maximise the socioeconomic and ecological benefits from marine fisheries under the Global Blue Economy Strategy. SWIOFC and SWIO-FFA are engaged in the same geography with different thematic mandates or functions which are mutually enriching.*

<sup>13</sup> *Please refer to the final technical reports of the legal consultants, Swan J and Payet R.*

<sup>14</sup> *Upon the enactment of the UNCLOS 1982, the coastal states worldwide were expected to enhance to socioeconomic and ecological wellbeing from the sustainable management and development of the natural resources inside their 200 nautical miles of EEZ. However, little progress has been achieved in these areas so far.*

represents a fair share of the ex-vessel value of the catch, including the management and conservation cost involved for maintaining the integrity of the fish stocks and their ecosystem. It is therefore crucial to assess the catch value of the harvest in the national waters to calculate the license revenue<sup>15</sup>. Based on historical fisheries and market data, it is possible to establish an indicative Total Allowable Catch or Quota based on which fishing opportunities or authorisation to fish can be established at the national level. However, this cannot be achieved for most of the SWIO states due to lack of consistency of the fisheries and environmental data. The strategic thinking relates to restricting the supply of fisheries access in a concerted manner to increase the market value of the scarce tuna resources. Market information of the globally traded raw tuna and tuna products is readily available but the assessment of the ex-vessel value of the catch is an intricate exercise owing to the intertwining nature of tuna value chains and markets volatility<sup>16</sup>. The ex-vessel price data of the different tuna species in relationship to their end-markets over the 2012-2016 are compiled from the FAO Globefish tuna market database. The data on license revenue at the national level are still not in the public domain.

The financial and economic leakages from the IUU fishing which is predominately conducted by licensed vessels and huge discards at sea owing to exponential growth FAD fishing are also evaluated. The SWIO states can act collectively to establish more stringent harvest rules than the IOTC to safeguard their fisheries resources. The Regional Minimum Terms and Conditions of fisheries access, also known as the Maputo Declaration 2014 is used as a benchmark for assessing the license revenue in the “With” and “Without” SWIO-FFA scenarios. Some SWIO states are precluded from this exercise because they do not grant fishing opportunities to foreign fleets in their national waters. They have been differentiated in two groups namely:

- i) **Group 1** - Those who grant fishing licenses to foreign vessels: Comoros, Kenya, Madagascar, Mauritius Mozambique, Seychelles and Tanzania.
- ii) **Group 2** – Those who do not grant fishing licenses to foreign vessels: Reunion (France), Maldives, Somalia, South Africa and Yemen.

The Group 2 (except Somalia and Yemen<sup>17</sup>) are promoting deeper collaboration with foreign fishing companies through joint ventures and flagging arrangements. Commercial information is not readily available to appraise the net value-added of these business collaborations at national levels. In the absence of regional MTC for doing business in the sub-region, there is a risk that some coastal states may play down each other in the race of domesticating foreign fishing companies while weakening regional bargaining powers. Currently, only a small fraction of the total catch is claimed by the DWFN to be harvested in the national waters of the coastal states. The latter cannot challenge these data due to inadequate MCS measures. Fishing the high seas is not economically viable without fishing access to national waters of the coastal

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<sup>15</sup> There are two approaches to determine the fishing license fee namely, a royalty which is a specified percentage of the catch value or turnover of the fishing vessel operators and an economic rent that mops up the surplus profit of the fishing industry to avoid overinvestments and conspicuous spending. Royalty is commonly charged to foreign fisheries access and the economic rent, for domestic fleets. The two approaches are bound to converge to promote a sustainable or triple-win business concepts in the regional tuna industry.

<sup>16</sup> For instance, the bulk of catch of the purse-seine fishing vessels is destined to canneries although the price of the raw materials - mainly skipjack, yellowfin and to a lesser extent, bigeye – varies according the species and size of the individual fish. The traditional tuna long-line fleets, which are dominated by the South East Asian countries, target mainly albacore, yellowfin, bigeye and a small quantity bluefin tuna, including some associated large pelagic fishes, such as swordfish, marlin and sharks. The catch is preserved on board at very low temperature (-40°C) and meant for high-value canned products and frozen sashimi markets in Japan as well as other developed and emerging economies. One should not lose sight the rapid development of the small-scale – artisanal and extended chilled tuna value chains in the SWIO and other sub-regions which are supplying the domestic and export markets with high quality chilled raw tuna and semi-processed tuna products.

<sup>17</sup> Somalia and Yemen

states<sup>18</sup>. A foresighted strategy is required on the part of the SWIO states to reduce the externalities caused to their fishing industry by restricting the fishing operations of the DWFN in the waters beyond national jurisdiction.

### 1.1.2.2 Economic Impacts

The economic impacts of an industry are measured in terms of Wealth Creation or Gross Value-Added, Net Foreign Exchange Earnings, Employment, Economic integration and the income distributive or spin-off effects. The environmental cost of fishing is included as part of the social cost. Currently, the SWIO states do not have consistent economic indicators to enable monitoring of the performance of the tuna industry at the national and regional levels. An Economic Research Programme is seen as a priority of the SWIO-FFA to inform tuna fisheries management, development and trade policies. The relevance of innovative approaches such as zone-base management and Vessel day Scheme will be also discussed in the socio-ecological context of the SWIO basin.

### 1.1.3 Financing SWIO-FFA

Fisheries management and conservation is an integral part of the cost of production of the fishing industry. It is to be collected judiciously by the government through appropriate cost recovery or fiscal tools. The end market price of fish and fishery products is to reflect their real cost to the society. By overlooking these hidden costs, the developing countries are often subsidising the consumers in the rich economies. An appropriate conservation and management cost recovery strategy is required for the migratory stocks by including the economic externalities of the fishing the high seas, which is still open-access. As stated earlier, the license fee consists of two components namely, an access fee for harvesting the fish stocks, including the implicated management and conservation costs. It may be considered as an economic rent<sup>19</sup> that releases the necessary resources to maintain the profitability and sustainability by curbing overinvestments in the fisheries. The value-added of regional cooperation for the management and conservation of shared fisheries does not require any textbook justification. It is in the best interest of the SWIO states to pool and share their scarce resources to improve their MCS operations.

License revenue is a low-laying fruit in the process of domestication or appropriation of the shared tuna stocks by the SWIO states. Some SWIO states (Group 2)<sup>21</sup> have already graduated to the next stage of development by promoting joint-venture and flagging of foreign vessels in lieu of outright sale fisheries access. It is assumed that these arrangements are based on an equitable sharing of value added between the parties and are not in contradiction with the collection of an adequate economic rent to sustain the fisheries. Domestic or foreign flagged vessel should not be an exception to the rules despite the generous fiscal incentives provided to them.

In all, the establishment of the SWIO-FFA is a transfer payment rather than an additional financial cost to the coastal states. It is meant to generate additional financial and economic benefits to the national economies through the operationalisation of a right-based management

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<sup>18</sup> Sala E, Sumalia R et al (Advance Science 2018). *Economics of fishing the high seas*

<sup>19</sup> *The concept of economic rent of the fishery resources consists of a fair share of the profit derived by the fishing operators, including the cost of managing the fishery. As a rule of thumb, lower economic rent is foregone financial revenue to the governments and super profits to the fishing industry, which contributes to overfishing. On the contrary higher economic rent may disproportionately increase of the financial revenue of the government by squeezing the normal profit of the industry and may lead to illegal and unethical fishing practices to make both ends meet.*

<sup>21</sup> *Except Somalian and Yemen that do not have a fisheries licensing arrangement in place due the current political instability in the country.*

system. It strengthens their power relationship with the DWFN. Several internal and external financing means are examined for the resource mobilisation and partnership development.

## 1.2 Methodology and Assumptions

The study is based on literature research and consultation with some key stakeholders. A short mission was carried out in Seychelles<sup>22</sup>. The IOTC online database has been the major source of secondary data which was complemented by the Seychelles Fishing Authority Fisheries Annual Report 2017. Access to financial information regarding licensing of foreign vessels is still taboo across the SWIO states. The available data and expert judgement are used judiciously to reconstruct realistic scenarios for the CBA. The key technical assumptions are as follows:

- i) The weighted average used in the simulations is derived from a ten-year period, 2007-2016 for the fisheries data and 5 year (2012-2016) for the market data.
- ii) The United States Dollars (US\$) is used as a common Monetary Unit across the SWIOFC and the annual mean exchange rate is used for converting the national currencies.
- iii) Nominal market prices are used, i.e. they are not inflation-adjusted.
- iv) Discounting rate of the project is assumed to be zero because the SWIO-FFA is service-oriented and requires relatively small upfront investments.
- v) A common but differentiated approach to cater for the specific development needs and aspirations of SWIOFC states for the regional tuna industry

## 1.3 Structure of the report

Apart from this section that relates to the objectives, the conceptual and methodological frameworks as well as the main assumptions of the study, the report contains 5 additional sections which are as follows:

**Section 2** relates to the potential benefits that can be derived from the operationalisation of the SWIO-FFA for the shared tuna fisheries. It takes an in-depth look at the economics of the main segments of the regional tuna fisheries to assess the ex-vessel value of the catch harvested in the national waters of the SWIO states. It is the backbone of the study.

**Section 3** investigates the current level and potential license revenue of the SWIO-states who are granting fishing opportunities to foreign vessels. It defines the baseline or business-as-usual scenario to demarcate the net additional benefits of the SWIO-FFA.

**Section 4** reviews the proposed two project options for the operationalisation of the SWIO-FFA. The financial cost is established on the backdrop of an optimal project concept, including its genesis in the short-medium and long-term.

**Section 5** is devoted to the financing strategy of the SWIO-FFA. It is inspired by the political economy of the regional tuna industry. Several innovative financial instruments are examined.

**Section 6** integrates the findings the foregoing sections to proceed with the conclusion, recommendations and way forward for establishment of the SWIO-FFA.

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<sup>22</sup> The list of persons met during the mission is given in the Annex.

## Section 2 – Economics of the SWIO tuna fisheries

The main objective of this section is to establish the catch value of the tuna harvests in the national waters of the SWIO states and the adjacent pockets of high seas. The analysis is not limited to the four major commercial tunas targeted by the industrial segments namely the purse-seine and tropical long line fishing which are predominately controlled by the DWFN and linked to the traditional markets in the developed economies. They are obviously the drivers of the license revenue for the coastal states. The study covers the small-scale tuna fisheries that comprise the indigenous coastal and extended or semi-industrial fishing operations. This holistic approach is useful to capture the real value of the shared tuna fisheries of the SWIO basin that have not been revealed so far. It is the stepping stone to a deeper understanding of the dynamics of the hegemonic tuna value chains and the prospects for reshuffling them in the common interest of the developing coastal states.

### 2.1 Global value of the tuna industry

In 2016, 78% of the global catch comprising 7 major commercial tunas came from 23 stocks which are at “healthy” levels. SKJ tuna stocks – at healthy levels in all ocean regions – constituted more than 50% of the total 2016 catch. The SBF tuna which was overfished earlier has been recovering consistently because of stringent harvest rules by the RFMO responsible for managing the stock. In contrast, the PBF tuna and Indian Ocean YFT stock and the Atlantic Ocean BET stock remain overfished. The global catch was at 4.9 million tonnes, a 2% increase from 2015. More than half of the total catch (57%) was SKJ, followed by YFT (30%), BET (8%) and ALB (4%). The BFT (3 species) accounted for only 1 % of the total catch.

The three largest fishing grounds in tonnes are the Western Pacific Ocean SKJ, Western Pacific Ocean YFT, and the Indian Ocean SKJ. Most (53%) of the world’s tuna is caught from the Western and Central Pacific Ocean, followed by the Indian Ocean (20%), Eastern Pacific Ocean (13%) and Atlantic Ocean (10%). World-wide about 65% of the catch is made by purse seining, followed by long-line (12%), pole and line (8%), gillnets (3%) and other gears (12%).

A recently published market study sponsored by PEW Charitable Trust<sup>23</sup>, assessed the global value of the seven major commercial tunas at US\$ 12 billion at ex-vessel prices and US\$ 42 billion at retail market prices based on the 2012 and 2014 market data. The share of Indian Ocean in global pie was evaluated at 21 % or US\$ 2.5 billion at first sale prices and nearly US\$ 9 billion at retail market prices. The estimates<sup>24</sup> are conservative but they provide meat for thought to the coastal states on how the global tuna wealth is distributed. Overall, raw tuna and tuna products account for nearly 50% of the global fish trade.

#### 2.1.1 Indian Ocean tuna fisheries

In the Indian Ocean, the tuna and tuna-like species are predominately harvested by small-scale fisheries. During 2007-2016, the mean total catch was 1.74 million tonnes per year and has fluctuated between 1.87 million tonnes and 1.61 million tonnes. The WIO represents 62% of the total catch of the IO and about 81 % of the industrial fisheries. The 12 SWIO states harvested about 302,823 tonnes of tuna and associated large pelagic annually during 2007-16 period. At the sub-regional level, Maldives and Yemen topped the rank in the small-scale tuna fisheries while Seychelles led the industrial PS and TLL fisheries development. The PS fishery and the canned tuna value chains are controlled by EU interests. The TLL fisheries are dominated by the SE Asian fleets which are focused mainly on the frozen sashimi market and high value canned tuna niches.

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<sup>23</sup> Macfayden G et al. Pew Charitable Trust 2016. Study of the global estimates of the tuna fisheries, Phase 1-3.

<sup>24</sup> These market value estimates are based on the official fisheries data of the 5 Regional Tuna Fisheries Management Organisations and does not include revenue leakages due to IUU fishing and discards at sea.

Table 1 – IO Tuna & Tuna-like Fisheries 2007-16 (mt)

YEAR	WESTERN INDIAN OCEAN			EASTERN INDIAN OCEAN			TOTAL / INDIAN OCEAN		
	ARTISANAL	INDUSTRIAL	TOTAL	ARTISANAL	INDUSTRIAL	TOTAL	ARTISANAL	INDUSTRIAL	TOTAL
2007	539,982	512,530	1,052,512	505,119	130,905	636,024	1,045,101	643,435	1,688,536
2008	548,426	461,100	1,009,526	515,911	122,557	638,468	1,064,337	583,657	1,647,994
2009	529,645	435,950	965,595	569,263	114,178	683,441	1,098,908	550,128	1,649,036
2010	548,789	397,852	946,641	592,746	104,443	697,189	1,141,535	502,295	1,643,830
2011	592,641	397,449	990,090	609,497	87,008	696,505	1,202,138	484,457	1,686,595
2012	668,583	416,652	1,085,235	609,770	90,200	699,970	1,278,353	506,852	1,785,205
2013	687,588	477,243	1,164,831	634,721	105,869	740,590	1,322,309	583,112	1,905,421
2014	721,101	481,399	1,202,500	574,767	104,565	679,332	1,295,868	585,964	1,881,832
2015	701,617	496,140	1,197,757	558,299	103,733	662,032	1,259,916	599,873	1,859,789
2016	704,144	569,356	1,273,500	547,353	91,638	638,991	1,251,497	660,994	1,912,491
MEAN	624,252	464,567	1,088,819	571,745	105,510	677,254	1,195,996	570,077	1,766,073
%	57%	43	100	84	16	100	68%	32%	100%

Source: Compiled from the IOTC Online Database

The industrial fisheries are conducted mainly by the DWFN and consists of two main segments: purse-seine (PS) and tropical long line (TLL). The purse-seine fishery is an extended arm of the canned tuna value chains. The tropical long line fisheries are dominated by the SE Asian Fishing Nations led by Taiwan and the harvests are meant for high-value canned products as well as for frozen sashimi markets. The BFT is not harvested in the SWIO region. The small-scale fisheries consist of coastal and extended vessels of less than 24 metres in overall length. They use a wide variety of gears such as gillnets, large seine, handline and trolling to land fresh or chilled fish for the local markets and export value chains.

Table 2 - WIO Tuna Fisheries 2007-16 (mt)

YEAR	PURSE SEINE IND	TROPICAL LONG LINE			COASTAL TUNA FISHERIES			TOTAL mt
		IND	SEMI-IND	SUB/TOTAL	SWIO	NWIO	WIO	
2007	262,086	164,710	85,734	250,444	213,516	326,466	539,982	1,052,512
2008	286,925	114,489	59,686	174,175	199,013	349,413	548,426	1,009,526
2009	267,232	106,634	62,084	168,718	183,478	346,167	529,645	965,595
2010	275,645	89,419	32,788	122,207	178,129	370,660	548,789	946,641
2011	269,176	94,783	33,490	128,273	182,503	410,138	592,641	990,090
2012	233,224	138,792	44,636	183,428	210,671	457,912	668,583	1,085,235
2013	285,067	136,701	55,475	192,176	222,254	465,334	687,588	1,164,831
2014	283,214	124,682	73,503	198,185	216,788	504,313	721,101	1,202,500
2015	298,912	127,181	70,047	197,228	218,857	482,760	701,617	1,197,757
2016	354,532	149,068	65,756	214,824	226,078	478,066	704,144	1,273,500
MEAN	281,601	124,646	58,320	182,966	205,129	419,123	624,252	1,088,819
PCT		68%	32%	100%	33%	67%	100%	
PCT	26%		17%			57%		100%

Source: Compiled from the IOTC Online Database – Accessed in August 2018

## 2.2 Purse seine Fishery

### 2.2.1 Catch

Table 3 - WIO - Purse seine Tuna fishery 2007-16 (mt)

YEAR	SKJ	YFT	BET	ALB	MISC	TOTAL
2007	139,853	96,147	22,578	725	2,783	262,086
2008	115,232	140,137	28,512	1,424	1,620	286,925
2009	151,519	86,203	27,954	392	1,164	267,232
2010	149,461	104,095	21,616	207	266	275,645
2011	130,550	112,624	21,640	726	3,636	269,176
2012	82,414	130,224	17,072	1,297	2,237	233,244
2013	120,345	135,702	26,998	500	1,522	285,067
2014	129,366	133,408	19,710	533	197	283,214
2015	130,472	142,103	24,973	534	830	298,912
2016	185,998	146,517	21,435	428	154	354,532
MEAN	133,521	122,716	23,249	677	1,441	281,603
PCT	47%	44%	8%	0%	1%	100%

The total catch of the PS fishery in WIO was 361,987 tonnes in 2016 after coming out gradually from the peak of the piracy crisis in 2011. Nearly 95% of the purse seine fishing occurs in the SWIO basin and 91 % of the catch comprises two major tunas: SKJ and YFT.

## 2.2.2 Fleets

In 2016 there were 47 active purse seiners and 18 supply vessels in WIO and most of them were stationed at Port Victoria. During 2007-16, the number of PS and VS has fluctuated between 58 and 35, 18 and 9 respectively. The extensive use of VS is directly related to the expansion of FAD fishing.

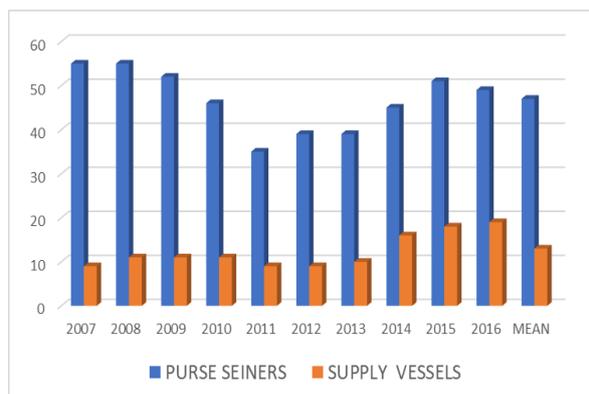


Figure 1 - WIO Active PS AND SV 2007-16

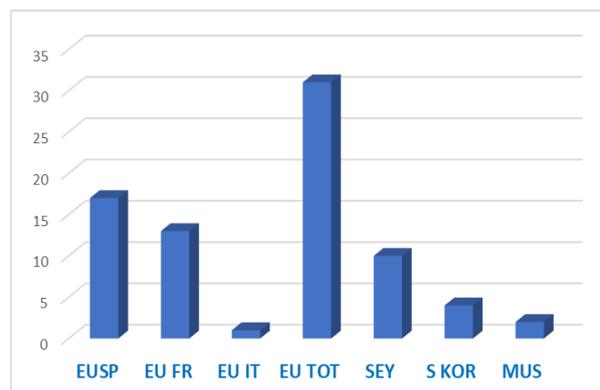


Figure 2 - WIO PS Fleets by Nationality

In the WIO, 92 % of the PS fleets in the WIO is owned by the EU member-states, including 26 % and 6 % which are flagged in Seychelles and Mauritius respectively. South Korea accounts for the remaining 8%. The fishery is driven by EU Fisheries Partnership Agreement with some of the SWIO states and the preferential access of the EU canned tuna markets under the ACP-EU Cotonou Convention. However, the EU industrial and trade policies, particularly the Rules of Origin of raw materials is a constraint for the SWIO tuna industry and need to be rendered more equitable to all parties<sup>25</sup>.

## 2.2.3 Catch Rate

Table 4 - PS Catch per Fishing Day 2007-16

YEAR	CATCH (MT)	EFFORTS F/DAYS	CATCH RATE MT/F DAY
2007	245,670	14,930	16.45
2008	278,956	13,233	21.08
2009	262,719	10,936	24.02
2010	279,244	9,318	29.97
2011	258,361	9,558	27.03
2012	231,477	9,696	23.87
2013	277,879	10,184	27.29
2014	277,837	11,789	23.57
2015	289,704	12,756	22.71
2016	350,913	13,721	25.57
<b>MEAN</b>	<b>275,276</b>	<b>11,612</b>	<b>23.71</b>

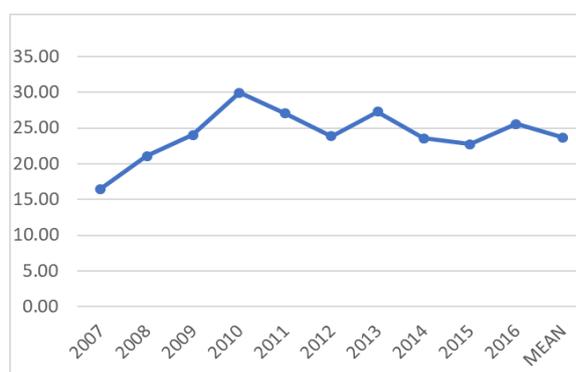


Figure 3 - PS Catch Per Fishing day (mt)

The productivity or Catch per Fishing Day (CPFD) of the PS fishery has increased consistently since 2007 to attain 25.57 tonnes in 2016. The fishing strategy as well as the economic efficiency of the different segments of the fishery varies significantly. For 2007-16 the inter-annual mean suggests that a PS has undertaken 243 fishing days to harvest 5,771 tonnes of fish annually. It assumed that it carried out 8 fishing trips of about 38 days and landed 712 tonnes per trip. In 2016 the PS fleets performed better with an average landing of 7,466 tonnes

<sup>25</sup> Stiglitz J & Charlton A, 2007. *How Trade can promote Development*

per vessel for 291 fishing days per year. The level of harvest was is slightly about the break-even point of the industry and hints at its financial precarity and reliance of inflow of the governmental subsidies.

## 2.2.4 Catch Composition

The purse seine fishery is the major supplier of raw-material to tuna canneries. The tuna species, including the individual size, commercial grade, quality, seasonality as well as the market factors have a direct impact on the sale proceeds of the boat operators.

Table 5 - PS Fishery Catch Composition (%)

YEAR	CATCH (MT)	YFT	SKJ	BET	ALB	MISC
2007	245,670	37.46	53.83	8.33	0.27	0.11
2008	278,956	40.41	49.23	7.33	0.56	0.14
2009	262,719	32.29	57.26	10.27	0.16	0.03
2010	279,244	36.93	55.07	7.91	0.07	0.02
2011	258,361	42.80	49.21	7.69	0.03	0.01
2012	231,477	35.50	35.50	7.34	0.52	0.02
2013	277,879	48.71	42.12	8.91	0.18	0.07
2014	277,837	45.64	46.47	7.64	0.19	0.06
2015	289,704	46.87	44.23	8.64	0.19	0.06
2016	350,913	41.70	52.01	6.09	0.12	0.08
MEAN	275,276	40.83	48.49	8.02	0.23	0.01

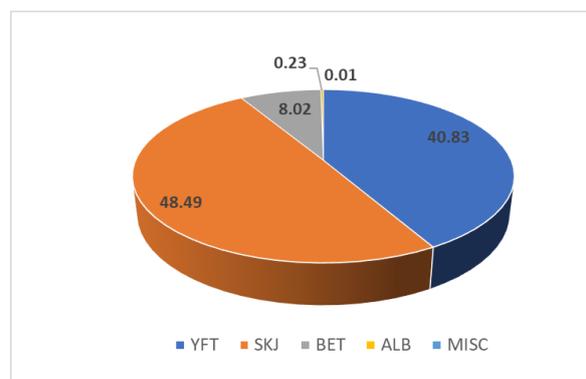


Figure 4 - PS Fishery Composition of Catch (%)

As shown in the above table, there is a major issue about the reporting on the by-catch and miscellaneous fish in the SWIO. For instance, the by-catch of the PS fishery was estimated conservatively at 14,196 tonnes with a potential market value of US\$ 13.6 million per year during 2010-12<sup>26</sup>. With the expansion of the FAD fishery in the WIO, the potential of discarded by-catch is likely to have doubled<sup>27</sup>. Despite of the Resolution 13/11 enforced as from 01/14, there has been no tangible progress in this area so far. It represents a non-negligible economic and environmental costs to the SWIO states.

## 2.2.5 Ex-vessel price of PS catch

Raw tunas and tuna products are globally traded commodities and the markets are well-connected and competitive. The ex-vessel prices are related to the market conditions of the end products, including the cost of freight and accessories for delivering the raw materials to downstream operators. Bangkok is the world trade centre for canned tuna markets. The freight-adjusted CNF price at Bangkok and the FOB price at Port Victoria are used to calculate the turnover of the vessel operators. The cost of freight and handling charges is approximately US\$ 300 per tonne. The boat owners do not disclose their financial data to third parties. There is no auction market for the offloaded catches and the prices are usually negotiated/agreed privately. During 2007-16, the prices of raw tuna and the canned products have fluctuated between 10 to 25 % within a single year and up to 50% inter-annually. It is also linked to the global trend of marine diesel prices for about 1 tonne of the fuel is consumed to harvest approximately about 3 tonnes of tuna. The ex-vessel prices used in the study are nominal, i.e. non-inflation-adjusted. The impacts of foreign exchange fluctuations and other external economic factors on the tuna markets are overlooked.

<sup>26</sup> Sweenarain S (ACP II – SMARTFISH, 2013). Market study on the by-catch of the industrial tuna fisheries in the Indian Ocean.

<sup>27</sup> Personal communication of Pascal Bach, marine ecologist of IRD based at Port Victoria. He is about the present a scientific paper of this issue at next IOTC meeting.

Table 6 - Ex-vessel Price to Tuna landed by the PS Fishery ( US\$ / mt)

YEAR	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	MEAN	LOWEST	HIGHEST
SKJ	1 128	1 500	954	1 042	1 481	1 917	1 870	1 247	995	1 217	1 335	954	1 917
YFT	1 696	1 881	1 373	1 547	2 150	2 423	2 313	1 822	1 568	1 681	1 845	1 373	2 423
BET	1 861	1 794	1 848	2 060	1 825	1 850	1 791	1 775	3 184	2 295	2 028	1 775	3 184
ALB	1 698	2 238	2 393	2 425	2 794	3 284	2 262	2 626	2 770	2 701	2 519	1 698	3 284
<b>WEIGHTED AVERAGE PRICE</b>										<b>US\$</b>	<b>1,601 /MT</b>		

Source: Compiled from the FAO Globefish Seychelles job and adjusted Thailand CNF prices

An indicative price of US\$ 500 per tonne is used for the small quantity of miscellaneous fish landed at Port Victoria. Until recently they were delivered free-of-charge to the cannery to produce pet foods and fishmeal to avoid the associated scavenging fee at port<sup>28</sup>. However, a recent market study suggested that the retail value of the by-catch of PS fishery is nearly two times of the total amount of license fees collected annually by SWIO states. There is scope for potential revenue streams from the by-catch or miscellaneous fish value chains in some of the SWIO states.

## 2.2.6 Ex-vessel Value of the PS Catch

In 2016, the aggregated turnover of the PS fleets in the WIO was estimated at US\$ 561.8 million, which is higher than the annual mean of US\$ 440.7 million for the 2007-16 period. This growth was supported by an increase in the total catch whereas the landed prices were slightly lower. The fishery is recovering from the financial crisis resulting from the Somali piracy.

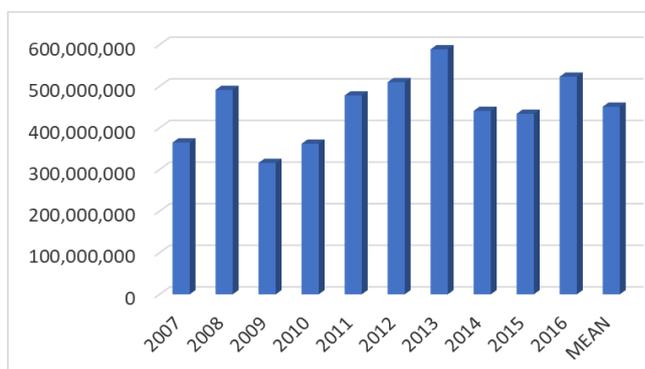


Figure 5 – Turnover estimated of the PS Fleets (US\$)

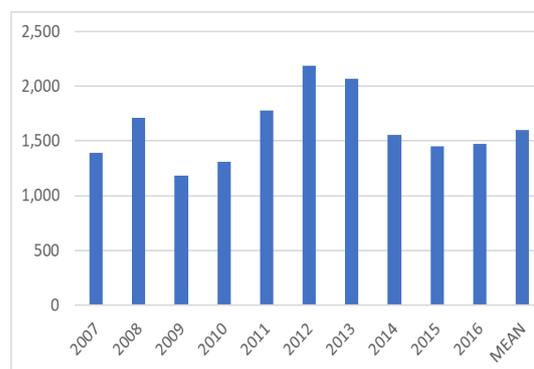


Figure 6 – Mean Price Trend of the PS catches (US\$/mt)

## 2.1.7 PS Harvest in the National Waters of the SWIO States

The data are extracted from the IOTC Historical Catch Database and the SFA fisheries data. Apart from Seychelles, it was not possible to differentiate the catch harvested by the domestic and foreign vessels in their EEZ and that of the national fleets in the international waters<sup>29</sup>. The missing data are crucial for a refined analysis and particularly for assessing Total Allowable

<sup>28</sup> There is a market of tuna by-catch at Diego Suarez and it was found that the market price was much higher than the tuna delivery to the cannery. It implies that there is strong market prospects for these by-products in the region and the coastal states have together to develop an appropriate business model. At Port Victoria, a part of these by-products is shipped in container-loads to Sri Lanka for value-addition and marketing.

<sup>29</sup> In principle, the catch harvested by a domestic or foreign vessel inside the EEZ of the coastal state bears the nationality of that country whereas the fish caught on the high seas hold the nationality of the flag state of the fishing vessel.

Catch in the national waters and the license revenue as a percentage of the catch value. So, the study could not discriminate the harvest of the domestic and foreign PS in the national waters. The exercise is to be completed by the national fisheries administrations.

*Table 7 - Summary the PS harvest in the SWIO National Waters*

YEAR	MDV	YEM	KEN	MOZ	COM	TZA	MDG	SOM	MUS	FRAT	SYC	TOTAL
2007	75	123	207	201	437	460	1,530	315	190	8,670	54,188	66,395
2008	138	98	78	744	336	105	1,065	153	65	10,186	59,805	72,773
2009	135	11	217	496	410	92	2,003	301	128	11,992	68,030	83,816
2010	4	39	140	483	429	1,117	1,227	100	160	18,114	77,336	99,150
2011	42	11	45	372	497	128	1,486	299	447	24,395	65,765	93,486
2012	6	64	302	175	512	473	977	359	716	26,869	53,164	83,618
2013	50	75	165	245	408	274	1,043	634	1,291	24,256	58,576	87,017
2014	20	8	690	10	69	345	60	868	8,282	25	64,791	75,167
2015	37	7	162	75	269	88	597	1,006	9,510	581	92,205	104,538
2016	47	4	209	130	737	842	1,095	366	11,535	677	114,085	129,727
MEAN	55	44	221	293	410	392	1,108	440	3,232	12,577	70,794	89,569

*Source: Compiled from the IOTC online Database & Seychelles Fisheries Report 2017*

During 2007-16, the mean annual PS catch was 89,569 tonnes and included 76,453 tonnes from Group 1 that formally provides fishing opportunities to foreign vessels. The annual mean fluctuated between 66.395 tonnes (2007) and 129,727 tonnes in 2016. Over this ten-year period, the PS fleets have spent 3771 effective fishing days in the national waters of SWIO states of total 11,612 fishing days in the WIO, which is approximately 32.5 % of the aggregated fishing efforts. It implies that 67.5 % of the total fishing days occur mostly in the adjacent international waters. For every 3 tonnes of tuna caught by the PS fleets in the WIO, only 1 tonne is claimed to be harvested in the EEZ of the SWIO states. Currently, Seychelles accounts for about 88 % of the total catch harvested in the national waters of the SWIO states. In shorthand, it can be stated that Seychelles stands for the PNA<sup>30</sup> of the WIO.

## 2.2.8 Ex-vessel value of PS catch in SWIO national waters

The mean value of the PS harvest in the national waters of the SWIO states for 2007-16 is estimated at US\$ 143.4 million per year. These estimates are skewed owing to the piracy crisis. The catch value estimate for 2016 is US\$ 191.4 million because of a better harvest despite of a slight decline in the mean price.

*Table 8 - Catch Value estimated of the PS fishery in the EEZ of the SWIO States*

2007-16		MDV	YEM	KEN	MOZ	COM	TZA	MDG	SOM	MUS	FRAT	SYC	TOTAL	GROUP 1	GROUP 2
Mean catch	MT	55	44	221	293	410	392	1,108	440	3,232	12,577	70,794	89,569	76,453	13,116
Landed Price	US\$	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601		
Catch Value	US\$	88,631	70,573	354,537	469,185	656,667	628,261	1,774,191	704,260	5,174,601	20,132,878	113,328,885	143,382,669	122,386,327	20,996,342
<b>2016</b>															
CATCH	MT	47	4	209	130	737	842	1,095	366	11,535	677	114,085	129,727	128,632	1,095
MEAN PRICE	US\$	1475	1475	1475	1475	1475	1475	1475	1475	1475	1475	1475	1475		
CATCH VALUE	US\$	69,853	5,918	308,270	191,269	1,086,647	1,242,855	1,615,276	540,294	17,017,449	998,892	168,309,438	191,386,162	189,771,205	1,614,957

The above catch value estimates appear to be on the lower side because they do not challenge the inconsistency of the fisheries data, the revenue leakages occasioned by the by IUU fishing by the licensed vessels and discarded by-catch. By applying the Maputo Declaration 2014, the potential licensing revenue is between US\$ 12.2 and US\$19.0 million for the Group 1 countries. The proposed regional strategy for the maximisation of the License Revenue should not be perceived as an attempt to increase fishing efforts indiscriminately by offering more fishing

<sup>30</sup> Parties to the Nauru Agreement in the Western Central Pacific Ocean

opportunities to foreign vessels, instead it aims at restrict access by imposing more stringent harvest rules at the regional level.

## 2.3 Tuna Long-line fisheries

The long line fishing technology is polyvalent and adaptable to various techno-economic and socio-ecological factors of the specific fisheries. It offers a range of tuna value chain development opportunities to the developing countries by adjusting the level of technological sophistication and labour intensiveness. Invented by the Japanese in the early 60s, the fishing technology has been further improved / automated by the US and is deployed worldwide in the large and small scale of fishing operations to target different species in diverse fishing grounds. The study takes a closer look at the industrial and semi-industrial TLL fisheries in the WIO. It is strategically important for SWIO states in the process of extraction more value from their shared tuna wealth.

### 2.3.1 Industrial TLL fishery

The industrial TLL fishing is widely dispersed in the IO and their operational and market strategies are totally different from the PS fishery. They target the same main tunas in addition to some high value large pelagic fishes such as marlin, swordfish and sharks.

#### 2.3.1.1 Catch

During 2007-2016, the mean annual catch of the industrial TLL in the Indian Ocean was 220,820 tonnes. It declined steadily since from 283,144 tonnes in 2007 to register 233,251 tonnes in 2016. The catch composition has also changed significantly as the share of the main tunas has dropped by 29.5 % but was compensated by other large pelagic fishes such as shark, marlin and swordfish. This alters the classical perception of by-catch in the industrial tuna fishery because what was considered as by-catch and miscellaneous fishes earlier have turned into targeted commercial species now<sup>31</sup>. The disruptive innovation is focused on product and market development to maximise the value of the available resources - *Fishing for the Dollar!*. This strategy is finding its way timidly in the purse fishery as well. The mean harvest of the industrial TLL fishery in the WIO was 124,646 tonnes per year. There is an interesting business model at Port Louis where about 300-500 tonnes of the miscellaneous fish are landed by the licensed TLL vessels and sold on the local markets through the Mauritius Fishermen Cooperative Federation<sup>32</sup>. The breakdown of the catch of the industrial TLL fisheries in the WIO for the 2007-16 is given below.

Table 9 - WIO Industrial Tuna fishery 2007-16 (mt)

Year	ALB	BET	BFT	YFT	SKJ	B/FISH	MISC	SHRKS	S/FISH	Total (t)
2007	13,328	60,400	1,841	49,618	93	23,317	5,310	10,801	2	164,710
2008	10,376	40,666	1,180	27,429	93	19,956	3,548	11,235	6	114,489
2009	18,282	30,675	1,692	19,201	163	17,595	6,812	12,201	13	106,634
2010	19,087	18,014	2,371	16,018	69	15,626	4,637	13,587	10	89,419
2011	16,825	21,002	1,560	21,044	57	15,072	4,124	15,081	18	94,783
2012	15,181	57,850	1,531	20,291	70	27,299	3,317	13,243	10	138,792
2013	21,220	38,124	367	20,735	288	23,899	20,274	11,781	13	136,701
2014	23,660	30,880	572	21,080	431	20,751	15,380	11,915	13	124,682
2015	21,204	30,544	831	26,786	668	22,468	13,996	10,580	104	127,181
2016	23,784	28,165	622	28,979	632	27,435	25,380	13,945	126	149,068
MEAN	18,295	35,632	1,257	25,118	256.4	21,342	10,278	12,437	32	124,646

Source: Compiled from the IOTC Online Database

<sup>31</sup> The bio-economic interactions among the different value chains of the tuna fisheries are still not well documented by the SWIO states.

<sup>32</sup> Sweenarain S (SmartFish 2013). Commercial feasibility for the operationalisation of an Electronic Fish Auction Market in the Seafood Hub of Mauritius.

### 2.3.2 Fleets

The number of registered industrial TLL vessels has dropped from 794 in 2007 to 448 in 2016. The fishery is predominately controlled by the South East Asian DWFN, especially by Taiwan with about 75 % of the fishing capacities. In 2016, the SWIO states accounted for 51 industrial TLL vessels (11%). Seychelles has the largest industrial TLL fleet among the SWIO states.

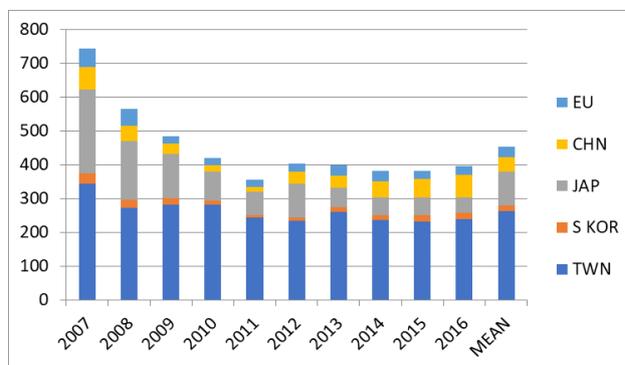


Figure 7 - WIO Foreign Ind. TLL Fleets by Nationality

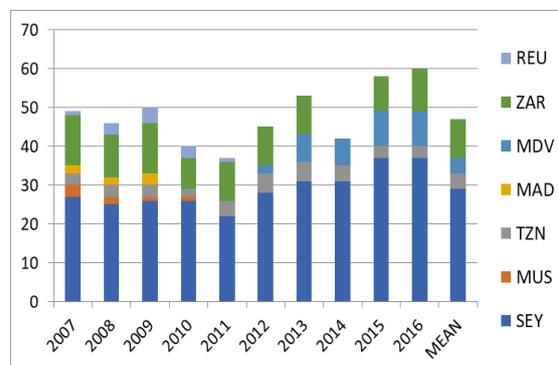


Figure 8 - SWIO Industrial TLL Fleets

### 2.3.3 Catch Rate

The productivity of the industrial TLL fishery is measured by the total number of hooks divided by the total catch. To derive a Catch Per Fishing Day indicator, it is assumed that 2500 hooks are used per fishing set and the duration of a fishing set /day from start-to-finish last 8 to 12 hours (industry standard). The catch rate data are taken from the SFA database.

Table 10 - Estimates of the Catch Rate & Fishing Days of Industrial TLL Fleets in the WIO

YEAR	NO VSLs NUM	NO HOKS NUM	CT RATE 1000 HKS	HOKS/SET NUM	CT/SET MT	SET/YEAR NUM	TOT CATCH MT	CT/VSSL MT	CT/VSL/YR MT	WIO %	F/DAYS PER /VSL	TOT F/DAY WIO
2007	794	318,678,261	0.460	2,500	1.150	161	146,592	185	400	46	348	127,471
2008	611	220,460,870	0.460	2,500	1.150	144	101,412	166	400	41	348	88,184
2009	534	223,269,048	0.420	2,500	1.050	167	93,773	176	400	44	381	89,308
2010	461	203,394,737	0.380	2,500	0.950	176	77,290	168	400	42	421	81,358
2011	393	177,554,348	0.460	2,500	1.150	181	81,675	208	400	52	348	71,022
2012	449	153,598,701	0.770	2,500	1.925	137	118,271	263	400	66	208	61,439
2013	452	238,034,694	0.490	2,500	1.225	211	116,637	258	400	65	327	95,214
2014	423	214,040,000	0.500	2,500	1.250	202	107,020	253	400	63	320	85,616
2015	441	199,767,273	0.550	2,500	1.375	181	109,872	249	400	62	291	79,907
<b>2016</b>	<b>457</b>	<b>231,212,727</b>	<b>0.550</b>	<b>2,500</b>	<b>1.375</b>	<b>202</b>	<b>127,167</b>	<b>278</b>	<b>400</b>	<b>70</b>	<b>291</b>	<b>92,485</b>
<b>2007-16</b>	<b>501</b>	<b>218,001,066</b>	<b>0.504</b>	<b>2,500</b>	<b>1.260</b>	<b>171</b>	<b>107,971</b>	<b>216</b>	<b>400</b>	<b>54</b>	<b>317</b>	<b>85,691</b>

Source: Compiled from the SFA Annual Fisheries Report 2017 & Expert Judgement

Based on the above data set and assumptions, the catch rate of an industrial TLL vessel is estimated at 1.375 tonne per Fishing Day in 2016 and 1.260 tonne per fishing day for 2007-16. The total number of fishing days in the WIO is assessed at 92,485 in 2016 and 85,691 per year for 2007-16. On an average, an industrial TLL fleet spends about 62% total fishing days annually in the WIO. The cost-saving strategy of the SE Asian fleets is prone to transshipment, refuelling, exchange of crew and supplies on the high seas.

### 2.3.4 Catch Composition

The catch composition of the industrial TLL fleets in the WIO for 2007-16 is summarised in the table below. A very small quantity of BFT is caught in cooler waters of the Indian Ocean. The catch is sorted and handled on board according to the destined end markets namely, for high

value canned tuna for the ALB and YFT depending on the market conditions and for the frozen sashimi markets in Japan as well as other developed and emerging economies.

Table 11 - WIO Ind TLL Fishery Catch Composition (mt)

Year	BET	BFT	YFT	ALB	SWDFISH	BILLFISH	SHARKS	MISC FSH	TOTAL
2007	52,320	1,595	42,980	11,545	20,198	4,600	9,356	83	142,676
2008	35,226	1,022	23,760	8,988	17,286	3,073	9,732	87	99,174
2009	26,571	1,466	16,632	15,836	15,241	5,901	10,569	154	92,370
2010	15,604	2,054	13,875	16,534	13,536	4,017	11,769	70	77,458
2011	18,192	1,351	18,229	14,574	13,056	3,572	13,063	67	82,105
2012	50,111	1,326	17,576	13,150	23,647	2,873	11,471	71	120,226
2013	33,024	318	17,961	18,381	20,702	17,562	10,205	262	118,415
2014	26,749	495	18,260	20,495	17,975	13,322	10,321	386	108,004
2015	26,458	720	23,203	18,367	19,462	12,124	9,165	683	110,181
2016	24,397	539	25,102	20,602	23,765	21,985	12,079	673	129,143
MEAN	30,865	1,089	21,758	15,847	18,487	8,903	10,773	254	107,975
[%]	28.59	1.01	20.15	14.68	17.12	8.25	9.98	0.23	100.00

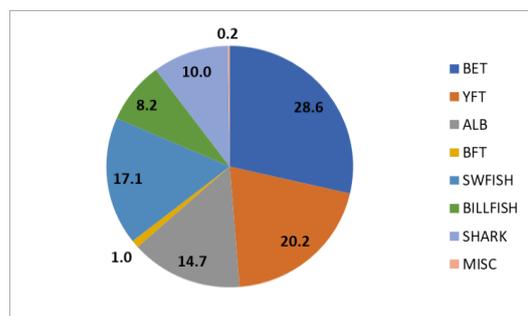


Figure 9 - WIO Ind TLL Fishery Catch Composition 2007-16 (%)

### 2.3.5 Ex-vessel Price of the Industrial TLL catch

The small quantity of BFT and the other individually quick freeze (IQF) tunas are highly value products. Almost the totality of the ALB and a part of the YFT, catch depending on the market conditions are delivered for canning. Currently over half of the total catch (approximately 60,000 t/year) of the SE Asian industrial TLL fleets is offloaded and processed in the Seafood Hub at Port Louis. Instead of transshipping to reefer-cargo vessels, boat operators are opting for refrigerated containers to ship their catch from the offloading port to market destinations. The cost of freight may vary from US\$ 1,000 to US\$ 1,500 per tonne to ship the frozen catch to the main ports in Japan and the East coast of USA. The 2007-16 ex-vessel prices of the main tunas and associated pelagic fishes are based on the FOB prices at Port Louis and freight adjusted prices at Bangkok which are compiled from the FAO Globefish Database.

Table 12 - Ex-vessel Prices of the Ind TLL Catches (US\$/mt)

YEAR	2,007	2,008	2,009	2,010	2,011	2,012	2,013	2,014	2,015	2,016	WT MEAN
YFT	3,463	4,841	5,281	5,921	7,128	6,305	4,897	5,180	4,013	4,406	5,144
BFT*	10,966	13,970	16,986	10,966	23,488	21,406	15,030	15,456	12,876	15,740	15,688
BET	5,483	6,985	8,493	9,830	11,744	10,703	7,515	7,728	6,438	7,870	8,279
ALB	2,175	3,526	2,683	3,062	2,676	3,341	2,355	2,683	2,989	2,948	2,844
SWORDFISH	5,586	6,709	6,025	4,261	6,424	8,356	9,036	2,990	8,425	8,846	6,666
BILLFISH	3,352	4,025	3,615	2,557	3,854	5,014	5,422	1,794	5,055	5,308	3,999
SHARK	4,469	5,367	4,820	3,409	5,139	6,685	7,229	2,392	6,740	7,077	5,333
MISC	1,557	2,071	2,284	2,040	2,237	2,654	2,205	2,184	2,021	2,165	2,142
WT MEAN	3,937	5,134	5,114	4,662	6,111	7,265	5,419	3,746	4,844	5,270	5,131

Source: Compiled from FAO-Globefish Fish Market Database

The weighted mean ex-vessel price of the catches of the industrial TLL fishery for 2007-16 can be read from the above table. It also illustrates the market volatility of these highly priced raw tunas and associated large pelagic fishes.

### 2.3.6 Catch value of the Industrial TLL fishery

Based on the above ex-vessel prices, the catch-value of the fishery for 2007-16 period was evaluated at US\$ 639.6 million per year and US\$ 785.6 million for 2016.

Table 13 - The Turnover of the Industrial TLL fishery for 2007-16 (US\$)

YEAR		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2007-16
TOTAL CATCH	MT	164710	114489	106634	89419	94783	138792	136701	124682	127181	149068	124,646
WT MEAN PRICE	US\$/mt	3,937	5,134	5,114	4,662	6,111	7,265	5,419	3,746	4,844	5,270	5,131
EX-VSL VALUE	US\$	648,494,115	587,800,350	545,343,938	416,900,198	579,238,407	1,008,341,423	740,822,247	467,117,767	616,026,290	785,621,291	639,570,603

Funded by the World Bank's SWIO-Fish 1 Project

### 2.3.7 Industrial TLL catch in the SWIO States

The table below summarises the total catch harvested by the domestic and foreign TLL fleets in the national waters of the SWIO states<sup>33</sup> for the period 2007-16. It accounts for about 20 % of the total catch of the fishery in WIO. The Group 1 takes 11,518 tonnes, which is about 68 % of the total catch harvested inside the national waters of the SWIO States.

Table 14 - Total Catches of the SWIO States Industrial TLL Fleets (mt)

COUNTRIES	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	MEAN
COMOROS	233	67	15	12	2	33	34	56	68	43	56
REUNION (FRF)	3,494	2,492	2,180	2,266	2,523	1,905	1,834	2,028	1,810	1,886	2,242
KENYA	385	337	305	139	0	37	19	25	34	18	260
MADAGASCAR	154	118	112	494	420	386	333	460	412	333	322
MALDIVES	449	1,765	1,471	73	92	229	2,567	3,099	562	1,648	1,196
MOZAMBIQUE	0	0	0	493	493	493	1,201	7	341	116	449
MAURITIUS	972	535	123	402	121	48	87	53	107	233	268
SEYCHELLES	10,252	5,847	7,133	6,401	7,070	14,358	11,856	10,342	12,373	15,996	10,163
SOMALIA	272	144	10	8	0	225	155	107	114	133	117
TANZANIA	956	763	723	569	882	1,556	893	815	514	392	806
SOUTH AFRICA	951	1,009	789	1,272	1,505	1,251	1,085	670	974	1,103	1,061
YEMEN	48	25	2	1	0	21	4	9	7	7	12
<b>TOTAL</b>	<b>18,118</b>	<b>13,077</b>	<b>12,861</b>	<b>12,129</b>	<b>13,108</b>	<b>20,521</b>	<b>20,064</b>	<b>17,662</b>	<b>17,309</b>	<b>21,901</b>	<b>16,940</b>

Source: Compiled from the IOTC Database

### 2.3.8 Ex-vessel value of the Industrial TLL fishery in SWIO national waters

The annual mean catch-value estimate in the national waters of the SWIO states over 2007-16 is US\$ 86.9 million and consist of US\$ 59 million in Group 1 and US\$ 27.8 in Group 2. The table below summarised the catch value by SWIO states.

Table 15 - Turnover of the SWIO States Industrial TLL Fleets (US\$)

2007-16	COM	FRF-REU	KEN	MAD	MDV	MOZ	MUS	SEY	SOM	TZN	ZAR	YEM	TOTAL
TOTAL CATCH MT	56	2,242	260	322	1,184	449	268	10,163	117	806	1,061	12	16,940
WT MEAN PRICEUS\$/mt	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
EX-VSL VALUE US\$	287,342	11,503,927	1,334,086	1,652,214	6,075,223	2,303,864	1,375,135	52,147,371	600,339	4,135,667	0	61,573	86,920,837
2016 MT	43	1,886	18	333	1,641	116	233	15,996	133	392	1,103	7	21,901
WT MEAN PRICEUS\$/MT	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270	5,270
EX-VSL VALUE	226,610	9,939,220	94,860	1,754,910	8,648,070	611,320	1,227,910	84,298,920	700,910	2,065,840	5,812,810	36,890	115,418,270
PERCENTAGE OF THE TOTAL EX-VESSEL VALUE (2016)													18%

In 2016, the share of SWIO states in the total catch value of industrial TLL fishery was about 18 % and the balance is harnessed mostly in the adjacent international waters. Based on recent global study on the economics of the fishing in the high seas<sup>34</sup>, 68 % industrial TLL fishing in the WIO occurs in the international waters. So, it deduced that about 14 % of the harvest is realised in the national waters of the NWIO states. Overall, the level of economic integration of the industrial TLL fishery by the SWIO states is still weak.

## 2.4 Semi-industrial TLL fisheries

The semi-industrial fishery comprises smaller TLL vessels which are in the range of 12 and less than 24 metres long owned by the SE Asian countries and operate mainly in the pockets of the high seas of the Indian Ocean. The fishery was predominately controlled by the latter until some coastal states of the Indian Ocean namely, Indonesian, Vietnam, Sri Lanka have developed sizeable fleets. They target the same species as the industrial TLL vessels, but the

<sup>33</sup> The Group 2 countries: South Africa, France (Reunion & Mayotte), Maldives also Somalia and Yemen do not provide fishing opportunities to foreign fishing vessels. Thus, it is assumed that the catch is harvested by the domestic fleets.

<sup>34</sup> Sala E et al. (Advance Science 2018). Economics of fishing the high seas

catch is mostly landed chilled and are destined for local and export markets. The development of this segment has gathered traction in some of the SWIO states namely Seychelles, Reunion and Mauritius. It is indeed a foresighted strategy for the development of domestic and export-oriented tuna value chains in the SWIO states. However, these armadas of small boats from the SE Asian countries have become a serious issue for the sustainability of the tuna fisheries resources in the WIO. They are called the “blue boats” or “piranhas” because their activities are not well-documented by the RFMO and they are not on the radar screen of the regional MCS systems. They represent a real threat of IUU fishing in the national waters of the SWIO states. It is critical for the SWIO states to understand the economics and operational strategies of these modern and extended traditional TLL fishing boats.

### 2.4.1 Catch

The total catch of this segment of the TLL fishery has declined gradually from 85,734 tonnes 2007 to 65,756 tonnes in 2016. The mean annual catch for 2007-16 is 58,320 tonnes. The share of the SWIO semi-industrial fleets is hardly half of one percent. In 2007, the total was 4,676 tonne and it fell to 1,460 tonnes in 2011 to attain 2,842 tonnes in 2016. The mean annual catch of the SWIO states over 2007-2016 was 2,518 tonnes.

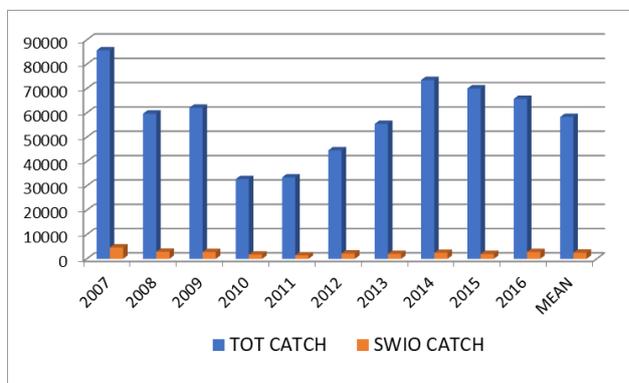


Figure 10 - WIO Semi-Ind TLL Fishery Catches (mt)

Table 16 - SWIO States Semi Ind TLL Fishery

YEAR	BOATS	CATCH	CATCH/BOAT
2007	72	4676	65
2008	66	2931	44
2009	62	2799	45
2010	73	1769	24
2011	66	1460	22
2012	79	2192	28
2013	57	2036	36
2014	64	2454	38
2015	52	2004	39
2016	74	2842	38
MEAN	67	2518	38

### 2.3.2 Fleets

In 2016, there were 1,433 semi-industrial TLL vessels potentially operating in the Western Indian Ocean and included 60 of the SWIO states. The fleet size was relatively stable during 2007-16 although some SWIO states, namely Seychelles and La Reunion (France) are poised to expand their fleets.

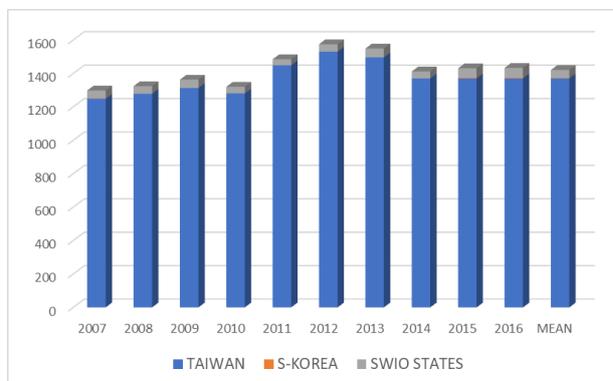


Figure 11 - WIO Semi Ind TLL Fleets

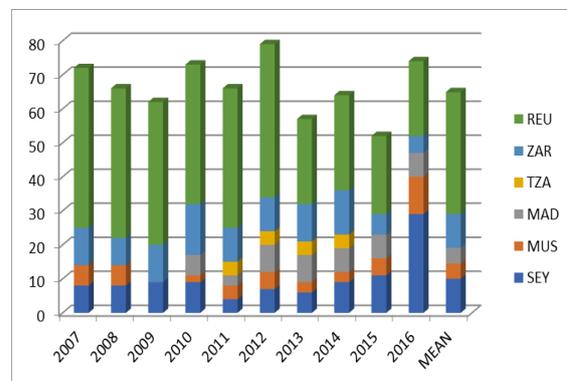


Figure 12 - SWIO States Semi-Ind TLL Fleets

These SE Asian semi-industrial TLL boats are wandering in the international waters of the Indian Ocean. They appeared consistently on the IOTC register until 2012 and vanished

afterwards. It is not possible for the SWIO states to track/monitor them through the existing electronic tools because they are not equipped with VMS or AIS. They move in clusters supported by supply vessel and operate through collective information sharing. The SWIO states are to step up appropriate MCS measures.

### 2.3.3 Ex-vessel value

The catch profile of the semi-industrial fisheries is like the industrial counterpart except the BFT is excluded while the harvest is landed chilled and destined for domestic consumption and processing for export markets. The ex-vessel prices are taken from the FAO Globefish Tuna Market Database and cross-checked with national tuna market data of Sri-Lanka and Indonesia.

*Table 17 - WIO Catch Value of Semi Ind TLL fishery (US\$)*

DETAILS	YFT	BET	BFISH	SHARKS	MISC	TOT
<b>2007-16</b>	20 412	14 580	12 830	7 582	2 916	58 320
MEAN PRICE	5 742	4 561	6 658	5 314	1 883	4 861
CATCH	117 205 704	66 499 380	85 422 140	40 290 748	5 490 828	<b>283 493 520</b>
<b>2016</b>	23 015	16 439	14 466	8 548	3 288	65 756
MEAN PRICE	5 406	4 585	8 846	7 077	1 896	5 999
CATCH VALUE	124 419 090	75 372 815	127 966 236	60 494 196	6 234 048	<b>394 486 385</b>
<b>SWIO STATES FLEET [ 0,4% ]</b>						
MEAN CATCH VALUE 2007-2016					US\$	<b>1 133 974</b>
<b>CATCH VALUE 2016</b>					<b>US\$</b>	<b>1 577 946</b>

The annual turnover of the semi-industrial TLL fleets in the WIO for 2007-16 is estimated at US\$ 283.5 million and US\$ 394.5 million in 2016. The modest share of the SWIO states is between US\$ 1.1 and US 1.6 million.

## 2.4 Coastal or artisanal tuna fisheries

### 2.4.1 Catch

The grass-root level tuna fisheries in the WIO consists of a diverse range of indigenous fishing boats and gears in countries with limited inshore fisheries resources. In 2016, the total catch of the fishery was 704,144 tonnes, which is higher than the 2007-16 annual average of 437,466 tonnes. Extensive development is taking place in the fishery in the WIO. The five top players are namely, India, Maldives, Iran, Pakistan and Yemen. In 2016, the share of the SWIO states was at 32 % (226,301 tonnes). However, the weight of the SWIO states has declined from 42 % to 32% over the 2007-16 period. Two SWIO states – Maldives and Yemen account for 80 % of the total landings of the sub-region.

*Table 18 - WIO Artisanal Tuna Fisheries Profile (mt)*

YEAR	REGION	TUNAS	BILLFISH	SHARK	MISC	TOTAL	% CHANGE
2007-16	WIO	415 316	14 471	4 864	2 805	437 456	47%
	SWIO	162 625	20 269	23 612	398	206 904	
2016	WIO	482 745	26 164	48 640	28 049	585 598	32%
	SWIO	182 022	6 991	23 612	398	213 023	

*Source: Compiled from the IOTC Database*

The root-causes for the underdevelopment of the artisanal tuna fishery are the same as the other indigenous coastal and inland fisheries of the SWIO region. They are namely, policy failures, poor management, lack of proper enabling environment owing to the persistence of

the open-access regime and informal nature of the fishing operations. The regional panorama of the fishery is summarised in the following illustrations.

Table 19 - SWIO Coastal Tuna fishery 2007-16 (mt)

SWIO COUNTRIES	%	2007-16
Comoros	4	8 030
EU-Reunion	0	429
EU-Mayotte	0	700
Kenya	0	934
Madagascar	7	14 053
<b>Maldives</b>	<b>58</b>	<b>118 585</b>
Mozambique	2	3 351
Mauritius	0	452
Seychelles	0	138
Tanzania	5	10 864
South Africa	0	40
Yemen	23	47 553
<b>TOTAL</b>	<b>100</b>	<b>205 129</b>

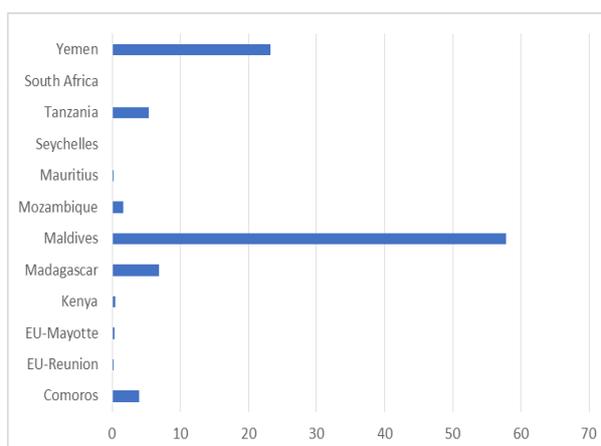


Figure 13- SWIO Coastal Tuna Fishery 2007-16 (%)

Source: Compiled from the IOTC Online Database

Additional research is required to produce aggregated data on the artisanal fishers, fish-workers and fishing assets of the fishery at the regional level.

## 2.4.2 Catch value

Based on a first sale price of the tuna and tuna-like species landed by the coastal boats, the aggregated turnover of the SWIO was US\$ 442.3 million per year during 2007-16 and US\$ 534.3 million in 2016. The breakdown is given in the table below.

Table 20 - SWIO Landed Value of the Coastal Fisheries (US\$)

DETAILS	REGION	TUNAS	BILLFFISH	SHARK	MISC	TOTAL	MEAN PRICE	% CHANGE
LANDED PRICE (US\$/mt)		2352	1465	1250	1500	2 305		
2007-16	WIO	976 823 232	21 200 015	6 080 000	4 207 500	1 008 310 747	2 305	44 %
	SWIO	382 494 000	29 694 085	29 515 000	597 000	<b>442 300 085</b>	2 138	
LANDED PRICE (US\$/mt)		2 705	1 685	1 438	1 725	2 651		
2016	WIO	1 305 728 676	44 079 799	69 920 000	48 384 525	1 468 113 000	2 507	37 %
	SWIO	492 333 106	11 778 087	29 515 000	686 550	<b>534 312 743</b>	2 529	

The landed value estimates for Maldives and Yemen are US\$ 309 million and US\$ 123 million respectively in 2016.

## 2.5 Integration

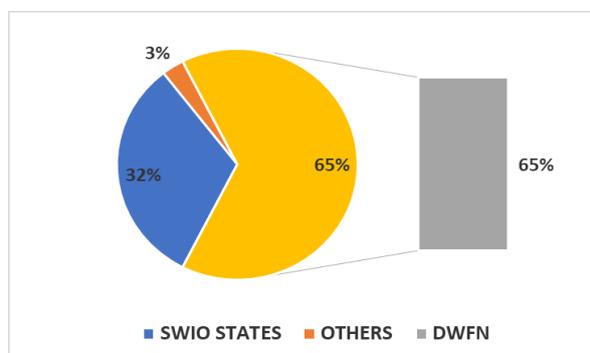
The aggregated landed value estimates of the tuna and tuna-like species in the WIO were US\$ 2.0 Billion per annum during 2007-16. The catch value estimates of the SWIO states were US\$ 674 million (34 %), which included US\$ 231.3 million from the industrial segments (12%). The turnover of the DWFN in adjacent international waters and the EEZ of third parties was US\$ 1.4 Billion per annum. Only 32% for the purse seine and 18% for the industrial tropical long line fisheries occurred in the national waters of the SWIO states. The landed value of the SWIO coastal tuna fishery is at par with the catch value of the PS fishery in the WIO and nearly 2 times of the aggregated landed value of the harvest of the industrial PS and TLL fisheries in the national waters of the SWIO states.

In 2016 the fisheries and market conditions of the global and regional tuna fisheries improved significantly, and the aggregated catch value was assessed at US\$ 2.6 billion, i.e. an increase of 21 % over the 2007-16 figures. The mean landed value of the harvests in the national waters of the SWIO states rose from US\$ 230.2 to US\$ 306.8 million.

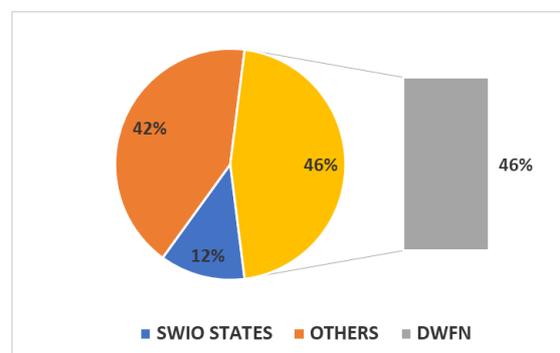
*Table 21 – Summary of the SWIO Aggregated landed value of the tuna fisheries 2007-16 (US\$)*

TUNA FISHERIES	2007-16			2016		
	SWIO	DWFF	TOTAL	SWIO	DWFN	TOTAL
Industrial Purse Seine	143.3	440.7	584	191.4	561.8	753.2
Industrial Long line	86.9	639.5	726.4	115.4	785.6	901
Semi-Industrial long line	1.1	283.5	284.6	1.7	394.5	396.2
Coastal / Artisanal fisheries	442.3		442.3	534.2		534.2
<b>TOTAL - US\$ million</b>	<b>674</b>	<b>1,364</b>	<b>2,037</b>	<b>843</b>	<b>1,742</b>	<b>2,585</b>
<b>TOTAL EX-CL. COASTAL FISHERIES</b>	231.3	17%		308.5	18%	
<b>POTENTIAL LICENSE REVENUE</b>	<b>23.02</b>			<b>30.68</b>		

The stake of the SWIO states is about 18 % of the aggregated catch value of industrial tuna fisheries in the sub-region. It is made up of 63 % of the PS and 37% of TLL fisheries. The industrial TLL fishery generates greatest turnover but its contribution in the revenue streams of the SWIO states is limited because the fleets operate mainly on the high seas.



*Figure 14 – SWIO Distribution of the PS Ex-vessel catch value 2007-2016*



*Figure 15 - SWIO Distribution of the TLL Ex-vessel catch value 2007-2016*

The socioeconomic weight of the coastal tuna fisheries is so important that it cannot be ignored by the regional policy makers. They are also reliant on the same shared tuna and tuna-like resources and the bio-economic interactions with the other segments of the tuna industry in the SWIO basin are still not well-documented

The disparity in the sharing of the economic value between the coastal states and the DWFN is flagrant. The DWFN are pushing for the so-called 'historical rights agenda in the regional tuna fora to institutionalise business-as-usual that will deprive the resource-owners of their legitimate development opportunities.

Therefore, effective regional solidarity and political leadership is not an option but indispensable for the SWIO coastal states in the furthering their Blue Economy Strategy. A new type of thinking is crucial for the SWIO states to harness the present and future development potentials of the shared fisheries resources in their national waters and the adjacent pockets of high seas within the philosophy of the UNCLOS 1982.

The most urgent issue for the coastal states is not IUU fishing in their national waters per se but restricting high sea fishing which is still open-access or the Wild West. The business collaborations with the DWFN and foreign investors are to be founded on an equitable sharing of the value added and a triple-win concept. The national and regional policy makers require real time scientific as well as economic knowledge and data for informed decision making and management decisions that cannot be catered by any single coastal economy however big or small it is.

### 3.0 Potential License Revenue

This section evaluates the additional license revenue that can be harnessed by the SWIO states – Group 1 through the implementation of regional MTC on foreign fisheries access and associated measures, including the establishment of the regional FFA. Except for Seychelles, it has not been possible to obtain detailed fisheries data of the domestic and foreign industrial fleets in the national waters. It is therefore assumed that the catch harvested by the industrial fleets in the national waters irrespective of their nationality is subject to same fisheries access tariffs. The potential license revenue is based on the Malabo Declaration 2014, i.e. 10 % of the catch value of the harvest in the national waters of the relevant SWIO states. This arrangement is also applied to SWIO states – Group 2 to assess the potential economic rent as a policy strategy to absorb the surplus profit of the domestic fishing industry by the government<sup>35</sup>. The licensing arrangements in the SWIO can be differentiated in 3 types namely, the EU Fisheries Partnership Agreement, Bilateral Fisheries Agreements and Private Agreements. The fisheries and financial data on the EU-FPA are obtained by consulting the DG MARE website and the ex-post EU-FPA evaluation reports. But, this was not possible for the other types of the Fisheries Agreements. The lack of transparency and availability of reliable fisheries and financial data at the national level have been a major obstacle to this study. A pareto approach or 20-80 rule is adopted to extrapolate the whatever available data to develop realistic estimates of the License Revenue. To improve the level of confidence of the analysis, a five-year market database (2012-16) has been constructed.

#### 3.1 Purse seine fishery

About 92 % of the PS fleets active in the WIO is owned by the EU member-states, including those which are flagged in the SWIO states (Seychelles and Mauritius). The remaining 8% are South Korean. The European Commission has a standard format of Fisheries Partnership Agreement with the ACP countries of the region namely Comoros<sup>36</sup>, Madagascar, Mauritius, Mozambique and Seychelles. The PS fleets are mostly based at Port Victoria to take advantage of the largest surface tuna fisheries in the Equatorial waters. Over 90% of the purse seine catch is offloaded or transhipped at Port Victoria<sup>37</sup>. The remaining 10 % is shared between Madagascar, Mauritius and others. During 2012-16, the SWIO states accounted for 34 % of the total harvest of the PS fleets<sup>38</sup>. The fishery is an extension of the EU canned tuna value chains and is vertically integrated with the world largest canneries located at Seychelles and Mauritius<sup>39</sup>. There are two smaller canneries in the region namely, a 25,000 tonnes capacity at Diego Suarez (Madagascar) and a 15,000 tonnes cooked loin processing plant at Mombasa (Kenya), which is currently closed. Over 80% of the annual purse seine catch is processed in the SWIO states<sup>40</sup>. The introduction of fishing quotas for the YFT stock by the

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<sup>35</sup> Management cost recovery is an indispensable tool to finance the maintenance of the natural capital, fisheries specific hard and soft infrastructure and social services. It makes no sense for conservation and management in the absence of development of the fisheries resources. The industry is to internalise the management cost to sustain the integrity of the natural resources and their environments.

<sup>36</sup> The Protocol under the Fisheries Partnership Agreement with Comoros has expired in 2016 and has not been renewed.

<sup>37</sup> Seychelles Fishing Authority – Annual Fisheries Report 2017.

<sup>38</sup> IOTC Historical Database, accessed the 20<sup>th</sup> August 2018.

<sup>39</sup> Each of these two canneries – Indian Ocean Tuna at Port Victoria and Prince Tuna at Port Louis have an installed capacity of 60,000 tonnes and are running double shifts to produce about 100,000 tonnes of canned tuna and loins each annually.

<sup>40</sup> There has never been a comprehensive economic impact assessment of the canned tuna value chain of the SWIO basin to assess the sharing of the economic impacts in terms of GDP, Employment, Foreign Earning, Income Distribution and spin-off effects.

IOTC is affecting the operations of regional canneries in the last quartile of the year. The EU inflexible Rules of Origin make it impossible to source raw-materials from non-eligible suppliers. There is an urgent need for better coordination between the fishing and processing operations in the SWIO.

### 3.1.1 Potential License Revenue

The following table summarises the potential Licence Revenue of SWIO Group 1 countries. It is assessed at US\$ 23,3 million for 2016 and US\$ 18.7 annually for 2012-16 owing to the fluctuations of the industrial tuna fisheries and tuna markets worldwide. A realistic target of 50% of the total catch inside the national waters through more stringent harvest rules and effective MCS operations may potentially increase the license revenue to up to US\$ 25 million annum based on 2012-16 fisheries and market data. Every additional percentile in the catch declared in the national waters represents an increase of US\$ 503,000 of License Revenue as illustrated in the table below.

*Table 22 - Summary of Potential License Revenue from the PS fishery*

PARTICULARS	UNIT	2012	2013	2014	2015	2016	MEAN
TOTAL CATCH	MT	233,244	285,067	283,214	298,912	354,532	290,994
WT MEAN EX-VSL PRICE	US\$/MT	2,186	2,065	1,557	1,451	1,475	1,601
TOT CATCH VALUE	US \$	509,922,188	588,788,794	440,822,936	433,837,856	523,042,496	499,282,854
TOT CATCH SWIO GP 1	MT	84,307	84,802	97,212	131,119	158,175	99,620
TOT CATCH VALUE SWIO GP1	US\$	184,313,483	175,154,376	151,310,321	190,305,396	233,356,315	186,887,978
PCT OF TOTAL CATCH VALUE	%	36%	30%	34%	44%	45%	37%
<b>POTENTIAL LICENSE REVENUE</b>	<b>US\$</b>	<b>18,431,348</b>	<b>17,515,438</b>	<b>15,131,032</b>	<b>19,030,540</b>	<b>23,335,632</b>	<b>18,688,798</b>
TARGET ( 50%)	US\$						<b>24,964,143</b>

### 3.1.2 License Revenue Estimates

The EU Fisheries Partnership Agreement is a standard format which is applied to all ACP countries under the ACP-EU Cotonou Agreement. It is activated by a Fisheries Protocol which is renewed after every 3 or 5 years. The FPA consists of two main financial components namely, Access Fee and an annual lumpsum amount for the Sector Support. The latter is managed jointly by the European Commission and the beneficiary country. It is not clear whether the sector support is a development aid or grant or part of the access fee. The access fee is based on a fictitious concept referred to as Reference tonnage, which is neither a Total Allowable Catch nor the total gross registered tonnage (GRT) of the fleet covered by the protocol. It is commonly understood as the fishing opportunities or authority to fishing in the specified areas of the national waters of the contracted party. The payment of the access fee is shared almost 50/50 by the EC and the EU Boat Owners who are willing to take up the fishing opportunities under an active protocol. The allotted fishing opportunities are not fully utilised.

To assess the potential License Revenue of the EU-FPA, two scenarios have been explored namely, one based on the reference tonnage and the other one is based on the catch harvested by the EU fleets in the national waters. The Maputo Declaration - 10% Catch Value - is applied to both scenarios by differentiating the sector support. Another unfavourable term for the coastal states in EU-FPA is that any surplus of catch above the reference tonnage is reimbursed by the EU at the rate of the access fee. So, it is arguable that the sector support is not part of license revenue. As at 2016, the EU has an FPA with 5 SWIO states, namely Comoros,

Madagascar, Mauritius, Mozambique and Seychelles but the Protocols with Comoros and Mozambique were pending. Apart from Seychelles, the provision for fishing opportunities granted to the EU fleets under the FPA is underutilised.

### 3.1.2.1 Total payment under the EU-FPA against Catch value

Table 23 provides some insights on the License Revenue gap between the current EU-FPA rates and the catch value based on 2012-16 data. The total payment varies between US\$ 120 and US\$ 148 and a mean of US\$ 132 per tonne against US\$ 160. The License Revenue deficit is US\$ 28 per tonne, i.e. a total amount of US\$ 3.1 million per year.

*Table 23 – Scenario 1 : Catch Value of 10% applied to the Reference Tonnage*

REF	ITEMS (EUR=1.208 US\$)	UNIT	COM	MAD	MAU	MOZ	SEY	TOTAL
A	Annual Reference tonnage (ART)	MT	6000	15750	5500	8000	50000	85250
	Annual Access Fee	US\$	362,757	846,433	365,780	556,227	3,143,894	5,275,091
	Annual Sector Support	US\$	362,757	846,433	365,780	556,227	3,143,894	5,275,091
B	Total	US\$	725,514	1,692,866	731,560	1,112,455	6,287,787	10,550,181
	Payment per reference tonnage	MT	121	107	133	139	126	124
	10% EX-VSL PRICE (\$1601/.1)	US\$	160	160	160	160	160	160
D	Diference per ART	US\$	-39	-53	-27	-21	-34	-36
E	Potential License Revenue Deficit	US\$	-235,086	-828,709	-148,990	-168,345	-1,717,213	-3,098,344
	Percentage		8%	27%	5%	5%	55%	100%

### 3.1.2.2 Access Fees under the EU-FPA against Catch Value

The second scenario applies the ex-vessel value of the catch to the reference tonnage, in addition to the sector support. If this proposal can be pushed ahead through a collective negotiation, an additional benefit of US\$ 8.3 million is down the pipeline. The breakdown by country is given in Table 24. The estimates do not include the payment for the surplus of catch over and above the reference tonnage, which is relevant for Seychelles. It is hope that the protocol with Comoros and Mozambique would be activated on better terms soon.

*Table 24 - Scenario 2 : License fee based on Catch Value plus Sector Support*

REF	ITEMS (EUR=1.208 US\$)	UNIT	COM	MAD	MAU	MOZ	SEY	TOTAL
A	Annual Reference tonnage (ART)	MT	6,000	15,750	5,500	8,000	50,000	85,250
	License Fee based on Catch Value	US\$/MT	160	160	160	160	160	160
	Potential License Value: ART @ US\$160	US\$/MT	960,600	2,521,575	880,550	1,280,800	8,005,000	13,648,525
	Annual Sector Support	US\$	362,757	846,433	365,780	556,227	3,143,894	5,275,091
B	Total	US\$	1,323,357	3,368,008	1,246,330	1,837,027	11,148,894	18,923,616
C	Total Payment (Access fee + Sector Support)	US\$	725,514	1,692,866	731,560	1,112,455	6,287,787	10,550,181
D	FOREGONE BENEFIT	US\$	-597,843	-1,675,142	-514,770	-724,573	-4,861,106	-8,373,434
E	PERCENTAGE		7%	20%	6%	9%	58%	100%

### 3.1.2.3 License Revenue based on Declared catch

The third scenario calculates the Licence Revenue based on the actual catch of the PS fleets in the national waters of the SWIO Group 1 States. There is a huge gap between the Agreed Reference Tonnage (ART) and the actual harvest. As shown in Table 25, apart from Seychelles the declared catch in the national waters of other SWIO states is insignificant as compared to the ART. Seychelles is not better in the deal because it is paid only the Access Fee, i.e. US\$ 63 per tonne for the surplus catch harvested in its EEZ. The potential licence fee under this scenario is estimated at US\$ 12.1 million, excluding the sector support of US\$ 5.3 million. In real terms, the annual access fees paid by the EU to Comoros, Madagascar and Mauritius

during 2007-16 exceed the mean catch value. Despite of these national inequalities, the EU enjoys a positive balance at the regional level which is compensated to some extent by Seychelles. So, it seems that the EU has a regional strategy while concluding FPA with the ACP countries of the SWIO region but the SWIO states do not have one so far.

*Table 25 – Scenario 3 : License Revenue based on Declared Catch 2007-16*

REF	SWIO GROUP 1	UNIT	COM	MDG	MUS	MOZ	SYC	TOT (mt)
A	Agreed Reference Tonnage	mt	6,000	15,750	5,500	8,000	50,000	85,250
B	Declared Catch (mt)	mt	410	1,108	293	3,232	70,794	75,839
C	Difference btwn B and A	mt	-5,590	-14,642	-5,207	-4,768	20,794	-9,411
C	Wt Mean price	US\$	1,601	1,601	1,601	1,601	1,601	1,601
D	Catch value ( B x C)	US\$	656,743	1,774,396	469,239	5,175,200	113,341,988	121,417,566
E	License Revenue (D x10%)	US\$	65,674	177,440	46,924	517,520	11,334,199	12,141,757
F	EU Total Payment	EU-FPA	725,514	1,692,866	731,560	1,112,455	7,597,840	11,860,235
G	Difference (E-F)	US\$	-659,840	-1,515,426	-684,636	-594,935	3,736,359	281,521
H	Access Fee per Actual Catch F/B		1,769	1,527	2,496	344	107	156

### 3.1.3 Fishing Day Approach applied to the EU-FPA

The Vessel Day scheme (VDS) was introduced recently by the Parties of the Nauru Agreement<sup>41</sup> in the purse seine fishery to enhance the license revenue of its member-states. The concept is based on Catch per Fishing Day metrics to manage foreign fisheries access within a zone-based or right-based management system. The business model is constructed by combining fisheries, environmental, technological and market data. However, it requires a robust and integrated database to experiment an analogous system in the SWIO basin. A simplified CPFDD concept is simulated for the EU-FPA in Table 26.

*Table 26 -Fishing Day Approach to EU-FPA for the PS Fishery*

Annual Reference tonnage (ART)	MT	6,000	15,750	5,500	8,000	50,000	85,250
License Fee based on catch value	US\$	960,600	2,521,575	880,550	1,280,800	8,005,000	13,648,525
Mean CATCH PER FISHING DAY (2007-16)	mt	23.71	23.71	23.71	23.71	23.71	23.71
Fishing Opportunity / Authorisation	FD	253	664	232	337	2109	3596
Fleet Size ( 2007-16)	NUM	47	47	47	47	47	47
mean FD per PS VSL ( seasonality)	NUM	5	14	5	7	45	77
License Fee per FD (VDS)	US\$	3796	3796	3796	3796	3796	3796

### 3.1.4 Extrapolation of the CPFDD Concept

The CPFDD concept presented in Section 3.1.3 is extended to the entire PS fishery of the SWIO Group 1 member-states. It is assumed that the SWIO states would muster the required regional political capital to establish a regional zone-based management system. Based on the Maputo Declaration and the fisheries and market data of 2012-16, the Access Fee is estimated at US\$

<sup>41</sup> Eight of the fourteen member-states of the SP-FFA harvesting about 80 % of the total PS catches in the WCPO. They are: Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu

3,939 per PS Fishing Day. The concept can be used to adjust the license fee for mitigating the economic externalities caused by the foreign vessels to coastal states through their fishing operations in the neighbouring pockets of high seas. To establish a similar scheme in the SWIO basis, a plethora of measures are to be undertaken namely, a robust fisheries database and reporting system, effective MCS measures including stringent enforcement and compliance, research on fishing patterns and an Economic and Market Research. The pivot of the entire management architecture resides in an effective Fisheries Management Information System capable of delivering real-time strategic intelligence to national fisheries managers.

**Table 27 - A Fishing Day Approach applied to the PS fishery of SWIO Group 1 States**

REF	PARTICULARS	UNIT	2012	2013	2014	2015	2016	MEAN
	TOTAL PS CATCH IN SWIO GROUP 1	MT	84,307	84,802	97,212	131,119	158,175	111,123
	WT MEAN EX-VSL PRICE	US\$/MT	1,601	1,601	1,601	1,601	1,601	1,601
<b>A</b>	<b>LANDED VALUE</b>	<b>US\$</b>	<b>134,975,507</b>	<b>135,768,002</b>	<b>155,636,412</b>	<b>209,921,519</b>	<b>253,238,175</b>	<b>177,907,923</b>
	Mean CATCH PER FISHING DAY (2012-16)	MT	23.87	27.29	23.57	22.71	25.57	24.602
	MEAN CATCH VALUE PER FISHING DAY	US\$	38,216	43,691	37,736	36,359	40,938	39,388
<b>B</b>	<b>MEAN LICENSE FEE PER FISHING DAY</b>	<b>US\$/FD</b>	<b>3,822</b>	<b>4,369</b>	<b>3,774</b>	<b>3,636</b>	<b>4,094</b>	<b>3,939</b>
	TOTAL FISHING DAYS IN SWIO	FD	3532	3107	4124	5774	6186	4517
	MEAN LICENSE FEES PER FISHING DAY	US\$/FD	3822	4369	3774	3636	4094	3939
<b>C</b>	<b>TOTAL LICENSE REVENUE</b>	<b>US\$</b>	<b>13,497,551</b>	<b>13,576,800</b>	<b>15,563,641</b>	<b>20,992,152</b>	<b>25,323,818</b>	<b>17,790,792</b>
	MEAN ACTIVE PS	NUM	47	47	47	47	47	47
	MEAN FISHING DAYS PER PS	NUM	75	66	88	123	132	96
	TURN OVER PER PS	US\$	2,871,819	2,888,681	3,311,413	4,466,415	5,388,046	3,785,275
<b>D</b>	<b>LICENSE FEE PER PS</b>	<b>US\$/PS</b>	<b>287,182</b>	<b>288,868</b>	<b>331,141</b>	<b>446,642</b>	<b>538,805</b>	<b>378,527</b>

### 3.1.5 Leakages in License Revenue

The SWIO-FFA is sought to stop the leakages of financial and economic benefits in the regional tuna industry. Three prioritised areas have been identified namely: the inconsistency of the catch and effort data inside the national waters; IUU fishing conducted mostly by the licensed foreign as well as domestic vessels and discard of non-targeted species. Through constant improvement in the management and compliance measures, an increase of license and associated revenue is projected as follows.

- i) 10 % gain through improved fisheries data as well as reporting and monitoring system in the national waters
- ii) 10 % gain on total catch inside the EEZ by intensive crackdown of IUU fishing conducted by licensed vessels.
- iii) Zero discard at sea. By-catch estimated at 7.5 % of total catch landed (significant increase of by-catch due extensive deployment of FAD which is not reflected in the official statistics)

**Table 28- Additional Revenue streams from the PS Fishery in SWIO Group countries**

REF	PARTICULARS	UNIT	2012	2013	2014	2015	2016	MEAN
>	TOTAL PS CATCH IN SWIO GROUP 1	MT	84,307	84,802	97,212	131,119	158,175	111,123
A 1	Improved Reporting in the EEZ	10%	8,431	8,480	9,721	13,112	15,818	11,112
	Catch Value at EX-VSL PRICE	US\$	13,497,551	13,576,800	15,563,641	20,992,152	25,323,818	17,790,792
>	Untapped License fee		1,349,755	1,357,680	1,556,364	2,099,215	2,532,382	1,779,079
A 2	Landing of by-catch	7.5%	6,955	6,996	8,020	10,817	13,049	9,168
>	Nominal Value of US\$ 1,601/tonne	US\$	11,135,479	11,200,860	12,840,004	17,318,525	20,892,149	14,677,404
	Untapped license fee	US\$	1,113,548	1,120,086	1,284,000	1,731,853	2,089,215	1,467,740
>	<b>UNTAPPED REVENUE</b>	<b>US\$</b>	<b>2,463,303</b>	<b>2,477,766</b>	<b>2,840,365</b>	<b>3,831,068</b>	<b>4,621,597</b>	<b>3,246,820</b>
A 3	TOTAL UNTAPPED LICENSE REVENUE	US\$			Scenario 1		Scenario 2	
	ADD ACTUAL PAYMENTS RECEIVED			Incl. Sector Support	6,345,163	Excl Sector Support	11,620,254	
					11,278,190		11,278,190	
<b>A 4</b>	<b>GRAND TOTAL</b>				<b>17,623,353</b>		<b>22,898,444</b>	

### 3.1.6 Concluding remarks

The additional license revenue estimates of the PS fishery that can be captured in the short-medium term through impacting regional MTC and associated measures by the SWIO-FFA are in the range US\$ 6.3 million and US\$ 11.6 million per year based on the 2012-16 data. The gap of US\$ 5.3 million per year is related to the ambiguity around the EU sector support.

The key issue that may arise in the re-negotiation of the EU-FPA is the inconsistency of the catch and effort data in the national waters of SWIO states. Reliable fisheries and market data are capital inputs. In 2011 the EU Parliament accepted the principle of a regional FPA with the ACP countries of the SWIO for reducing the transaction costs of negotiating individual agreements. But the difficulties encountered by the latter in concluding a regional Economic Partnership Agreement was a clue that it was premature to expect a regional FPA.

By-catch cannot be discarded at sea for socioeconomic and ecological reasons. Instead of being landed at canneries to produce fishmeal, it can be diverted for human consumption. It offers good prospects for business development by indigenous processors and traders in the SWIO states. The direct economic impacts of the by-catch value chains in selected coastal states are estimated conservatively at US\$ 25 million<sup>42</sup>.

The EU has an unrevealed regional strategy to deal with the coastal states of the SWIO. The approach enables the latter to balance its activities between the national waters of the coastal states and the surrounding high seas to ascertain net positive benefits. But these coastal states do not have a concerted approach to further their common interest.

## 3.2 Tropical Long Line Fisheries

The tropical tuna fisheries are differentiated into the industrial and semi-industrial activities. The fisheries are dominated by the SE Asian countries, the largest fleet owned by Taiwan. Unlike the PS fleets, they are trans-oceanic and operate across several hotspots in SWIO at different periods of the year.

### 3.2.1 Industrial tropical long line fishery

In 2016, about 448 industrial TLL vessels were active in the Indian Ocean. The fleets included 28 EU and 58 SWIO states owned / flagged vessels. Of the total catch of 127,167 tonnes in the WIO, 18 % was harvested in the national waters of the SWIO states. During 2012-16, the mean number of vessels was 438 and total catch from the WIO was 115,167 tonnes. Apart from the EU TLL fleets, the licensing arrangements were mostly bilateral and private. Due to high mobility of these industrial TLL vessels, they do not take up fishing license from any coastal states on an annual basis. About 20% of the global catch of the TLL fisheries contributes to nearly 50% of end-market value<sup>43</sup> but the rate of the license fees is the same as the purse seine fishery.

#### 3.2.1.1 EU-FPA – TLL Fisheries

The EU sought fishing opportunities for 81 industrial and 93 semi-industrial TLL vessels in their FPA and Protocols with the SWIO states. The semi-industrial fleets are based in Reunion Island and the fishing opportunities to operate in the national waters of the SWIO states are almost fully utilised. The licensing structure is the same as the PS fishery. The license fee estimated at US\$ 134 per tonne which is about 25 % potential license revenue (US\$ 553

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<sup>42</sup> 11,112 tonnes of by-catch at retail market value of US\$ 2,500 per tonne.

<sup>43</sup> Macfayden G et al (2016). Study of the global estimate of the value of tuna fisheries

per tonne) based on the Maputo Declaration. The license revenue deficit under the EU-FPA is estimated at US\$ 4.0 million per year. The details are summarised in the table below.

**Table 29 – Comparative Analysis of the License Revenue Estimates from the EU TLL Fleets**

REF	ITEMS	UNIT	COM	MAD	MAU	MOZ	SEY	TOTAL
A.	Duration of FPA	YEAR	7	6	6	5	6	
	Duration of Protocol	YEAR	3	4	3	3	6	
	Starting date of Protocol		Jan-14	Jan-15	Jan-14	Jan-12	Jan-14	
	Expiry Date		Dec-16	Dec-18	Jan-17	Jan-15	Jan-20	
	Status		Expired	Renewed	Renewed	Expired	Active	
	LL<100 GRT		20	50	23			93
	LL>100 GRT			20	22			42
	LL>250 GRT					16	3	19
	LL<250 GRT					16	3	19
<b>B.</b>	<b>Annual Reference tonnage (ART)</b>	<b>TONNE</b>	<b>900</b>	<b>3,040</b>	<b>3,170</b>	<b>3,040</b>	<b>630</b>	<b>10,780</b>
<b>C</b>	<b>Total Paymt per tonne based on ART</b>	<b>US\$/MT</b>	<b>120.92</b>	<b>120.25</b>	<b>145.10</b>	<b>148.13</b>	<b>133.74</b>	<b>133.63</b>
<b>D</b>	<b>Total payment ( B +C)</b>	<b>US\$</b>	<b>108,827</b>	<b>365,552</b>	<b>459,976</b>	<b>450,302</b>	<b>84,254</b>	<b>1,440,491</b>
<b>E</b>	<b>EX-VESSEL PRICE</b>	<b>US\$/MT</b>	<b>5,131</b>	<b>5,131</b>	<b>5,131</b>	<b>5,131</b>	<b>5,131</b>	<b>5,131</b>
<b>D</b>	<b>EX VESSEL VALUE OF CATCH</b>	<b>US\$</b>	<b>4,617,900</b>	<b>15,598,240</b>	<b>16,265,270</b>	<b>15,598,240</b>	<b>3,232,530</b>	<b>55,312,180</b>
<b>E</b>	<b>LICENSE FEE - 10 % CATCH VALUE</b>	<b>US\$</b>	<b>461,790</b>	<b>1,559,824</b>	<b>1,626,527</b>	<b>1,559,824</b>	<b>323,253</b>	<b>5,531,218</b>
<b>F</b>	<b>DEFICIT IN LICENSE REVENUE</b>		<b>-352,963</b>	<b>-1,194,272</b>	<b>-1,166,551</b>	<b>-1,109,522</b>	<b>-238,999</b>	<b>-4,090,727</b>

Overall, the aggregated license revenue deficit to the SWIO Group 1 countries under the EU-FPA, including the PS and TLL fisheries is in the range of US\$10.3 and 15.6 million per year.

### 3.2.2 SE Asian Industrial TLL Fisheries

The annual license revenue estimates derived from the SE Asian TLL Fleets in the SWIO Group 1 countries were US\$ 6.3 million per year for 2007-16 and US\$ 9 million for 2016. The access fee per Vessel Fishing day is estimated at US\$ 647 for 2007-16 period. The details are presented in the table below.

**Table 30 - Potential License Revenue from the SE Asian TLL Fleets in the SWIO Group 1 countries**

REF	PARTICULAR	UNIT	2016	2007-16
	CATCH	MT	21,901	16,940
	EX-VESL PRICE	US\$/MT	5,270	5,131
	TOTAL LANDED VALUE	US\$	115,418,270	86,919,140
<b>A</b>	<b>POTENTIAL LICENSE REVENUE</b>	<b>10%</b>	<b>11,541,827</b>	<b>8,691,914</b>
	SWIO GROUP 1 COUNTRIES	MT	17,131	12,324
	LANDED VALUE	US\$	90,280,370	63,234,444
<b>B</b>	<b>POTENTIAL LICENSE REVENUE</b>	<b>10%</b>	<b>9,028,037</b>	<b>6,323,444</b>
<b>C</b>	<b>MEAN CATCH PER FISHING DAY</b>	<b>MT</b>	<b>1.38</b>	<b>1.26</b>
<b>D</b>	<b>MEAN FISHING DAYS/ YEAR</b>	<b>NUM</b>	<b>12,459</b>	<b>9,781</b>
<b>C</b>	<b>TOTAL NUM OF VESSEL IN WIO</b>	<b>NUM</b>	<b>457</b>	<b>501</b>
<b>E</b>	<b>MEAN FISHING DAYS / VESSEL</b>	<b>NUM</b>	<b>27</b>	<b>20</b>
<b>F</b>	<b>LICENSE FEE PER FISHING DAY</b>	<b>US\$</b>	<b>725</b>	<b>647</b>

#### 3.2.1.2 Actual License Revenue Estimates

The lack of transparency and availability of reliable financial data is a major issue for determining the license revenue of this segment. The current license fee across the SWIO states for 2007-16 is around US\$ 2500 per month. The simulation shows that the access fee is underestimated by 3 times. This is a big-money business with high risk for corrupt practices.

*Table 31 - Access fee Estimates per fishing day for the Industrial TLL Fishery*

REF	PARTICULAR	UNIT	2016	2007-16
	EX-VSL PRICE	US\$/MT	5,270	5,131
<b>A</b>	<b>Month Access fee</b>	<b>US\$</b>	<b>2500</b>	<b>2500</b>
	Potential Fishing Days	FD	20	20
	Mean Catch Per Fishing Day	MT	1.38	1.26
<b>B</b>	<b>Potential Catch</b>	<b>MT</b>	<b>27.6</b>	<b>25.2</b>
	CATCH VALUE	US\$	145,452	129,301
<b>C</b>	<b>POTENTIAL LICENSE FEE /MONTH</b>	<b>US\$</b>	<b>14,545</b>	<b>12,930</b>
<b>D</b>	<b>FORGONE LICENSE REVENUE</b>	<b>US\$</b>	<b>12,045</b>	<b>10,430</b>

Based on the above estimates, the license revenue from the industrial TLL fleets can be increased by approximately US\$ 10 million per year. The SWIO states are to encourage bilateral licensing arrangements with the SE Asian DWFN. The strategic thinking behind the establishment of a right-based management system in the SWIO basin is to restrict fishing operations in the adjacent international waters. The SWIO-FFA can be the stepping stone for this paradigm shift. As a low laying fruit, the license revenue derived from the industrial TLL fishery can be enhanced by at least 50 %, say US\$ 5 million to justify the bill of the SWO-FFA.

### 3.3 Summing Up

Based on the foregoing analysis and assumptions, it is concluded that the additional license revenue and accessories that can be captured by the SWIO – Group 1 states through a concerted management approach of their tuna and tuna-like resources is estimated between US\$ 21 and US\$ 26 million per year based on 2007-16 fisheries and market data. The maximisation of license revenue is to be considered as a starting point for harnessing the full development potentials of the shared tuna fisheries. The long-term strategy of the SWIO states is to balance foreign fisheries access and the development of their own domestic industry. However, the bio-economic and value-chain interactions of regional tuna industry within its global ecosystem is still not on the agenda of these coastal states. The DWFN are foresightedly pushing hard in the international regional forums to institutionalise the so-called historical rights of the highly migratory fish stocks which may deprive the coastal states of their present and future rights for developing their offshore fisheries. The sustainable development of the small-scale chilled tuna value chains is a common denominator for the SWIO states.

Access fee is a one-off payment that may or may not contribute to the socio-economic development of the resource-owners depending on how the money is spent by the government. So far, it has not been leveraged adequately to crowd-in public and private investments. Its impact on wealth creation, employment and economic integration is negligible. The extended and artisanal tuna fisheries which are often unknown to the RFB and the coastal states are in fact contributing about 50 % of the first sale proceeds of US\$ 2.6 billion in the SWIO states.

The establishment of a regional FFA by coastal states is so obvious that it does not beg for a feasibility or CBA analysis. It is fuelled by the quest of regional solidarity and political leadership to maximise the profitability and sustainability of the tuna business from the coastal state perspectives. There is no comparison between the operating cost of the SWIO-FFA and economic magnitude of regional tuna wealth. In other words, the operating cost of the SWIO-FFA is estimated at US\$ 3.0 million at full capacity whereas the catch value of the regional tuna fisheries is US\$ 2.6 billion per year. It will hardly cost the SWIO states about 10% of untapped license revenue to operationalise the programme.

## Section 4.0 SWIO-FFA Project Options

The core question is to determine the Cost and Benefit of the proposed two project options for the operationalisation of a regional FFA for the shared fisheries, with primary emphasis on the tuna and tuna-like species in the SWIO basin. This section examines the theory of change of these project alternatives before assessing their upfront and operating costs. The SWIO-FFA builds on the ongoing works of the IOTC related to the conservation and management<sup>44</sup> of these highly migratory fish stocks to unleash their full development potentials to the SWIO states. The impetus of the SWIO states is on the maximisation of the profitability and sustainability to progress towards the global SDG 2030 and Blue Growth Initiatives. These developing coastal and island states are behind schedule by more than one generation as compared to the Pacific Island Countries. A new type of thinking is needed to reduce their reliance of development grants and aids to accelerate the development of their inshore and offshore fishing industry. The business-as-usual approach has led to a massive drain of the wealth of the sector that could have been leveraged judiciously for their socioeconomic transformation<sup>45</sup>. The politics between the rich nations and third world countries are not based on philanthropy but economics. Making the rich richer does not help the poor. The SWIO states have no choice but to strengthen their regional political capital to obtain a fair deal from the DWFN and multinational corporations involved in the regional segments of the global tuna value chains.

The fisheries sector of the Sub-Saharan African countries - both inland and marine – has got the potentials to usher sustained economic growth and prosperity in these mostly poor and fragile countries. It can play a prominent role in progressing food and nutrition security, poverty reduction, gender equity and sustainable management of the sub-ocean region and inland water bodies – life under water. The per-caput fish consumption on the African continent is about 9.4 kg, which is lower than the global average of 18.4 kg. It is supplied mainly by the inland capture fisheries and aquaculture while the fisher communities are not enabled to look beyond the inshore fisheries. The fish consumption in Africa is projected to decline to 6.8 kg by 2020 if appropriate actions are not taken urgently. One should not lose sight of the existence of the immense shared fisheries resources in the inland water bodies such as the Zambesi Basin, Lake Victoria, Nile River, Lake Tanganyika and so on. On the ocean side, over 90% of the global marine fisheries resources are located inside the EEZ of the coastal states, mostly in the territorial waters and the remaining 10% comprising the tuna and associated large pelagic, toothfish, alphonso and orange-roughy stocks are harvested on the high seas<sup>46</sup>.

### 4.1 A new type of thinking

Time is a critical factor in the planning process. The SWIO states have been accustomed to look at the shared tuna resources through the lenses of the DWFN and the supremacy or value chain governance of the multinational enterprises of the rich economies. There is the need for a paradigm shift to nurture a shared value or ethical business model<sup>47</sup> to achieve a triple-win approach. The foregone benefits / opportunity costs due to delayed action are too high for developing countries. The consultancy does not find any competing interest or trade-off between the proposed two project alternatives. In fact, they are complementary and mutually

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<sup>44</sup> Under the Article 64 of the UNCLOS 1982 related to the needs for the global conservation and management of 16 tuna and tuna-like species through effective collaboration between the coastal states and DWFN. This article does not provide a formal definition of the term conservation and management and therefore open to different interpretation by different interest groups. The functioning of the RFMO is different than the UN General Assembly where the interest and concerns of the third world countries are not taken on board owing the strong influences / lobbies of the developed economies despites of their majority of votes.

<sup>45</sup> Late Kofi Anan et al. 2016. 2<sup>nd</sup> Advance Africa Platform Report

<sup>46</sup> New Zealand National Department of Marine Fisheries Report 2016

<sup>47</sup> Inspired by Michael Porter, the guru of Value Chain Theory and Share Value Business Models.

enriching. The analysis is based on the works of the legal consultants who have researched the institutional aspects in holistic way, including the organisational and functional implications of these alternatives. In the absence of a finite project document on the SWIO-FFA, the consultancy is compelled to design a realistic business model. It is assumed that the focus of the programme is a business-oriented approach for the maximisation of profitability and sustainability of the tuna wealth in the SWIO basin. It aims at enhancing the IOTC activities to impose more stringent Harvest Rules and Minimum Terms and Conditions for the regional fisheries, industrial and trade Policies. At the onset, the agency will focus on the offshore tuna fisheries and may consider to eventually extend its high-level advisory and facilitation services to shared inshore fisheries of the member-states.

An integrated and holistic management approach is necessary to tackle the institutional reforms and rehabilitation strategies of the marine fisheries within the complex and dynamic factors of the globalised environments. The coastal tuna fisheries offer the pathways for mitigating the adverse impacts of those reforms on the livelihoods of the local fisher and fish-worker communities. Free Trade generic is not a boon for industrial development of the fisheries sector in the developing coastal states. The revival of the African fisheries sector is incumbent to policy factors, effective multi-stakeholder dialogues, knowledge and information management, capacity development and resource mobilisation.

As stated earlier, the SWIO-FFA and SWIOFC can be synergistic for marine fisheries sector in the region. The fundamental issue is not about binding powers but ownership on the part of the coastal states and the mobilisation of domestic financing. Both projects have their own rationale that cannot be trade-off against each other. The process of institutionalisation of these projects can be anticipated simultaneously to reduce upfront cost and to emulate a holistic approach for the regional marine fisheries sector. Merging the two projects is neither institutionally realistic nor financially feasible. Both require to be independent or “interdependent” agencies embedded into an autonomous administrative and financial management system. This is imperative for the setting up of a goal-oriented, efficient and transparent agency to win the trust of its member-states and the donor agencies.

## **4.2 SWIO-FFA**

The business model aims at maximising the profitability and sustainability of the shared fisheries resources for the regional and national economies. This Sub-Saharan African region is in the limelight of international community for over 200 million people need to be pulled out of extreme poverty and food insecurity owing the shortage of land-based resources which are exacerbated by the impacts of climate change. The geopolitical instability in region is a challenge for the global peace and prosperity. The sovereign rights of the coastal states on their national waters are inviolable, however regional solidarity is indispensable for the sustainable management and responsible development of their shared marine wealth. The marine fisheries have the potentials for uplifting the socioeconomic wellbeing of the present and future generations of the Eastern-Southern African peoples. The SWIO region is lagging by nearly 4 decades - more than one generation<sup>48</sup> as compared to the South Pacific region since the enactment of the UNCLOS 1982. So far, they have been dancing on the tune of the DFWN. The SWIO must catch up on this issue for the common good of the region. By not making the right decisions, policy-makers are contributing to the high cost of inaction through the foregone benefits. The gist of the challenge is beyond the scope of a feasibility study or CBA but a high-level political vision. Why is the region sharing poverty amidst plentiful of natural wealth?

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<sup>48</sup> *The Western Indian Ocean Tuna Organisation (WIOTO), which was promoted in 1992 died prematurely because it aimed at starting big by including the Northern Western Indian Ocean states and the heavy bureaucracy in the decision-making process in those countries.*

The implementation of the SWIO-FFA requires a new mindset of interdependence and collective actions. It calls for regional political wisdom and far-sightedness to adopt a common but differentiated approach among the SWIO states for supporting each other in pursuing their development needs and aspirations within a broader framework of regional economic integration<sup>49</sup>. This approach has been a major contributor for the success of the SP-FFA. For example, Australia and New Zealand have been a role model in supporting the developing small and tiny island states of the South Pacific through the FFA. It is awaited that France through its territories - Reunion and Mayotte - also as a member of the EU and a major DWFN in the SWIO would judiciously support this initiative to empower regional political economy in the marine fisheries. It is also expected that South Africa as the largest emerging economy as well as Mauritius and Seychelles, two higher middle-income SIDS would provide the needed political leadership to take the regional domestic tuna industry to its next level of shared growth and prosperity. The global political and economic order is shifting from the Atlantic to the Indian ocean through the emerging economies such as India and China as well as African continent as a huge market.

The tuna strategy of the SWIO states should not be perceived as a win-lose game between the resource-owners and the DWFN, but as a triple-win based on an equitable sharing of value added and genuine partnership. Several multilateral and bilateral agencies are supportive of this regional vision through the SDG 2030 and the Blue Growth Initiative. So, there should not be any fear of retaliation whatsoever on the part of the traditional DWFN or economic partners. The global geopolitics and economics are fast-changing and the SWIO states should not miss this golden opportunity – the African Renaissance.

#### **4.2.1 Project Description**

The SWIO-FFA is thought as an independent Inter-Governmental Agency that does not require any binding powers as prescribed in the Article XIV of the FAO Constitution<sup>50</sup>. It is assumed that the member-countries are fully committed to the modus operandi upon signing the framework agreement. The techno-administrative and political process for the establishment of the new agency can be facilitated by the SWIOFC Secretariat with support of its co-sponsors namely, the SWIO-Fish 1 Project and WWF, which will be a more cost-effective approach. The proposed project concept consists of 3 cost-centres.

##### **4.2.1.1 Preliminary and pre-operative phase**

It acknowledged the works that have been done so far by the SWIOFC in collaboration with its privileged development partners<sup>51</sup> would persevere until the accomplishment of the project. A pluri-disciplinary consultancy is needed to assist the SWIOFC Secretariat in the facilitation of the high-level consultative process. The genesis of the new agency may take up to two years from start-to-finish in the best-case scenario<sup>52</sup>. In the meantime, a comprehensive economic impact analysis of the regional segments of the domestic and global tuna value chains is necessary to highlight the prospects and challenges of the shared tuna fisheries to the SWIO states. The expected outcomes can lead the ‘dollars talks’ – a language that policy makers are more conversant. They constitute the building blocks for the formulation of the SWIO Tuna

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<sup>49</sup> *The programme is in alignment with The African Union Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa, 2014*

<sup>50</sup> *The South Pacific Forum Fisheries Agency has played an advisory and facilitation role and has been binding as prerequisite for its aspiring successes. They are not a guarantee that the member-states would either meet their financial contributions timely or support indiscriminately the regional policies or minimum terms and conditions.*

<sup>51</sup> *The World Bank SWIO-Fish 1 Project, EU Fisheries Governance Programme and Smart-Fish Programme implemented by AU-IBAR and IOC respectively and WWF.*

<sup>52</sup> *Based on a virtual discussion with the acting Secretary of the SWIOFC on the facilitation of the political process for the SWIO-FFA along with its own institutional reform.*

Industry Strategy and Action Plan. They will pave the way for the publication of the first Satellite Account of the Regional Tuna Industry with selected baseline macroeconomic indicators and for planning as well as Monitoring and Evaluation of selected Work Programmes.

A communication strategy is necessary to mobilise support across the key stakeholders of the SWIO States, including the business communities, Research and Development Institutions and Non-Governmental Organisation under the institutional leadership. The preliminary expenditure involved in the process of creating the legal identity of the SWIO-FFA that entail additional consultancies and administrative works, technical workshops and meetings and a Ministerial Conference, including logistics and contingencies are estimated at US\$ 300,000 over the period of 2 years. The budget estimates for undertaking the above-mentioned techno-economic researches is US\$ 200,000. This preliminary and pre-operative costs should be sourced from the supporting donor agencies and international NGO.

#### **4.2.1.2 Installation Cost**

Upon obtaining the political green-light, the next step for the SWIO-FFA is to establish its Secretariat and the National Coordination Units. The NCU is thought as a one-stop-shop at the top-level management of the Fisheries Ministry to fast-track the necessary inter-ministerial approval and supports for mainstreaming of the regional policies and management measures at the national levels. The geographic location of the Secretariat is of strategic significance for the success of the Secretariat and should be examined carefully by the member-states. The hosting country is to show the courtesy of providing adequately equipped office space and diplomatic status to the key staffs and may contribute partly to the operating costs of the Secretariat. The installation phase can be managed by the SWIOFC Secretariat in collaboration with the hosting country and may last about six months, until the key managerial and professional staffs are recruited.

The interim budget is estimated at US\$ 500,000 to foot the administrative and travelling expenses and salaries of the staffs, until the first annual work plan and budget is approved by its hierarchical authorities. The budget of the Secretariat is limited to its own operations and therefore, its members-states will require to make provision for adequate capabilities and resources to respond at the national level. A Letter of Service Agreement is to be concluded between the Secretariat and its member-states individually to monitor the commitment and performance from either side. The national representatives will have to bear the cost of participating in the high-level statutory meetings. This can be an acid-test of their real engagement and trust.

#### **4.2.1.3 Establishment Cost / Recurring Budget**

The major component of the recurrent budget is the pay-roll of the managerial and professional staffs and the operating expenses associated with the performance of their duties. The other cost centres include the administrative and office operations, logistics supports, communication and marketing of the programme and travelling cost for attending regional missions, meeting and workshops. A proper communication networking is essential to connect the key stakeholders, including think-tanks, Research and Development Organisations and supportive donor agencies. The key professional and managerial staffs will consist of:

- i) An Executive Director
- ii) A Policy Expert
- iii) A Tuna fisheries Expert
- iv) A Legal Expert
- v) Senior Economist
- vi) An IT Professional
- vii) An Administrative and Financial Manager
- viii) A Fisheries Statistician
- ix) Programme Coordinator and Project Managers
- x) A communication Officer

The best regional experts with international exposure are to be hired by providing attractive salary and associated benefits<sup>53</sup>. They can be supported by international experts in specific areas through blue-ribbon contracts. The deputation of top national experts and fellowship to the Secretariat for inter-active and continuous capacity building are to be encouraged. The budget estimates for the first 5 years is US\$1.5 million per year<sup>54</sup>. The organisational genesis is planned in 3 contiguous or overlapping phases over a period of fifteen years<sup>55</sup>. The following is a lay-out of the professional staffs at the SWIO-FFA secretariat.

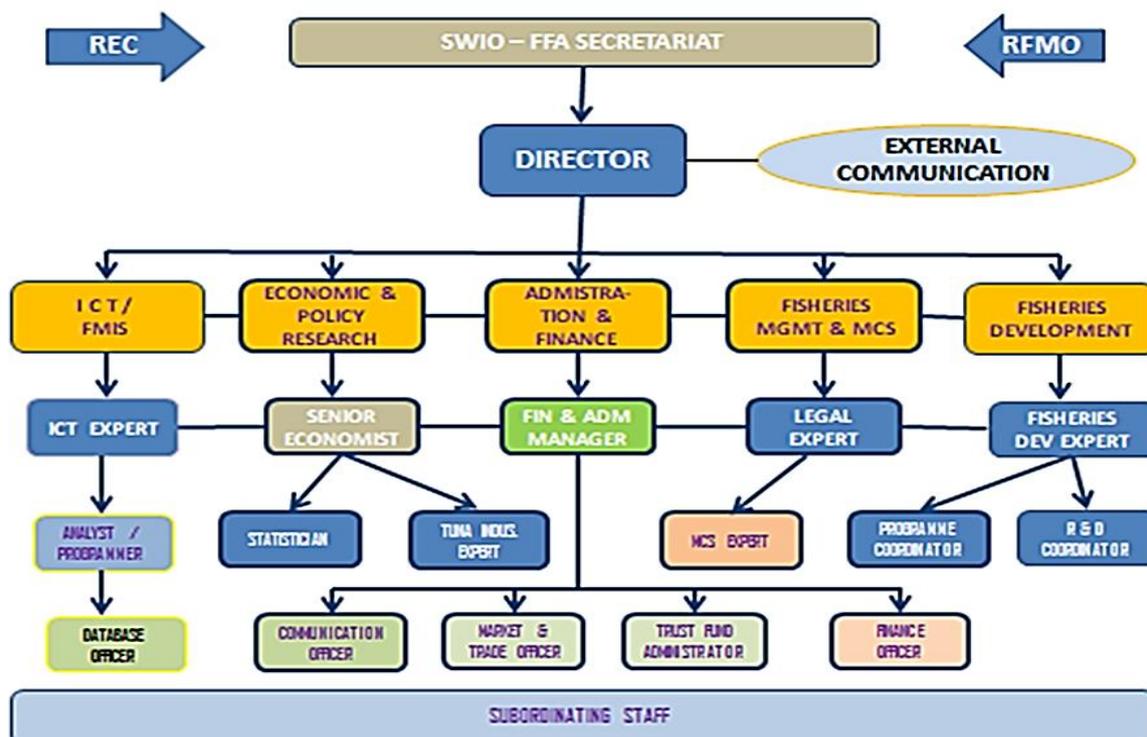


Figure 16 - SWIO-FFA - Proposed Professional Staffs

Genesis	Details	Duration	Budget Estimates
Ground 0	Prelim & Pre-operation cost	2 years	US\$ 200,000 -300,000
Phase 1	Installation / Inventory	5 years	US\$ 1.5 million
Phase 2	Consolidation	5 years	US\$ 2.5 million
Phase 3	Cruising/ Centre of Excellence	5 years and up	US\$ 3.0 million

#### 4.2.1.4 Comparative Analysis

These budget estimates are based on the current standard practices and are comparable to analogous RFB. Indicatively, the SP-FFA 2018 annual budget is US\$ 30 million and it has 300 permanent staffs across five main thematic areas. It caters for 18.4 million sq.km of EEZ belonging to 18 member-states with an annual tuna harvest of 1.2 million tonnes. The SWIO-FFA

<sup>53</sup> The pay-roll constitutes a major part of the operating costs. As an indication a gross remuneration of US\$ 11,250 per a regional professional and US\$ 7,500 for a managerial staff per month for an initial contract of 3 years which is renewable.

<sup>54</sup> These budget estimate bear reference to the recent technical studies namely, Swan J 2017 and Payet R 2015 and a Cost-Benefit Analysis conducted by Prof Glen Hurry 2015 on the institutional reforms of the IOTC.

<sup>55</sup> A financial projection of the SWIO-FFA Secretariat for the first 15 years is presented in Section 5 – Sustainable Financing

scenario consists of 12 member-states with a total area of national waters of approximately 10.4 million sq.km and an annual catch of 500,000 tonnes. At full capacity, its recurrent budget is estimated at US\$ 3 million and may accommodate up to 30 staffs, i.e. one tenth of the operating cost of the SP-FFA<sup>56</sup>. The SP-FFA is still dependent on external financing because its internal resources are limited to about 30 % of the annual budget. A significant part of the budget is supported by direct grants from New Zealand and Australia. They also deploy generously their sea and air patrol assets for regional fisheries surveillance operations. The SP-FFA has been successful in linking the issues of regional maritime security and fisheries surveillance in the Pacific Ocean. The annual management fees of approximately US\$ 1.5 obtained from the US Treaty is considered as a bedrock for the financial stability of the agency. The SP-FFA has developed several management cost recovery schemes to grow its financial resilience. The financial analysis of the SWIO-FFA is based on a fully operationalised structure, i.e. US\$ 3 million as a benchmark.

#### **4.2.1.5 Work Programmes**

The managerial and professional team will constitute a multidisciplinary powerhouse to deliver high-level policy and management advice to the member-states<sup>57</sup>. It will be responsible for the formulation of a Regional Strategy and road-map for the implementation of the shared vision of the SWIO-FFA upon its approval by the national technical and political leaders. The facilitation of work programmes and the mobilisation of financial resources and partnership constitutes one of its primary function<sup>58</sup>. It is argued that there is no scarcity of development finance but of bankable projects that meet the standards of the international funding and donor agencies. The communication and marketing officer of the agency is to play a key role in building global supports for the regional advocacy and fund raising. The Secretariat is to be equipped with a top project management unit to maximise the value-for-money of the programme investments as an imperative to win the trust and confidence of the member-states as well as the external technical and financial partners. Several tuna management related initiatives are ongoing in the SWIO region with the assistance of different donor and development agencies. They will have to be revisited and converged to the objectives of the SWIO-FFA for the optimal utilisation of these scarce resources. These programmes include:

- i) The continued support of the World Bank's SWIO-Fish 1 Project to SWIOFC activities, including the national capacity building for MCS, Regional Minimum Terms & Conditions Guidelines, Regional Observers Programme and the SWIO-FFA initiative.
- ii) IOC-Regional Fisheries Surveillance Plan<sup>59</sup> which has been benefits from the technical and financial assistance of the EU funded Smart-Fish Programme and SWIO-

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<sup>56</sup> Empirically, the cost efficiency ratio for the SWIO-FFA is projected at US\$ 6 per tonne as compared to US\$ 25 per tonne for the SP-FFA.

<sup>57</sup> The policy advice is not limited to regional Minimum Terms and Conditions for fisheries access only to address development needs and aspirations of the participating states in a common but differentiated approach. Following the best practices of the SPFFA, a Letter of Services Agreement (LSA) can be concluded between the Secretariat and the member states on the backdrop of the annual budget to enumerate the prioritised activities at the national level in alignment with the regional programme. This is necessary establish objectively verifiable engagement of either parties in advancing the common objectives of the SWIO-FFA.

<sup>58</sup> The main functions of the Secretariat of the SWIO-FFA are summarised in Annex 3.

<sup>59</sup> The Regional Fisheries Surveillance Programme of the Indian Ocean Commission has grown into an overarching tool for the sustainable management of the shared tuna resources of the SWIO. The programme has been nurtured with financial supports of the European Commission over the past ten years. Currently it includes seven SWIO-states while the admittance of other two members - South Africa and Somalia - is in the pipeline. It is now ready to fly its own wings by establishing itself as an autonomous mechanism within the institutional ecosystem of the IOC. However, the programme is seen to be operationally more effective within the arena of the future

Fish 1. The cross-regional fisheries Programme, Eco-Fish under the 11<sup>th</sup> EDF will maintain its supports to the IOC RFSP until 2024.

The SWIO-FFA can catch up on the time-lag by coordinating/managing the existing and future tuna related programmes. A Trust Fund is to be established and managed according to international standards and best practices. It is to play a significant role in mobilisation of external funding for prioritised programmes. There should not be any doubt about the availability of adequate financial resources to fund these programmes by the international development and donor agencies. This may be considered smartly as a small and indirect compensation to the cost of the externalities of fishing and unethical practices by the DWFN on the adjacent pockets of high seas. The contribution of the member-states is sought as an equity capital and the Secretariat will be accountable to the national shareholders for its earned value. This should not be considered as additional payment or hardship rather than a transfer or high-yield investment in their shared tuna industry. The value-added of effective regional cooperation and economic integration need no justification but is to be quantified and monitored by the project.

### **4.3 SWIOFC**

It is not appropriate to look at the SWIOFC with the lenses of the SWIO-FFA or through the offshore fisheries only. The TOR was conceived to hit two birds with one shot, i.e. to conduct a CBA of the SWIO-FFA and at the same, of the institutional transformation of the SWIOFC. These two projects have their own rationale that should not be distorted in the best interest of the regional marine fisheries sector. The cost incurred by the SWIOFC cannot justify the benefits derived by SWIO-FFA and vice-versa. They are standalone but mutually enriching through in their specific objectives and functions<sup>60</sup>. The intended institutional uplifting of the SWIOFC entails a deeper analytical diagnosis of its policy and strategic frameworks that cannot be accommodated in this consultancy<sup>61</sup>. The SWIO-FFA, as an independent RFB is bound to maintain strong ties with SWIOFC as its parent-agency as well as other regional and international fisheries management bodies, donor agencies and non-governmental organisations.

#### **4.3.1 SWIOFC Past Performance**

The 2011 External Performance Review of the SWIOFC commended the good works accomplished by the latter for the sustainable management and responsible development of the inshore fisheries of the member-states albeit its limited financial and human resources over the past decade. It recommended an in-depth institutional review to cope more effectively with the emerging prospects and challenges of national fisheries in consultation with its members. The recommendation was followed by a legal consultancy that took an in-depth look at the legal, administrative and financial implications of its institutional transformation from Article VI to Article XIV under the FAO Constitution<sup>62</sup>. The legal consultant suggested an intermediate

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*SWIO-FFA. It has obtained the financial and technical supports of next cross-regional fisheries programme, Eco-fish under the 11<sup>th</sup> European Development Fund for next six years.*

<sup>60</sup> SWIOFC (2011). *Report of the Performance Review of the South West Indian Ocean Fisheries Commission. SFS/DM/SWIOFC/12/E.*

<sup>61</sup> *It suggested that a comprehensive feasibility and consultation would be carried out to document the prospects and challenges of the inshore fisheries of the SWIO states to propose an adequate institutional arrangement and sustainable financing modalities. The collaboration between the SWIOFC and SWIO-FFA will evolve constantly for the common good of the regional fisheries sector.*

<sup>62</sup> *The key differences between an Article VI and XIV type of Regional Fisheries Bodies under the FAO Constitution are related to three main criteria namely: i) Advisory and facilitation role vs binding power on member-states; ii) Financial and administrative management autonomy and iii) Management of Trust Fund for receiving external grants and aids. Also, for any external financial resources exceeding US\$ 200,000, the FAO charges a management fee of not less than 13%.*

solution that provides adequate institutional flexibility to SWIOFC in the pursuance of its priorities and suggested a comprehensive study and consultation with the key beneficiaries. There is no clue that the above guidelines and recommendations have been taken into consideration by the Commission.

### 4.3.2 SWIO Inshore fisheries

The development potentials of the shared tuna fisheries should not overshadow the socio-economic significance of the inshore fisheries of the SWIO basin which are predominately subsistence and artisanal activities. Over 60 million peoples living in the coastal areas are directly or indirectly dependent on these coastal fisheries for their livelihoods, food and nutrition, security and cultural diversity. The annual catch of the marine fisheries in the WIO is about 5 million tonnes and 90 % of it, including nearly one million tonnes of tuna and associated large pelagic fishes, is harvested by the subsistence and commercial artisanal fisheries. The annual first sale proceeds of these coastal fisheries in the SWIO region is estimated at US\$ 2.5 Billion at a nominal landed price of US\$ 1 per kilo.<sup>63</sup> However, the industrial tuna fisheries seem to be more appealing to the national policy makers because they are a major source of foreign exchange earnings in terms of license revenue and servicing of the foreign fleets.

The SWIO basin accounts for 40 % of total catches of the artisanal fisheries and 80 % of the industrial fisheries of the WIO (FAO Zone 57). The total catch value of the marine - inshore and offshore - fisheries is estimated conservatively at US\$ 4 Billion but are economically inefficient from the coastal state perspectives. These coastal fisheries create an annual turnover of US\$ 2 Billion and some 7.5 million direct and direct jobs<sup>64</sup> in the local communities. The untapped economic rent is about US\$ 200 million<sup>65</sup> per year due to policy failures and poor management. This is a paradox on poverty amidst plenty because the coastal states are dilapidating their own financial resources and are relying on grants and aids for developing their fisheries sector.

These coastal marine fisheries are deteriorating steadily due to demographic explosion, over-fishing, illegal and unethical fishing practices and environmental degradation, which are exacerbated by the subtle impacts of global climate change. The root-causes of the “tragedy of the commons” in the coastal fisheries is the open-access regime and informal also potentially unethical practices. The foregone development opportunities in the sub-sector is estimated at US\$ 5 Billion annually<sup>66</sup>. The development of the coastal tuna value chains can be leveraged to thrive appropriate policy reforms and rehabilitation measures in the regional inshore fisheries. The above prospects and challenges owe to be a top priority of the SWIOFC. Therefore, the institutional transformation of the SWIOFC should not be limited to offshore industrial tuna fisheries to focus on the massive development potentials of the inshore and offshore small scale fisheries in an integrated and holistic way.

### 4.3.3 Coastal tuna fisheries

The tuna and tuna-like species are highly migratory and seasonal irrespective of being harvested by the industrial or small-scale fisheries. The IOTC mandate is related mainly to the

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<sup>63</sup> ASCLME/SWIOFP (2012). *Transboundary Diagnosis Analysis for the Western Indian Ocean – Baseline Report*. The financial estimates data have been adjusted to reflect the 2016 economic situation. This analysis is based on the official fisheries data which are seriously underestimated as stated by Kevern Cochrane 2016 and Daniel Pauly 2017 – *Reconstruction of the Global Fisheries Data*.

<sup>64</sup> Gertjan de Graaf et al. (NEPAD – FAO 2014). *Value of African Fisheries*. The economic indicators provided in the economic impact assessment of the African fisheries are produce these estimates.

<sup>65</sup> Malabo Declaration 2014 on the re-investment of least 10 % of annual turnover of the fisheries and aquaculture sector for enhancing the hard and soft infrastructure for sustained and equitable growth.

<sup>66</sup> Hoegh-Gulberg O et al (WWF 2015). *Reviving the Ocean Economy: The Case of Action*.

industrial high sea tuna fisheries. The UNCLOS 1982 vested upon the coastal state the rights and responsibilities for the sustainable management and responsible development of these fish stocks inside their national waters and the pockets of high seas through the effective co-operation and collaboration among the neighbouring coastal states and the DWFN. So far, most of the SWIO states have not built the required capabilities to harness the development potentials of their small-scale fisheries.

The extension of the small-scale tuna fishery has not received adequate attention on the part of the development and donor agencies as well. Most of regional initiatives<sup>67</sup> over the past decades have emphasised on the technical aspects, such as FAD engineering, fishing technologies and capacity building<sup>68</sup>. None of them adopted a value chain approach to promote appropriate business models through products and markets development. The niche for SWIOFC to intervene in the small-scale tuna fisheries within its existing institutional arrangement exists. The real issue is the mobilisation of technical and financial resources to do the works. The financial situation of all the SWIO states is not healthy owing to relatively high Balance of Payment and Budget Deficits<sup>69</sup>. The national governments are to be convinced of the value-for-money of their financial contributions and the expected outcomes.

#### **4.3.4 A common but differentiated approach**

The coastal tuna fisheries cannot be segregated from the other segments of the marine fisheries sector, particularly the inshore fisheries owing to their multitude interactions. A holistic approach is needed because the small-scale fisheries share the same onshore infrastructure and logistics. Most of fishing units are polyvalent / versatile in terms of fishing capabilities and operational strategies to adapt to the seasonality of the fish stocks. The sustainability of the small-scale fisheries in the region is jeopardised by policy and non-policy factors discussed earlier. These challenges cannot be addressed without strong political will within their local socio-ecological context. The establishment of an RFB with binding powers or fund-raising capacities does not relieve the member-states from their responsibility to solve the root causes of the problems of underdevelopment in their own country.

The small-scale fisheries sector cannot continue be open-access and informal. It is to be re-connected to the national political economy through adequate policy and regulatory frameworks. This may seem to be the hard way, but the right to foster the sustainable management and development of the sector to leverage domestic resources for the mobilisation of the needed public and private investments as well as partnership development. As a rule of thumb, any economic sector is not viable if it does not reinvest at least 10% of its gross value-added to sustain its growth<sup>70</sup>. Nearly US\$ 200 million of economic rent is dissipated annually in the SWIO coastal fisheries, which is feeding the negative loop of underdevelopment. The key stakeholders of the fisheries sector should acknowledge that they cannot simply rely on aids and grants for the sustainable development of the sector, but it can be used to kick-start the process<sup>71</sup>.

A new type thinking is required to get rid of the business-as-usual in the small-scale fisheries sector. The interaction between the SWIO-FFA and SWIOFC is evident particularly in the small-scale tuna fisheries. It can trigger an appropriate strategy for enabling in-depth reforms and rehabilitations of the inshore fisheries which are on the verge of collapsing owing human-induced and environmental factors, including climate change. The tuna and tuna-like resources

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<sup>67</sup> Namely, the EU-IOC Regional Tuna Project 1991-96, the World Bank First SWIO-Fish Programme.

<sup>68</sup> Rey H et al. Banque Mondiale SWIOFP 2011. *Etude d'impact socioéconomique de la pêche locales autour des DCP dans les pays du sud-ouest de l'océan Indien*

<sup>69</sup> International Monetary Fund – World Bank Economic Outlook of Sub-Saharan African countries 2018.

<sup>70</sup> The Council of African Ministers of Fisheries and Aquaculture (CAMFA) - Malabo Declaration 2014

<sup>71</sup> Mac-Fayden G (World Bank, FAO and EU 2007) – *Evaluation of donor driven fisheries programmes in Africa over the past 5 decades.*

appear to be more resilient to the impact of the ocean warming and acidification. Public and private investments are to be converged for the development of climate smart fisheries infrastructure, market logistics, fishing assets and technologies.

#### **4.3.5 Cost of the institutional reforms**

The current annual budget of the SWIOFC is about US\$ 611,200 to cover the remuneration of the professional staffs (Secretary, Programme Officer and Administrative Assistant) and activities. The host country provides around US\$ 25,000, excluding office space and transportation. In the event of an independent status with autonomous financial and administrative management system within the FAO Constitutional Framework like IOTC, it will require to boost its organisational and functional capacities. The operating cost of reformed RFB is estimated at US\$ 1 million per year, excluding extra-budgetary financing for the relevant management and development programmes. It is therefore suggested to conduct a proper feasibility study for the institutional reform of the SWIOFC in the context of the renaissance of the marine fisheries inside the national waters of its member-states.

#### **4.3.5 Summing Up.**

The two project alternatives are complementary and mutually fortifying to achieve a holistic approach for the sustainable management and development of the marine fisheries of the SWIO states. The SWIO-FFA is proposed with a dedicated business plan to maximise the profitability and sustainability of the shared tuna fisheries resources in national waters and beyond. It does not overlap with the mandate of the IOTC, SWIOFC or any other regional fisheries agency. The impetus SWIO-FFA as a resource-owners association aims at unleashing the development potentials of the regional tuna stocks to thrive shared growth and prosperity of its member-states. Inspired by the achievements and best practices of the SP-FFA, the SWIO states can catch up with the time-lag.

The preliminary and preoperative cost for the creating the legal identity of the SWIO-FFA is estimated at US\$ 300,000 and the process may take up to 2 years. The operating cost of reformed SWIOFC is estimated at US\$ 1 million per year. The SWIOFC requires a similar process to decide on its institutional transformation. However, it may be cost and time saving to initiate both processes simultaneously.

The organisational development of the SWIO-FFA is scaled up over 15 years in 3 successive phases of 5 years namely, installation, consolidation and cruising. It starts with a recurrent budget of US\$ 1,5 million to culminate at US\$ 3 million at maturity. The needed work programmes to pursue the objectives of the SWIO-FFA are to be supported by ex-budgetary financing.

The CBA is based on the Cost of US\$ 3 million per year. The projected investments are nominal as compared to the expected additional benefits from multi-billion-dollar fisheries sector of the SWIO region. The gist of the challenge is to usher a mind-shift of the policy makers and key stakeholders.

## Section 5.0 - Sustainable Financing and Benefits

An innovative approach is needed to mobilise sustainable funding for the operationalisation of the SWIO-FFA as well as public and private investments in the marine fisheries sector of the sub-region. The same also applies for the reformed SWIOFC based on a realistic business plan. These projects require development finance in a timely and predictable manner to deliver on their agenda. The global economic and trade crises have increased the challenges of the low and middle-income countries to accessing adequate financial resources to thrive their economic growth and resilience. The SWIO states own collectively a cornucopia of natural wealth but are short of finance. These developing countries are struggling with their financial and budget deficits that curb their investment capabilities in the productive sectors. Their natural assets are turning into liabilities due policy and external factors which is defeating the primary objectives of the UNCLOS 1982.

The establishment of the SWIO-FFA is based on a high-level objective for the shared tuna fisheries. It is neither sought as a survival strategy of the SWIOFC nor to increase the financial burden of its member states. The project aims at galvanising the regional solidarity and political capital to mobilise resources to maximise the profitability and sustainability of the shared tuna fisheries of the SWIO basin. It is bound to enhance the financial and economic benefits of the participating states by unleashing the development potentials.

The Secretariat is to adopt a business-oriented style and international best practices to maximise the earned value of its nominal investments. The chapter investigates the prospects and challenges as well as the pre-requisites for accessing internal and external financing for the SWIO-FFA. It also looks at the enabling environment to augment the appropriation of the shared tuna resources and the domestication of the regional tuna industry.

In a nutshell, the first sale value of the regional tuna fisheries is estimated conservatively at US\$ 2.0 billion but its economic contribution to the SWIO states is still marginal. The aggregated license revenue is approximately US\$ 20 million per year and it can be doubled in the short-medium term through a concerted strategy. There are substantial development opportunities in the small-scale tuna value chains that cannot be optimised due to policy and regulatory bottlenecks and market failures.

### 5.1 Financing Modalities

To recall from the preceding chapter, the SWIO-FFA is a service-oriented RFB and requires a recurrent budget of US\$ 3 million per year at full capacity. It adopts a zero-budget rule, any surplus of resources over the expenditure is transferred to a dedicated Reserve or Trust Fund. The low-budget and strategic programmes such as Economic and Market Research, Regional MTCs, Fisheries Management Information System, Regional Vessel Register and Project Management Unit are implemented by the inhouse professional team. Some major operations are to be outsourced or coordinated through existing specialised institutions to avoid economic inefficiencies.

Most of the tuna-related Work Programmes such as the MCS tools: VMS, Sea and Air Patrol Deployments, Regional Observers Programmes are ongoing and are to be linked to the objectives the SWIO-FFA<sup>72</sup>. It is an opportunity for the SWIO states to adopt a one-stop-shop to institutionalise the IOC sponsored Regional Fisheries Surveillance Programme under the SWIO-FFA. The Work Programmes are to be managed / coordinated by the Secretariat and

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<sup>72</sup> Driven by the vested interest of some donor agencies, the existing programmes have emphasised on the conservation and management of the shared fisheries resources whereas the maximisation of the profitability and sustainability of the tuna fisheries of the SWIO states has been overlook. The SWIO-FFA is to build on the sustainable biomass to enhance the socioeconomic benefits and development opportunities.

financed by extra-budgetary resources. The establishment of a Trust Fund tends to strengthen the political engagement the regional leaders to mobilise external financial resources and technical partnership, with emphasis on the South-South Cooperation. The membership is kept at a bare minimum whereas the financing strategy is based on management cost recovery.

## **5.2 Financing of SWIO-FFA**

A common but differentiated approach is required to build a unified SWIO-FFA to meet the diverse development needs and aspirations of its member-states. It is to encourage a positive discrimination and subsidiarity among them to enhance regional solidarity and leadership<sup>73</sup>. The harmonised MTC for the maximisation of the foreign fisheries access is just a stepping stone to mobilise the SWIO states for deeper economic penetration in the regional tuna industry. This strategy is not a tug-of-war with the DWFN, but the endeavour of the developing island and coastal states for the development of their Blue Economy. The SWIO states were differentiated in two groups namely, those offering fisheries opportunities to foreign vessels and those who are focusing exclusively on the domestication of the industry by offering Flag of Convenience and Joint Venture possibilities. Somalia and Yemen are unable to concentrate on their development issues due to serious political unrest in the country and require the fraternal supports of the other neighbouring countries.

From the management viewpoint, the distinction between the foreign and domestic vessel is immaterial because both are to comply with the Harvest Rules and pay the economic rent of the fish stocks. This does not prevent the national governments to provide some fiscal rebates or incentives to the domestic industry to boost their competitiveness on the foreign markets. The sustainability of the regional tuna industry depends on its capacity to generate a surplus of revenue to finance its sustained growth and prosperity<sup>74</sup>. The gist of the challenge for the SWIO States is the capacity to mobilise the huge potential of domestic resources for investing in social overheads and productive capitals; turning the million to billion in the shorthand of the World Bank<sup>75</sup>. Being generous to the DWFN is synonymous to subsidising the consumers of the rich economies.

The life-blood of the SWIO-FFA is regional solidarity and political capital backed by a shared vision for the sub-region. Technical leadership is to come forward with bankable - ambitious but realist - projects to mobilise domestic and external resources and partnership. The institutional transformation of the SWIOFC needs to be well-framed and marketed so that it is not perceived as a duplication of efforts and resources in the eyes of the member-states and the donor agencies.

A regional coordination platform is needed to synergize the activities of various programmes and development agencies. The cut-off between the offshore and inshore fisheries is to be properly defined. While the delineation of the industrial segment is clear, it is quite puzzling for the small-scale fisheries owing to the interactions among the different fishing types. These are to be sorted out on the ground through multi-stakeholder dialogues.

Beside the high-level political endeavour for indiscriminate regional economic integration, it is to be acknowledged that the scope of active cooperation is limited in the inshore sedentary

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<sup>73</sup> *The is critical to avoid to toxic competition among the member-states by playing down each other in developing their industry that will have a higher opportunity cost for the entire region. The prisoner's dilemma.*

<sup>74</sup> *World Bank 2017. The Sunken Billions Revisited. Progress and Challenges in the Global Marine Fisheries.*

<sup>75</sup> *The CAMFA Malabo Declaration 2014 that recommended the re-investment of at least 10% of the annual gross value of the fisheries and aquaculture sector to progress the SDG 2030, especially food and nutrition security (1), poverty reduction (2), gender equality (5) and sustainable ocean governance (14).*

fisheries as compared to the migratory and straddling fish stocks. So, regional cooperation is not to agree on 'Everything or Nothing' and is to be grounded with realism. Irrespective of the role and powers conferred to the RFB, the member-states are responsible for their fisheries sector. The overlap of membership and activities of the Regional Economic Communities and Regional Fisheries Bodies are to be streamlined to avoid overlap and duplication of efforts as well as wastage of scarce resources. Development grants and aids alone do not have the traction to usher the expected transformation and may even exacerbate the issues in the long run. In keeping with the foregoing narratives and the inferences of the previous consultancies, the following avenues are explored for the sustainable financing the SWIO-FFA.

### **5.2.1 Member's Contribution**

It is assumed that the 12 SWIO states would join the regional FFA for their common good. The annual membership is earmarked at US\$ 10,000 with an increment of 5% for the consecutive years. The amount raised for Year 1 is US\$ 120,000 and will represent 3 - 5 % of the project financing over the first 15 years. The financial contribution of the member-states is a requisite to demonstrate their ownership in the project and a gateway to express the political capital.

### **5.2.2 Regional Fishing and Support Vessels Registry**

This mechanism is meant to maintain a regular income stream for the agency and to ensure that the fishing and supporting vessels applying for licenses in the national waters of the SWIO are in good standing. Without the registration and clearance from the Registry, no vessel is not eligible to apply for license in the SWIO member states. The domestic fleets also will require to register, and a preferential rate may be established later. Currently, there are about 500 active foreign fishing vessels, fish carriers and supporting vessels in the WIO. At a nominal rate of US\$ 2,000 per annum, US\$ 1 million can be raised annually. The fee is to be increased by 10% every 5 years.

### **5.2.3 Levy on the License fees**

A 5% levy would be charged to the foreign fleets acquiring fishing opportunities in the national waters of the SWIO states. An alternate option will be devised to charge a small percentage of the first sale value of the catch landed by the SWIO domestic industrial and semi-industrial fleets that do not grant fisheries access to foreign vessels. During the first 5 years, US\$ 1 million can be captured through this instrument and may increase subsequently because of the improvement in fisheries management.

### **5.2.4 Conservation fee**

The SWIO-FFA is to play a leading in the management / coordination of selected programmes contributing to achieve its objectives. The study anticipates the minimal financial requirements of these programmes, such as the Regional MCS Operations and the Regional observers Programme etc. Based on a recent feasibility study for the institutionalisation of the IOC Regional Fisheries Surveillance Programme revealed that it would require an annual budget of US\$ 2 to 3 million over the next fifteen years to uphold its MCS operations in the SWIO basin. The programme is to be partly financed by the EU Cross-Regional Fisheries Programme 'Ecofish' under the 11<sup>th</sup> EDF for the next 6 years as from 2019. The project proposes to make provision to ensure the technical and financial resilience of the mechanism which is one of the major determinants for achieving the goals of the SWIO-FFA. An annual conservation fee of US\$ 5,000 is to be charged to foreign vessels acquiring fishing opportunities in the national waters of the SWIO states or the approved zones of cooperation. It is also an indirect way to sensitise the DWFF on the importance of the fish stock and biodiversity conservation. Likewise, an

annual budget of US\$ 240,000, which is topped up 5% annually to cover the operating cost of the Regional Observers Programme. This programme<sup>76</sup> is instrumental for developing a robust fisheries database, reporting and monitoring system. The user rights approach does not only secure the resource-owners but also the foreign fleets in the SWIO basin.

### **5.2.5 Trust Fund**

The Trust Fund is a powerful tool for the mobilisation of the external resources to finance the relevant fisheries management and development projects in the regional tuna industry. The surplus income over the expenditure will be transferred to the Trust Fund. It aims at demonstrating the financial engagement of the SWIO-FFA to attract donor funding. The Trust Fund is to play a strategic role in fund raising and is assumed at coefficient of 5.

### **5.2.6 Mobilisation of Domestic Resources**

The SWIO-FFA is sought to synergise national capabilities. However, this gigantic task cannot be accomplished without national engagements. The improvement of the enabling environment is critically important for the mobilisation of the domestic and foreign investments and partnerships. The surplus profit or the economic rent of the tuna fisheries is to be captured judiciously through appropriate fiscal measures to boost the national public finance.

The lack of transparency and reliable fisheries and financial data is a major hurdle for assessing the profitability of the fishing operations. The economic rent is a double-edged knife. When underestimated, it leads to revenue leakages / foregone benefits to the government and surplus profit to the industry. It construes a subsidy in disguise that feeds the vicious circle of overinvestment and dissipation of the economic rents. On the contrary, higher economic rents in the form of license fees and indirect taxes can disproportionately squeeze the normal profit of the industry.

As a rule of thumb, by capturing 5% of first sale turnover from domestic tuna fisheries of the SWIO states an annual economic rent of approximately US\$ 33.7 can be mobilised based on the 2007-16 data. This money can be utilised by the national governments to invest in the modernisation the fisheries sector. Well invested, the investments can potentially turn the million into billion through the spin-off or multiplier effects.

### **5.2.7 Innovative Financing**

The setting up of a zone-based management in the SWIO basin opens the region to several innovative financial mechanisms such as the Blue Bonds (natural capital and bio-diversity finance) promoted the World Bank, the Climate Funds which is championed by the Global Environmental Fund and other market-based instruments. Collectively, the sub-region can establish a sustainability label that can fetch higher prices for their tuna and products<sup>77</sup>.

## **5.3 Financial projection of the SWIO-FFA**

Based on the above-mentioned fund-raising strategy and assumptions, the financial projection of the SWIO in the short-medium and long term is summarised in the following spread sheet at Page 50, which is self-explanatory. The main points are as follows:

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<sup>76</sup> So far, the Regional Observers Programme drive by the EU Fleet Operators has emphasis on the scientific tasks related to stock assessment. Compliance observation at sea is crucial for the resources-owners.

<sup>77</sup> This is measures are in place in the South Pacific. For instance, the PNA has obtained the MSC certification for its Skipjack fishery and has establish a consortium by the name of 'Pacifical' to promote the sustainability label of their tuna products.

- i) The membership is nominal (5%) and yet, critical for showcasing the regional political capital.
- ii) The proposed financing strategy enables the project to raise US\$ 2.2 million during the first year of operation to build it up steadily to US\$ 4.1 million on its fifteenth anniversary.
- iii) The surplus income over the budgeted expenditure is to be placed in the Reserve Account and/or a Trust Fund. The savings are necessary for the long-term financial health/sustainability of the agency and to drive additional investments into the regional tuna industry.
- iv) It avoids piece-meal and duplication of fund-raising processes which may confuse the member-states and the fishing industry by promoting a holistic approach to mobilise adequate financing for the recurrent budget as well as the strategic work programmes. The conservation levy is instrumental in raising US\$ 2.5 million annually during the first 5 years to support the selected work programmes. An increment of 10% is provided on quinquennial basis.
- v) As a precautionary approach, the project is assumed to yield tangible/sustainable benefits as from the fifth year. An increase in the license revenue is scheduled accordingly, i.e. US\$ 10 million per year for the following 5 years and US\$ 20 million thereafter.
- vi) Over the first 15 years, the aggregated operating cost of the SWIO-FFA Secretariat is estimated at US\$ 32.8 million, i.e. an annual average of US\$ 2.2 million and the expected additional license revenue is US\$ 150 million or an annual mean of US\$ 10 million. The Net Return on Investment is nearly 5 times.
- viii) In addition to the above direct financial benefits, the project enables the mobilisation of internal financing of US\$ 15.6 million through the stipulated cost-recovery strategy. This fund is to leverage up to 5 times (US\$ 77.9 million) of additional public and private investments for the sustainable management and responsible development of the SWIO tuna industry.
- ix) Based on the financial projection, every US\$ invested by the SWIO states enable to raise US\$ 17 through the cost recovery and mobilisation of external financial resources. There cannot be better investments for the developing SWIO states to leverage their shared fisheries resources to advance the Global SDG 2030.

## **5.4 Projected benefits from the SWIO-FFA**

The study has drawn some baseline indicators of the status of the tuna fisheries of the SWIO basin which is used to make some realistic projections of the benefits be derived from the SWIO-FFA over its first fifteen years of operation. Based on the 2007-16 fisheries and market data, about 27% of the industrial and semi-industrial tuna fisheries of the WIO occurs in the national waters of the SWIO states. It implies that 73 % of those activities are taking place mainly on the adjacent international waters. The financial revenue derived by the SWIO states is assessed at US\$ 30.3 million, approximately 3% of the aggregated turnover of the fishing fleets (US\$ 1.1 Billion). The SWIO coastal tuna fisheries accounts for 205,000 tonnes per year with an aggregated landed value of US\$ 438.3 million. The economic contribution of the coastal tuna fisheries is 15 times more than direct financial benefits derived from the industrial fisheries. There is no data on the sport fishery which targets some large pelagic fishes, including tuna. The main objective of the SWIO-FFA is to enhance the appropriation of the regional tuna fisheries as a prerequisite to maximise the license revenue and the domestication of the tuna value chains. The strategy is based on increasing the value of the shared tuna stocks by imposing more stringent harvest rules and MCS operations instead of fishing down the web. Table 32 at Page 51 presents a simulation of the projected financial benefits through the advisory and facilitation services of the SWIO-FFA. Over the initial life-cycle of 15 years, it aims at increasing the direct annual financial benefits from US\$ 30 million to US\$ 149 million through smart licensing and domestication of the foreign fleets. Due emphasis is to be laid on the sustainable management and modernisation of the semi-industrial and coastal tuna value chains. The aggregated turnover of the domestic tuna fisheries is projected to increase from US\$ 443 million to US\$ 673 million per year. All the SWIO states are bound to benefit from the above-mentioned initiatives based on their geo-economic features and development needs and aspirations. A more detailed analysis is possible due to lack of consistent national data.

Table 32 - Financial Projection of SWIO-FFA

MOBILISATION OF FINANCIAL RESOURCES FOR OPERATIONALISATION SWIO-FFA AND ASSOCIATED WORK PROGRAMMES

(US\$ 10K CONTRIBUTION)

REF	YEAR	PRE-OP	PHASE 1 - INSTALLATION					PHASE 2 - CONSOLIDATION					PHASE 3 - CRUISING					TOTAL	PCT
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
A	FINANCING SWIO-FFA	500,000	1,500,000	1,575,000	1,653,750	1,736,438	1,823,259	1,914,422	2,010,143	2,110,651	2,216,183	2,326,992	2,443,342	2,565,509	2,693,784	2,828,474	2,969,897	32,867,845	
b1	Host Country Contribution	50,000	50,000	52,500	55,125	57,881	60,775	63,814	67,005	70,355	73,873	77,566	81,445	85,517	89,793	94,282	98,997	1,128,928	3%
b2	Contribution (US\$10K per annum)		120,000	126,000	132,300	138,915	145,861	153,154	160,811	168,852	177,295	186,159	195,467	205,241	215,503	226,278	237,592	2,589,428	6%
b3	Regional Fishing Vessel Register		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000	1,210,000	1,331,000	1,464,100	1,610,510	1,771,561	17,887,171	41%
b4	5 % Levy of License fees (FFV)		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	22,500,000	51%
B	MOBILISATION OF FUNDS	550,000	2,170,000	2,178,500	2,187,425	2,196,796	2,206,636	2,816,968	2,827,816	2,839,207	2,851,167	2,863,726	3,486,912	3,621,758	3,769,396	3,931,070	4,108,149	44,105,527	
C	RESERVES / TRUST FUND		670,000	1,273,500	1,807,175	2,267,534	2,650,910	3,553,456	4,371,129	5,099,685	5,734,669	6,271,403	7,314,973	8,371,222	9,446,833	10,549,429	11,687,681	15,571,823	
			45%	38%	32%	27%	21%	47%	41%	35%	29%	23%	43%	41%	40%	39%	38%	34%	38%
D	FINANCING REG MCS PROGRAMME	RFSP BUDGE	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	37,500,000	
C	REGIONAL OBSERVERS PROGRAMME	12x US\$ 20K	240,000	252,000	264,600	277,830	291,722	306,308	321,623	337,704	354,589	372,319	390,935	410,481	431,006	452,556	475,184	5,178,855	
D	CONSERVATION LEVY	(US\$5000)	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	3,025,000	3,025,000	3,025,000	3,025,000	3,025,000	41,375,000	
E	ADDITIONAL LICENSE REVNEUE		0	0	0	0	0	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	150,000,000	
F	MOBILISATION OF EXT RESOURCES	RESERVES X 5	3,350,000	6,367,500	9,035,875	11,337,669	13,254,552	17,767,280	21,855,644	25,498,426	28,673,347	31,357,015	36,574,865	41,856,109	47,234,164	52,747,147	58,438,407	77,859,114	
1	Contribution (b2) / Resources Mobilised(B)		6%	6%	6%	6%	7%	5%	6%	6%	6%	7%	6%	6%	6%	6%	6%	6%	6%
	Leverage (1:17) / Political Capital		18	17	17	16	15	18	18	17	16	15	18	18	17	17	17	17	17
2	Contribution (b2) / Reserves (Trust Fund) ( C)		18%	10%	7%	6%	6%	4%	4%	3%	3%	3%	3%	2%	2%	2%	2%	17%	6%
	Leverage (1:6)		6	10	14	16	18	23	27	30	32	34	37	41	44	47	49	29	29

Table 33 – Projection of the potential Benefits from the shared tuna resources

SWIO-FFA GENESIS OVER 15 YEARS

PROJECTION FOR THE ENHANCEMENT OF THE FINANCIAL AND ECONOMIC IMPACTS OF THE TUNA FISHERIES

Based on 2007-16 Fisheries and Market data

REF	FISHERY	SWIO BASIN			GROUND ZERO			FORECAST 1 - 5 YRS			FORECAST 2 - 5 YRS			FORECAST 3 - 5 YRS		
		TOT (mt)	PCT	US\$	TOT (mt)	PCT	US\$	TOT (mt)	PCT	US\$	TOT (mt)	PCT	US\$	TOT (mt)	PCT	US\$
A	PURSE SEINE FISHERY	282,000	67%	451,764,000	90,240	32%	14,456,448	141,000	50%	22,588,200	169,200	60%	27,105,840	197,400	70%	31,623,480
B	IND TLL FISHERY	107,000	26%	549,017,000	19,460	18%	9,984,926	32,100	30%	16,470,510	42,800	40%	21,960,680	53,500	50%	27,450,850
C	SEMI IND TLL FISHERY	29,000	7%	148,799,000	1,140	4%	5,849,340	8,700	30%	44,639,700	14,500	50%	74,399,500	17,400	60%	89,627,400
	<b>SUSTAINED GROWTH</b>	<b>418,000</b>	<b>100%</b>	<b>1,149,580,000</b>	<b>110,840</b>	<b>27%</b>	<b>30,290,714</b>	<b>181,800</b>	<b>43%</b>	<b>83,698,410</b>	<b>226,500</b>	<b>54%</b>	<b>123,466,020</b>	<b>268,300</b>	<b>64%</b>	<b>148,701,730</b>
	<b>APPROPRIATION</b>				<b>0</b>	<b>3%</b>		<b>17%</b>	<b>7%</b>		<b>11%</b>	<b>11%</b>	<b>10%</b>	<b>13%</b>		
D	COASTAL TUNA FISHERY	205,000	33%	438,290,000	205,000	100%	438,290,000	225,500	10%	482,119,000	248,050	10%	530,330,900	272,855	10%	583,363,990
E	SPORT FISHERY ?			(N.A)												
>	<b>ECONOMIC INTEGRATION</b>	<b>623,000</b>	<b>100%</b>	<b>1,587,870,000</b>	<b>315,840</b>	<b>51%</b>	<b>468,580,714</b>	<b>407,300</b>	<b>65%</b>	<b>565,817,410</b>	<b>474,550</b>	<b>76%</b>	<b>653,796,920</b>	<b>541,155</b>	<b>87%</b>	<b>732,065,720</b>
	<b>GROWTH RATE</b>				<b>0</b>	<b>30%</b>		<b>15%</b>	<b>36%</b>		<b>11%</b>	<b>41%</b>	<b>11%</b>	<b>46%</b>		

REF ASSUMPTIONS:

Fast Tracking the establishment and operationalisation of an optimal FFA

Focus on enhancing market value of the catch ( not chasing more fish) by implementing rigorously Policy and Management environment and MCS tools.

The strategy is not catch more fish but to extract more value. By acting collective on more stringent harvest rules and enhancing national Policy and Legal frameworks as well as MCS capabilities

Revenue raise from fines and accessories not included.

A&B Focus on maximisation of License Revenue through improved management of Foreign Fleets & smart domestication strategies. Improved economic integration and value added.

The low laying fruits are the curb IUU fishing the national water (100% Compliance Observation and Catch Reporting and Monitoring System) and Eliminate discards at sea.

C Sustainable and Responsible Development semi-industrial high value tuna value chain e.g. of Seychelles, Reunion Island, Maldives...

D Improved management and modernisation of coastal tuna fisheries and value chains.

## 5.5 Tuna Fisheries of SWIO States

### 5.5.1 In terms of catch

The tuna fisheries of the SWIO states show a highly contrasted landscape as it can be seen the following charts. For instance, Seychelles is leading the industrial PS and TLL fisheries and is followed France (Mayotte and Reunion Island) and Mauritius. The coastal tuna fisheries are driven by Maldives, Yemen and Comoros. The development of the tuna fisheries in the other SWIO states are still nascent. The semi-industrial chilled tuna fishery is gaining traction in some SWIO states namely, Seychelles, Reunion Island, South Africa and Mauritius.

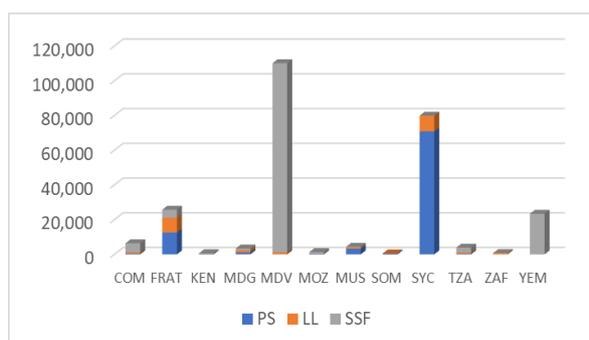


Figure 17 - SWIO States Tuna fisheries 2007-16 in mt

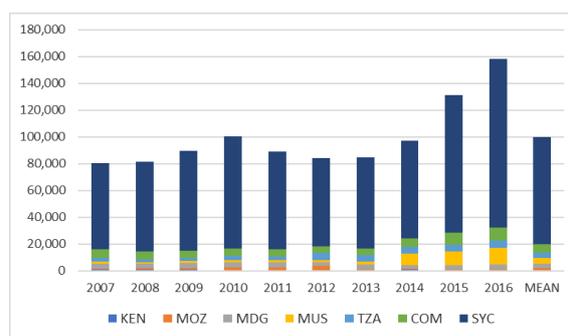


Figure 18 – SWIO - Group 1 States tuna fisheries in mt

Figure 18 illustrates the SWIO Group 1 states – these seven countries offer fishing opportunities to foreign vessels in their national waters. The other 5 countries namely, France (Reunion and Mayotte), Maldives, Somalia, South Africa and Yemen do not grant foreign fisheries access. Five of the 8 SWIO Group 1 states – Comoros, Madagascar, Mozambique, Mauritius and Seychelles - have concluded a Fisheries Partnership Agreement with the EU but Comoros and Mozambique do not have an active Protocol. Otherwise, fishing license is issued to foreign vessels mostly through private agreements.

Table 34 – Synopsis of the SWIO Tuna fisheries based 2007-16 data

SWIO GROUP 1	COM	KEN	MDG	MOZ	MUS	SYC	TZA	TOT (mt)	PCT	WIO(mt)
PS FISHERY	410	221	1,108	293	3,232	70,794	392	76,453	27%	281,708
TLL FISHERY	797	124	1,308	156	764	9,056	797	13,003	6%	200,725
SSF FISHERY	5,168	293	953	837	351	2	2,686	10,289	2%	460,718
TOT	6,375	514	3,369	1,286	4,348	79,853	3,875	99,620	11%	943,151
PCT	6.4%	0.5%	3.4%	1.3%	4.4%	80.2%	3.9%	100%		

SWIO GROUP 2	FRAT	MDV	SOM	ZAF	YEM	TOT (mt)	PCT	WIO (mt)
PS FISHERY	12,577	55	440	0	44	13,116	5%	281,708
TLL FISHERY	8,555	1,195	117	703	12	10,582	5%	200,725
SST FISHERY	4,553	108,783	0	11	23,300	136,647	30%	460,718
TOT	25,685	110,034	557	714	23,356	160,345	17%	943,151
PCT	16.0%	68.6%	0.3%	0.4%	14.6%	100.0%		
<b>GRAND TOTAL</b>						<b>259,966</b>	<b>28%</b>	<b>943,151</b>

SWIO STATES	MDV	SYC	FRAT	YEM	COM	MUS	TZA	MDG	MOZ	ZAF	SOM	KEN	TOT (mt)
PS FISHERY	55	70,794	12,577	44	410	3,232	392	1,108	293	0	440	221	89,569
TLL FISHERY	1,195	9,056	8,555	12	797	764	797	1,308	156	703	117	124	23,585
SSF FISHERY	108,783	2	4,553	23,300	5,168	351	2,686	953	837	11	0	293	146,936
TOTAL (mt)	110,034	79,853	25,685	23,356	6,375	4,348	3,875	3,369	1,286	714	557	514	259,966
PCT	42.3%	30.7%	9.9%	9.0%	2.5%	1.7%	1.5%	1.3%	0.5%	0.3%	0.2%	0.2%	100.0%

Table 33 summarises the tuna harvests in the national waters of the 12 SWIO states. It also differentiates the Group 1 and Group 2 countries. It shows that Seychelles and Maldives

accounts for 73 % of the total catch in national waters of the SWIO states. However, the tuna development strategy of these two Small Island Developing States differs significantly. Maldives has a unique tradition of small-scale pole and line tuna fishing. The PS catch recorded by France (Mayotte) were landed by EU fleet prior to 2014.

### 5.5.2 In terms of catch value

The following table attempts to tell apart the catch value of the harvests in the national waters of the SWIO states while keeping mind that the Group 1 countries are entitled only to potential license revenue on the catch of the foreign vessels. The computation is based on the 2007-2016 fisheries and market data. The same prices are applied to all the countries.

**Table 35 – SWIO States Catch Value based on 2007-16 Fisheries and Market Data (US\$)**

SWIO GROUP 1	COM	KEN	MDG	MOZ	MUS	SYC	TZA	TOT US\$
PS FISHERY	656,743	354,578	1,774,396	469,239	5,175,200	113,341,988	628,334	122,400,478
TLL FISHERY	4,089,082	636,244	6,712,527	799,330	3,922,018	46,468,204	4,089,082	66,716,488
SSF FISHERY	11,912,655	674,411	2,196,308	1,929,464	808,770	4,158	6,191,179	23,716,946
<b>TOT</b>	<b>16,658,480</b>	<b>1,665,233</b>	<b>10,683,230</b>	<b>3,198,033</b>	<b>9,905,988</b>	<b>159,814,351</b>	<b>10,908,595</b>	<b>212,833,912</b>
PCT	7.8%	0.8%	5.0%	1.5%	4.7%	75.1%	5.1%	100.0%

SWIO GROUP 2	FRAT	MDV	SOM	ZAF	YEM	TOT US\$
PS FISHERY	20,135,206	88,642	704,341	0	70,581	20,998,770
TLL FISHERY	43,895,705	6,133,197	600,327	3,606,097	63,244	54,298,570
SST FISHERY	10,495,487	250,744,469	0	25,372	53,705,487	314,970,814
<b>TOT</b>	<b>74,526,398</b>	<b>256,966,308</b>	<b>1,304,668</b>	<b>3,631,468</b>	<b>53,839,312</b>	<b>390,268,154</b>
PCT	19.1%	65.8%	0.3%	0.9%	13.8%	100.0%

SWIO STATES	MDV	SYC	FRAT	YEM	COM	TZA	MDG	MUS	ZAF	MOZ	KEN	SOM	TOT US\$
PS FISHERY	88,642	113,341,988	20,135,206	70,581	656,743	628,334	1,774,396	5,175,200	0	469,239	354,578	704,341	143,399,248
TLL FISHERY	6,133,197	46,468,204	43,895,705	63,244	4,089,082	4,089,082	6,712,527	3,922,018	3,606,097	799,330	636,244	600,327	121,015,058
SSF FISHERY	250,744,469	4,158	10,495,487	53,705,487	11,912,655	6,191,179	2,196,308	808,770	25,372	1,929,464	674,411	0	338,687,761
<b>TOT</b>	<b>256,966,308</b>	<b>159,814,351</b>	<b>74,526,398</b>	<b>53,839,312</b>	<b>16,658,480</b>	<b>10,908,595</b>	<b>10,683,230</b>	<b>9,905,988</b>	<b>3,631,468</b>	<b>3,198,033</b>	<b>1,665,233</b>	<b>1,304,668</b>	<b>603,102,066</b>
PCT	42.6%	26.5%	12.4%	8.9%	2.8%	1.8%	1.8%	1.6%	0.6%	0.5%	0.3%	0.2%	100.0%

### 5.5.3 Seasonality of the Industrial tuna fisheries

The migratory patterns of the tropical tuna stocks in the WIO are well documented. The aggregation and disaggregation processes of the tuna stocks are related to bio-physical factors of their habitats that influence their nutrition and reproduction behaviours. The charts below highlight the operational strategies of the industrial tuna fleets in response to the displacement cycle of the main tunas in the sub-region. It sheds some light of the movement of the industrial tuna fleets in the WIO. As stated in Section 2, Seychelles is at centre of the largest and regular surface tuna fishery in the Indian Ocean. Over 80% of the annual purse harvest occurs in this fishing area. There are two subsidiary fishing zone in the SWIO namely, at the northern entrance of the Mozambique channel that embrace the national waters of Comoros, the Western façade of Madagascar and Mozambique. The fishing season in these areas extends from March to June. The other hotspot for the purse seiner fishery in along the East African coast starting from Tanzania to Somalia that last from August to November. During 2007-12, The industrial tuna fisheries in WIO were shattered by the Somali Piracy and their profitability was exacerbated by the global financial and economic crises. Mauritius, Reunion (France) and the Eastern side of Madagascar are not part of the traditional fishing group of the PS fleets. A peer-reviewed study on the effects of climate variations on the tropical tunas revealed that the tuna stocks are moving eastwardly at speed of one kilometre per decade<sup>78</sup>.

<sup>78</sup> Miller K A (2007). *Climate Variability and Tropical Tunas. Management Challenges for Highly Migratory Fish Stocks. Marine Policy* 31, Page 56-70.

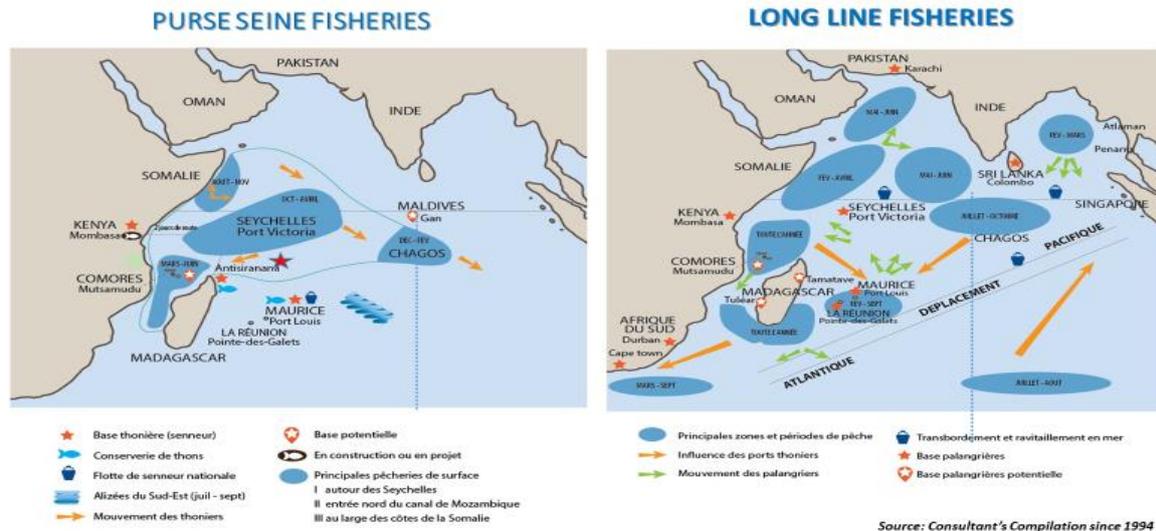


Figure 19 - Seasonal Movement of the Industrial Tuna Fleet in the WIO

The hypothesis is verified since the surface tuna fishery extending gradually easterly towards the Chagos Archipelagos. Beside some 545 identified seamounts, more than 50,000 artificial FADS are deployed by the PS fleets in the WIO. The activities of the industrial TTL are more dispersed and the above chart has earmarked some hotspots in the WIO. Most of the SE Asian fleets operating seasonally in the WIO use Port-Louis as a transshipment base. Apart from the PS in the EEZ of Seychelles, the foreign fleets operate only a few months in waters of the other SWIO states. The operational strategies and fishing patterns of the industrial tuna fleets in the SWIO are still not well documented.

#### 5.5.4 Non-Policy factors influencing the global tuna industry

The non-policy factors that will influence the regional segment of the global tuna industry over the next two decades are briefly commented below.

**i) Climate Change** – Modelling conducted on the purse seine fishery in the Indian Ocean suggested the sizes of the main tuna stocks will not be affected by ocean warming, but the distribution of the stocks may shift eastward <sup>79</sup>.

**ii) Markets and the economy** - The global supply of the main tunas has registered a steady growth since the 1960s and is now approaching natural limits with little further expansion. The traditional markets for canned and raw tuna are declining and may be balanced by the emerging economies. An increase in the price of fish and fish products is expected but will be offset by a surge of the fishing costs as crude oil price is projected to double in real term by 2040.

**iii) Science and technology** - Fishing technology is expected to enhance the economic efficiency and fish product quality. Fisheries monitoring, and surveillance technology is seen to reduce enforcement costs, including expanded satellite tracking of vessels, use of unmanned aircraft systems for patrols and electronic fishing catch and effort monitoring.

**iv) Population growth** - The overall population surrounding the Indian Ocean, including the Sub-Saharan African countries is expected to grow by 50% over the next 20 years. The productivity of inshore and inland fisheries is declining while the aquaculture development is stumbling. This may exacerbate the food fish gap.

**v) External Value chain Governance** - The trade preferences that several SWIO states currently enjoy with the EU is expected to erode under the pressure of the WTO. This will further reduce the capability of the regional tuna processor to compete of the global market place

<sup>79</sup> Robinson J et al. (2009). *Impacts of Climate variability on the tuna economy of Seychelles*; HAL 2009/36

## **Section 6.0 - Conclusion and Recommendations**

In keeping with the above researches, assumptions and findings, the study concludes that the expected Potential Benefits from the operationalisation of the SWIO-FFA exceed by far its cost estimates. However, this project does not require a pre-feasibility study or CBA because it is inspired by effective regional solidarity and leadership embedded into a broader regional economic integration strategy to establish a zone-based management system for the tuna fisheries of the SWIO basin. The sub-region is a significant segment of the global multi-billion-dollar industry which is still dominated by the DWFN and multinational corporations. The level of regional economic integration in the tuna industry is still weak. The SWIO-FFA is geared to unleash the full development potentials of these renewable resources to leverage regional shared growth and prosperity considering the Global SDG 2030 and Blue Growth Initiatives.

The two project options for the implementation of the regional FFA are not alternatives but complement each other in many ways. The previous hypothesis revolves around two main issues namely, the need for binding powers to enable the RFB to be more effective in mobilising of financial and technical resources. The study posits that 'Binding powers' are illusionary without strong commitments on the part of the signatories to the common goals and objectives irrespective of good intentions. The root causes of the problems of underdevelopment of the fisheries sector in the SWIO basin are the predominance of the open-access regime, informal and potentially unethical activities coupled with external factors such as population growth, environmental pollutions, including the impacts of the climate change. These negative loops are exacerbated by policy failures, poor management and market distortions. The gist of the challenge for setting the fisheries sector on the path of sustainability is to operationalise the right enabling environments and to connect it to the national political economy by pushing a change of mindset of the key stakeholders. By taking these bold initiatives, the sector is bound to generate potential wealth and financial resources to support its shared growth and prosperity. Therefore, a new type of thinking is necessary to bring out the desire transformation of the common good. Development aids and grants can kick-off the engine but cannot substitute national endeavours.

Since the initial objective of the sponsors is focused on the regional Minimum Terms and Conditions for foreign fisheries access, the study has mined the fisheries and market data of the SWIO tuna fisheries to calculate the catch value to differentiate the actual and potential license revenue. Surprisingly, the aggregated landed value of the tuna and tuna-like species in the WIO is estimated at US\$ 2.0 Billion per annum during 2007-16. However, the aggregated catch value estimates in the national waters of the SWIO states were US\$ 674 million, i.e. 34 %. It implies that 66% of the harvest is still made from the adjacent pocket of international waters. The share of SWIO states consists of one third of the industrial fisheries, US\$ 231.3 and the remaining two thirds, from the coastal tuna fisheries (US\$ 442.3 million). The annual turnover of the Distant Waters Fishing fleet in the surrounding international waters of the WIO is about US\$ 1.4 billion. Only 32% for the purse seine and 18 % for the industrial TLL fisheries occurred in the national waters of the SWIO states.

In 2016 the fisheries and market conditions of the global and regional tuna fisheries improved significantly, and the aggregated landed value estimates were US\$ 2.6 billion. The catch value harvested in the EEZ of the SWIO states rose from US\$ 230.2 to US\$ 306.8, an acceleration of 25 %, but still low. The actual license revenue estimate is US\$ 20.4 million and its can be increased by US\$ 16.3 and 21.6 million by applied to Maputo Declaration and the gap of US\$ 5.3 million is about the ambiguity related to the sector support or development aid which is included in the EU Fisheries Partnership Agreement. So, business-as-usual will not help the SWIO-states to leverage the development potentials of the shared tuna resources.

The coastal and island states of the African Sub-Saharan region account for 40% of small-scale and 80% of industrial fisheries of the WIO – FAO Zone 57. The landed value of the total catch is estimated at US\$ 3.5 billion. Over 60 million peoples living in the coastal areas are directly or indirectly dependent on these coastal fisheries for their livelihoods, food and nutrition, security and cultural diversity. The gross value added (wealth creation) generated in the regional economy is assessed at US\$ 1.6 billion per year and the number of indirect and induced employment is estimated roughly at 7.5 million. The untapped economic rent from the inshore fisheries is estimated at US\$ 200 million. The missed economic opportunities the SWIO states in the marine fisheries sector are estimated at US\$ 5 Billion annually. This is a paradox of poverty amidst plenty.

The operating cost of the SWIO-FFA at full capacity is estimated at US\$ 3.0 million and the gestation period is 15 years scheduled over 3 consecutive phases of 5 years namely: Installation, Consolidation and Cruising / Centre of Excellence. The preliminary and pre-operative expenditure is US\$ 500,000 but includes US\$ 200,000 to finance some pertinent techno-economic studies to prepare the ground for the agency. They include a comprehensive economic impact assessment of the regional segments of the global tuna value chains, formulation of a Regional Tuna Strategy and a business plan to roll out SWIO-FFA. The recurrent budget for the first year starts with US\$ 1.5 million, which is to increase gradually to attain US\$ 3.0 of the 15<sup>th</sup> anniversary. A team of managerial and professional staffs will consist of regional experts with international exposure and will be guided by world-class consultant in specific fields. The membership is earmarked at US\$ 10,000 per year with an increment of 5% per annum. A cost recovery strategy is designed to meet the operating cost and the replenishment of the Trust Fund. A conservation fee is also envisaged to raise fund for major Work Programmes, such as the Regional MCS operation and the Regional Observers Programme. A cash-flow projection is presented in the study report. The project does not mean to increase the financial burden of the participating states because it will enhance their direct benefits in many folds and contribute to potential savings in management cost through the regional value-added.

The SWIO region is lagging by nearly one generation in making this bold decision as compared to the Pacific Island Countries. The maximisation of the license revenue is seen as a low laying fruit while the ultimate focus is on the domestication of the regional tuna industry, particularly the development of coastal and small-scale tuna value chains. Time is an essential factor. The consultancy makes the following recommendations:

- i) To prepare and submit a blue-print, including a policy brief, the final draft legal document and business plan of the project for high level consultation and multi-stakeholder dialogue in the SWIO-member-states. A communication and awareness building support are also necessary.
- ii) To undertake a comprehensive economic impact assessment of the regional segments of the global to tuna value chains to develop baseline socioeconomic indicators for informed policy-making and management decisions to enable effective Monitoring & Evaluation.
- iii) To formulate a Regional Tuna Strategy and budgeted Action Plan that reflects the development needs and aspirations of the member-states.
- vi) To negotiate with the IOC and relevant SWIO member-states regarding the forthcoming institutional anchorage of the Regional Fisheries Surveillance Programme to fit in the SWIO-FFA agenda and objectives.
- v) To establish a Strategic Alliance with the SP-FFA to benefit from its learning investments and best practices
- vi) To pen talks with potential development and donor agencies as well as NGO to mobilise the necessary technical and financial supports during the preliminary and pre-operational phase
- vii) To conduct a comprehensive feasibility study and business plan regarding the institutional transformation and financing of the SWIOFC.

## Annex 1 – South Pacific Forum Fisheries Agency

Like most of the RFB worldwide, the SP-FFA was created without any feasibility study or business-plan; it was fuelled by an acknowledgement of the need for strengthening the regional political leadership and solidarity among the Pacific Island Countries to maximise sustainable benefits from the shared tuna and tuna-like resources in the national waters and beyond. There are no better words to describe their state of mind than that of the representative of Fijian government, “Tuna may be a commodity for the consumers of the developed economies, but it is the source of life and survival for the PICs”. There is a tendency to replicate the SP-FFA or PNA in the SWIO region through the SWIO-FFA. This copy and paste approach is not owing to the difference in the socio-ecological environments of the two sub-regions. Some key facts about the SP-FFA are highlighted below.

- i) It is an independent RFB established exclusively by the coastal states outside the FAO system. It has adopted a business-oriented approach with an autonomous governance, administrative and financial management following international best practices.
- ii) It did not require any binding powers because the members are committed to the organisational role, goals and objectives enshrined in the Forum Agreement.
- iii) It has achieved consistent organisational growth despite being heavily dependent on external financial supports from Australia and New Zealand and other donor agencies and international NGO<sup>80</sup>.
- iv) It also provides centralised fisheries management services to some of the tiny island states of the South Pacific as they are short of institutional capacities and resources to do so on their own. This may not be applicable to the SWIO states because they have opted for a decentralised approach of regional cooperation by laying emphasis on national capacities development and pooling of national assets for regional operations<sup>81</sup>.
- v) It derives substantial management fees from the administration of the US Treaty on behalf of its member-states that contribute to the annual budget. Currently it is US\$ 1.3 million per year. However, a centralised licensing arrangement is not on the agenda of the SWIO states.
- vi) The WCPO tuna fishery is gigantic as compared to the SWIO<sup>82</sup>. There are very few patches of international waters inside the zone of cooperation. The purse-seine fishery is mostly concentrated in the PNA areas that accommodate up to 436 purse-seiners annually. There is a tough competition among the foreign fleets to secure fisheries access in these waters. The EU fleet is in minority in that region. In the WIO, there are less than 50 active purse seiners, mostly owned by the EU member-states.
- vii) The WCPO has a significant bluefin tuna fishery that supplies the Japanese sashimi markets with chilled and frozen fish. Australia undertakes ranching of the Southern bluefin tuna on a commercial basis. In SWIO, a disruptive technological innovation is underway in the purse seine fishery; a French company is experimenting sophisticated refrigeration technology on small fleet of large purse-seiners to divest the catch from canning to high value direct consumption products. In the coastal states prospective,

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<sup>80</sup> The SPFFA was established in 1979 with an initial budget of S\$ 130,000 (Solomon Shillings) to attain US\$ 5 million after five years and the 2017 budget was US 30 million while in the internal financing is about 30%.

<sup>81</sup> A good example of the decentralised cooperation in the SWIO tuna fisheries management is the multi-faceted IOC-Regional Fisheries Surveillance Programme.

<sup>82</sup> The zones of cooperation of SPFFA is approximate 22 million Km<sup>2</sup> which almost the same size of the Western Indian Ocean. The total EEZ of eight SWIO states participating in the IOC RFSP is 6.8 million Km with an annual tuna production of less than 500,000 tonnes.

the canned tuna business models are exhausted. These value chains as well as the bio-economic interactions of the major tuna fisheries require constant re-thinking.

- viii) PNA is a business-type corporation comprising 8 Pacific Island Countries that have the largest and most productive surface tuna fishing zones in the WCPO. Altogether they produced nearly 80 % of the total purse-seine catch of the region. The other 9 members share the remaining 20%. They do not see real economic interest in the PNA but are pursuing the development of their offshore fisheries through SP-FFA.
- ix) The tuna processing capacities in the WCPO are limited (less than 20%) and thus, the bulk of the raw material are transported to other destinations namely Thailand and American Samoa for value-additions. This is not the case of the SWIO where over 80% of purse-seine catch is processed inside the region.
- x) The SPFFA has adopted a centralised approach for sea and air deployments which are coordinated by the New Zealand and Australian Navies. The cost of these operations is not internalised by the industry. The IOC-RFSP has a different fisheries surveillance strategy based on “pool and share” of national sea and air patrol assets to offer cost-effective MCS operations <sup>83</sup>.

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<sup>83</sup> 2017 Global Fish Watch / SkyTruth Report of the Global view of transshipment at sea showed that there is virtually no authorised transshipment in the zone of cooperation of the IOC-PRSP.

## Annex 2 - SWIO-FFA and IOTC Relationship

The IOTC is an Article XIV type of RFB under the FAO Constitution with the core objective of implementing conservation and management measures for the tuna and tuna-like species<sup>84</sup> in the international and national waters EEZ of the coastal states through effective cooperation and collaboration. One of the greatest achievements of the international community in the post-World War II era<sup>85</sup> is the enactment of the UNCLOS 1982. The establishment of the Exclusive Economic Zone<sup>86</sup> empowers the coastal states to exercise their sovereign rights and responsibilities for conservation and management of the underlying natural resources to improve the livelihoods and wellbeing of their populations. Globally, the achievements of the developing coastal and island states in harnessing their blue wealth are still negligible. The IOTC is thriving its agenda to some extent but is required to be overhauled regularly to meet the emerging prospects and challenges<sup>87 88</sup>. The SWIO-FFA has distinct, but converging objectives in relation with the IOTC. There is no textbook contradiction or overlap between the two RFB however the core interests and stakeholders are different. The IOTC is a common platform to ensure the conservation and management of fish stocks and the marine ecosystems on the high seas whereas the SWIO-FFA is a coastal states forum that intend to further a right-based management for the maximisation of sustainable benefits from the sustainable management and responsible development of the shared tuna fisheries in their national waters and beyond. The following points demarcate the SWIO-FFA from the IOTC.

- i) **Geographic delineation** - The zone of cooperation of the SWIO-FFA englobes the ZEE of the coastal states and territories, excluding any grey in the SWIO region candidate for a zone-based management system. It constitutes a segment of FAO Zone 57. Despite some patches of regulations, the international waters remain open access to DWFN. It is imperative for the coastal states to band together to prevent these externalities from destroying their national fisheries industry.
- ii) **Membership** - The membership of the SWIO-FFA is restricted to the independent coastal states and territories of the sub-region with the aim of enhancing regional political leadership and solidarity. They want to be in the driving seat to shape their common destiny.
- ii) **Mission** - The SWIO-FFA has twin objectives, viz. the conservation of tuna resources along with the maximisation of sustainable financial and economic benefits for its

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<sup>84</sup> 16 highly migratory and straddling stocks of main commercial tuna, tuna-like and associated large pelagic fishes as per UNCLOS List of Species.

<sup>85</sup> Establishment of the United Nations System and the Bretton Wood Institutions such as the World Bank and the International Monetary Fund ... to promote global peace and prosperity through the advancement of Universal Human Rights, Democracy and Market economy.

<sup>86</sup> Wikipedia - An exclusive economic zone (EEZ) is a sea zone prescribed by the United Nations Convention on the Law of the Sea over which a state has special rights regarding the exploration and use of marine resources, including energy production from water and wind. It stretches from the baseline out to 200 nautical miles from its coast. In colloquial usage, the term may include the continental shelf. The term does not include either the territorial sea or the continental shelf beyond the 200 nautical miles limit. The difference between the territorial sea and the exclusive economic zone is that the first confers full sovereignty over the waters, whereas the second is merely a "sovereign right" which refers to the coastal state's rights below the surface of the sea.

<sup>87</sup> IOTC (2016). Report of the 2<sup>nd</sup> IOTC Performance Review

<sup>88</sup> Van der Gest R et al (WWF / ISSF 2017). No Effective Management in Indian Ocean Tuna Fisheries without Monitoring, Control and Surveillance.

members. However, IOTC is focused on the scientific aspects of stocks management but is inert to the socioeconomic factors <sup>89</sup> of fisheries management.

- iv) **Fisheries Development** - The IOTC does not have the mandate to support the coastal states in the development of their tuna industry. It is stumbling to document the socio-economic impacts of the tuna fisheries on the coastal states. SWIO-FFA is positioned to act as a one-stop-shop for delivery high-level advisory and facilitation services to its constituencies.
- v) **Conversation vs Management** - Most of the ongoing programmes / initiatives of the IOTC, such as harmonised Minimum Terms and Conditions for Compliance and Regional Observers Programmes resources are conservation oriented and are not geared to further sustainable management of the fisheries. SWIO-FFA is bound to build on these mechanisms to advance its development and management goals.
- vii) **Implementation capacity** - The IOTC resolutions and recommendations are achieved by consensus and binding on its member-states. They are brought home for implementation but may not have the capabilities to so. The SWIO-FFA is to enhance these measures to its management standards and assist the member in their implementation. This may apply to the Harmonised Terms and Condition for compliance, the Regional observers' Programme and so on.
- viii) **Scope** – The IOTC mandate is limited to the 16 tuna and tuna-like species and the industrial fisheries – more than 24 metres overall length or small vessel which are engaged high seas fishing. There are several large pelagic species which are important in the offshore fisheries but are researched by the IOTC due to lack of interest of the DWFN. The foreign fleets of smaller on-going tuna boats baptised as the “Blue boats or piranhas” are not on the radar screen of the AIS and VMS. However, they constitute a major threat of IUU fishing in the SWIO.
- vi) **Common Issues** - IUU fishing is not only a threat to resources conservation and the ecological integrity of the marine environment, it is a major leakage of financial and economic benefits to the coastal states. The coastal states are required to join hands to combat these challenges and this is being done outside the arena of the IOTC.

To sum up, similar inter-governmental agencies exist in other sectors to promote the economic interest of the resource-owners <sup>90</sup>. There is no contradiction or overlap between the IOTC and SWIO-FFA because they have specific missions which are mutually enriching - ecological integrity, social equity and economic efficiency. The SWIO-FFA has a critical role to play in unleashing the development opportunities and socioeconomic benefits for its members.

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<sup>89</sup> So far, the IOTC has not demonstrated any interest in the socio-economic aspects of the tuna fisheries. In 2017 Sri Lanka and Seychelle made a joint request to IOTC for the implementation of a comprehensive socio-economic study but it was not postponed.

<sup>90</sup> For example, the Organisation of Petroleum Exporting Countries (OPEC) and the Cocoa Producer Alliance (CPA)

## Annex 3 – SWIO Functional Areas and Work Programmes

Ref	Functional Area	Tasks and Work Programmes
1.	Administration & Management	Establishment Fisheries Training & Capacity Building Programme Management / Coordination Effective Communication and Fund Raising Statutory meetings
2.	Economic and Policy Research	Economic Impact Assessment Evaluation of Projects & Industry Proposals High Level Advice Access Negotiations Assistance Fisheries, Economic and Market Research Fishing Patterns & Value chain Interactions Regional Fishing Vessels Register
3.	Fisheries Management	Improving Fisheries Data & Reporting Harmonised Fisheries Regimes and Access Arrangements Joint Venture and PPP negotiation Assistance Fisheries Monitoring, Control and Surveillance Regional Observers Programme
4.	Fisheries Development	Fisheries Development Planning Development of small-scale tuna fisheries Infrastructure and Commercial Projects facilitation Resources mobilisation and partnership
5.	Information – Communication and Technology	Integrated Fisheries Management Information System Website management Internal and external Communication
6.	Integrated Capacity Building	Overarching and cross-cutting
7.	Monitoring & Evaluation	

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## Annex 6 – Questionnaire for Data-Collection

### QUESTIONNAIRE

MEMBER STATE	<input type="text"/>	REPRESENTATIVE	<input type="text"/>
POSITION	<input type="text"/>	EMAIL ID	<input type="text"/>
		DATE	<input type="text"/>

CALENDAR YEAR	2012	2013	2014	2015	2016	REMARKS
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#### A. DOMESTIC TUNA FISHING ACTIVITIES

##### A 1 - ARTISANAL TUNA FISHERIES ( tuna and associated large pelagic fishes)

NO OF FISHING CRAFTS < 10 m						
OVERALL NO ART FISHING CRAFTS						
NO OF FISHERS						
OVERALL NO OF ART FISHERS						
TOTAL CATCH (metric tonnes)						
OVERALL ART CATCH						
CALENDAR YEAR	2012	2013	2014	2015	2016	REMARKS

##### A 2 - EXTENDED / SEMI-INDUSTRIAL TUNA ACTIVITIES

NO OF FISHING BOATS >10 <24 m						Any intra-regional Licensing Arrangements..
TOTAL CATCH						
Catch in its EEZ						
Catch in High seas						
Catch in other SWIO EEZ						

##### A 3 - INDUSTRIAL TUNA FISHING ACTIVITIES

A3(i) - LONG LINE VESSEL						Owned / Flagged / JV Arrangements...
NO OF F VESSELS >24 m						Licensing Arrangements.
TOTAL CATCH						
Catch inside the EEZ						
Catch in other EEZ						
Catch on High seas						

##### A 3 (ii) PURSE SEINE FISHING ACTIVITIES

NO OF PS VESSELS						Owned / Flagged / JV Arrangements...
NO OF SUPPLY VESSELS						Licensing Arrangements...
TOTAL CATCH						
Catch inside the EEZ						
Catch in other EEZ						
Catch on High seas						

CALENDAR YEAR	2012	2013	2014	2015	2016	REMARKS
<b>B. FOREIGN FV LICENSING ARRANGEMENTS</b>						
<b>B1 - PURSE SEINE FISHERY</b>						Current Licensing T&Cs / Declared or Estimated Catch...
<b>i) EU - FISHERY PARTNERSHIP AGRMT</b>						
No of PS/SV Licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Sector Support						
Others compensations...						
Total Days spent n the EEZ						
Total Catch in the EEZ						
<b>ii) MAYOTTE FLAGGED EU FLEET</b>						
No of PS / SV licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimated						
<b>iii) PRIVATE LICENSING ARGMTS</b>						
No of PS / SV licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimated						
<b>iv) FLAGGED FOREIGN VESSELS</b>						
No of PS / SV licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimates						
CALENDAR YEAR	2012	2013	2014	2015	2016	REMARKS

<b>B2 - LONG LINE FISHERY</b>						
<b>i) EU - FISHERY PARTNERSHIP AGRMT</b>						Current Licensing T&Cs / Declared or Estimated Catch...
No OF FOREIGN TLL VESSELS Licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Sector Support						
Others compensations...						
Total Days spent n the EEZ						
Total Catch in the EEZ						
<b>ii) MAYOTTE FLAGGED EU FLEET</b>						
No of FOREIGN TLL VESSELS licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimated						
<b>iii) PRIVATE LICENSING ARGMTS</b>						
No of TLL VESSELS licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimated						
<b>iv) FLAGGED FOREIGN VESSELS</b>						
No of FLAGGED TLL VESSELS licensed	/	/	/	/	/	
Total Licensing Revenue (EUR)						
Total Days spent in the EEZ						
Total Catch declared / Estimates						

THANK YOU - PLEASE SEND THE DULY FILLED QUESTIONNAIRE TO THE CONSULTANT'S EMAIL ADDRESS

24/07/2018

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## Annex 8 - References

- AFRICAN UNION. 2016.** *A guide for the Implementation of the Policy Framework and Reform for Fisheries and Aquaculture in Africa.* 2016.
- AU SUMMIT. 2014.** *Malabo Declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods.* 2014.
- CACAUD, P. 2016.** *Development of Harmonised Minimum Terms and Conditions for IOTC Conservation and Management Measures.* s.l. : IOTC, 2016.
- CAMPBELL, H and OWEN A. 1994.** *The Economics of Papua New Guinea's Tuna Fisheries.* ACIAR. Canberra : s.n., 1994. p. 269.
- COFREPECHE, MRAG, NFDS & POSEIDON. 2016.** *Ex-post and Ex-ante Evaluation of the Protocol to the Sustainable Fisheries Partnership Agreement between the EU and the Republic of Mauritius (Framework Contract /DG MARE 2011).* 2016. p. 141.
- DOULMAN, D. 1987.** *Tuna issues and Perspectives in the Pacific Islands Region.* s.l. : East-West Center, 1987.
- European Commission . 2017.** *Annual Economic Report for the EU fishing fleets (STECF 17-12): Chapter on the socioeconomic indicators of the Distant Fishing Fleets.* 2017.
- European Courts of Auditors . 2015.** *Are the Fisheries Partnership Agreements well managed by the Commission ? .* 2015.
- IOC - SMARTFISH. 2016.** *Feasibility of the Implementation of Minimum Terms and Conditions for foreign vessels fishing in the EEZ of 4 SWIOFC member states.* 2016.
- IOC-PRSP. 2016.** *Evaluation Technique et Opérationnelle du Programme Régional de Surveillance des Pêches.* IOC-SMARTFISH. 2016. p. 91.
- IOTC. 2016.** *Report of the 2nd IOTC Performance Review.* 2016.
- ISSF Technical Report 2018.** *Status of World Fisheries for Tuna (Indian Ocean) : February 2018.* pp. 73-101.
- MACFAYDEN, G et al. 2016.** *Study of the global estimate of the value of tuna fisheries - Phase 1 - 3 reports.* Pew charitable Trust. 2016.
- MBENDO, J. 2012.** *Developing Regional Minimum Terms and Conditions for granting Tuna Fishing Access in the Western Indian Ocean.* WWF-Coastal East Africa Global Initiative. 2012. p. 147.
- Miller, K A. 2007.** *Climate Variability and Tropic tunas; Management challenges for highly migratory fish stocks.* s.l. : Marine Policy 31, 2007. pp. Page 56-70.
- NFDS Africa. 2015.** *Final Report to prepare a technical rationale for supporting certain recommendations adopted at the regional meeting for developing Regional Minimum Terms and Conditions for fisheries access arrangements, 28-29 August 2015 in Maputo, Mozambique.* WWF. 2015. p. 57.

- ODYSSEE DEVELOPPEMENT. 2018.** *Technical Expertise for the Institutional anchorage of the Regional Fisheries Surveillance Plan under the aegis of the Indian Ocean Commission.* 2018. p. 53.
- POSSEIDON, MRAG, NFDS & COFREPECHE. 2014.** *Review of tuna fisheries in the Western Indian Ocean (Framework Contract DG MARE /2011/01) 165 pges.* Brussels : s.n., 2014.
- Prof GLEN, Hurry. 2015.** *Costs and Benefits of the IOTC inside and outside the FAO.* s.l. : IOTC, 2015. p. 60.
- RICHARD , Herr. 1990.** *The Forum Fisheries Agency - Achievements, Challenges and Prospects.* s.l. : Institute of Pacific Studies of the University of South Pacific, 1990.
- SALA, E et al. 2018.** *The Economics of Fishing the High Seas.* American Association of Advanced Science. 2018.
- SINGH, S.K.** *Public Finance in Theory and Practice.* p. 759.
- SKYTRUTH & GLOBAL FISH WATCH . 2017.** *The global view of transshipment: Revised preliminary data.* 2017.
- SWAN, J. 2014.** *An assessment on options to render SWIOFC more effective on meeting the growing needs of countries.* SWIOFC. 2014. p. 40.
- **2017.** *Legal, Policy, Institutional and Budgetary Implications for formulating, adopting and implementing a Regional Fisheries Cooperation and Collaboration Agreement by the South West Indian Ocean Range of States.* 2017. p. 117. Draft.
- SWEENARAIN, S and HANOOMANJEE, S. 2014.** *Market study of the by-catch of the industrial tuna fisheries in the South West Indian Ocean member-states.* IOC-SMARTFISH & ACPFISH 2. 2014.
- SWEENARAIN, S. 2013.** *Commercial Feasibility for the reorientation of the operations of the Electronic Fish Auction Market at Port Louis in the context of a Regional Seafood Hub Strategy.* IOC SMARTFISH / GOVT OF MAURITIUS. 2013.
- **1998.** *Commercial Feasibility of an integrated large scale cold storage facility in the Freeport Seafood Hub for the Mauritius Freeport Development.* Mauritius Freeport Development. Port Louis : s.n., 1998. Commercial Feasibility.
- **1995.** *Etude d'impacts économiques de la pêche thonière dans les pays-membres de la Commission de l'Océan Indien.* EU-IOC Regional Tuna Project, Phase 2. 1995.
- **2016.** *Potential Effects of climate change and variations on the small scale fisheries on the member-states of the Indian Ocean Commission.* EU CTA. s.l. : IOC-SMARTFISH, 2016.
- SWIOFC - WPCCTF. 2016.** *Fifth Working Party on Collaboration and Cooperation in Tuna Fisheries.* Durban : s.n., 2016.

## Annex 9 - list of Abbreviations and Acronyms

<b>ART</b>	Agreed Reference Tonnage
<b>CIF</b>	Cost Insurance and Freight
<b>CNF</b>	Cost and Freight
<b>COM</b>	Comoros
<b>CPFD</b>	Catch Per Fishing day
<b>DWFF</b>	Distant Waters Fishing Fleets
<b>DWFN</b>	Distant Waters Fishing Nations
<b>EEZ</b>	Economic Exclusive Zone
<b>EIO</b>	East Indian Ocean
<b>EU</b>	European Union
<b>EUR</b>	Euro
<b>FFA</b>	Forum Fisheries Agency
<b>FOB</b>	Free on Board
<b>FPA</b>	Fisheries Partnership Agreement
<b>FRAT</b>	French Territories
<b>FV</b>	Fishing Vessel
<b>GRT</b>	Gross Registered Tonnage
<b>IO</b>	Indian Ocean
<b>IOC</b>	Indian Ocean Commission
<b>IOTC</b>	Indian Ocean Tuna Commission
<b>KEN</b>	Kenya
<b>KG</b>	Kilogramme
<b>MAD</b>	Madagascar
<b>MAY</b>	Mayotte
<b>MDV</b>	Maldives
<b>MOZ</b>	Mozambique
<b>mt</b>	metric tonne
<b>MUS</b>	Mauritius
<b>PIC</b>	Pacific Island Countries
<b>PNA</b>	Parties to Nauru Agreement
<b>PS</b>	Purse seine
<b>REU</b>	Reunion
<b>SEY</b>	Seychelles Fishing Authority
<b>SFA</b>	Seychelles Fishing Authority
<b>SIOFA</b>	South Indian Ocean Fisheries Agency
<b>SOM</b>	Somalia
<b>SP-FFA</b>	South Pacific Forum Fisheries Agency
<b>SV</b>	Supporting Vessel
<b>SWIO</b>	South West Indian Ocean
<b>SWIOFC</b>	South West Indian Ocean Fisheries Commission
<b>TLL</b>	Tropical Long Line
<b>TZN</b>	Tanzania
<b>US\$</b>	United States Dollar
<b>VDS</b>	Vessel day Scheme
<b>VRT</b>	Vessel Registered Tonnage
<b>WBG</b>	World Bank Group
<b>WIO</b>	Western Indian Ocean
<b>WWF</b>	World Wildlife Fund
<b>YEM</b>	Yemen