**Inter-American Development Bank**

**Suriname**

**Sustainable Management of Fisheries**

*Final Report*

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**List of Acronyms**

|  |  |
| --- | --- |
| BRD | By-catch Reduction Device |
| CPUE | Catch per Unit Effort |
| CRFM | Caribbean Regional Fisheries Mechanism |
| EAF | Ecosystem Approach to Fisheries Management |
| ETP | Endangered, Threatened and Protected |
| FAO | Food and Agriculture Organization of the United Nations |
| HCR | Harvest Control Rule |
| FISS | Fisheries Information System for Suriname |
| ICCAT | InternationalCommission for the Conservation of Atlantic Tunas |
| IUCN | International Union for the Conservation of Nature |
| IUU | Illegal, Unreported and Unregulated |
| LRP | Limit Reference Point |
| TRP | Target Reference Point |
| LVV | Ministry of Agriculture, Animal Husbandry and Fisheries |
| MAS | Maritime Authority of Suriname |
| MSC | Marine Stewardship Council |
| TED | Turtle Excluder Device |
| NBSLME | North Brazil Shelf Large Marine Ecosystem |
| VMS | Vessel Monitoring System |
| WECAFC | Western Central Atlantic Fisheries Commission |
| WWF | World Wildlife Fund |

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**Sustainable Management of Suriname Fisheries**

# Executive Summary

The purpose of the study is to generate an analytical outline of the fisheries sub-sector, with special emphasis on identifying conditions for sustainable management, identify policy and/or institutional reforms, and identify needs of further technical cooperation to help Suriname achieve an internationally recognized sustainable fisheries program. To do so, (i) the status and trend of Suriname main fisheries was reviewed and analyzed, (ii) interviews were undertaken with industrial and artisanal fishers, fish processors, and aquaculture producers to identify their perception of the main issues and challenges of the fisheries and aquaculture sector, (iii) field trips to landing sites of the different types of fleets, and (iii) meetings with the Director of Fisheries and technical staff of the Department of Fisheries to jointly identify policy options, actions and capacity building needs to improve research and management of Suriname fisheries and aquaculture,

The status and trend of the main fisheries and aquaculture are the following:

*Shrimp Fishery (Penaeus spp.)*

The catch per unit of effort for the period 1994-2011 shows a slight decrease in stock abundance (See Figure 4 of report). For the same period, mean CPUE was 19.8 ton with a corresponding standard deviation of 4.3 ton. This situation seems to indicate that the expected stock recovery from systematic reduction in fishing effort of the industrial Surinamese shrimp fleet (from 119 shrimp trawlers in 1994 to 30 in 2012) is not occurring, and is likely of being offset either by: (a) increasing fishing mortality by other shrimp fleets in the region harvesting the spawning stock of main species harvested (P. brasiliensis, P.notialis, P.subtilis, and P.schmitti) in the Brazil-Guianas shelf, (b) increasing fishing mortality of juveniles of these species caught estuaries and coastal lagoons by artisanal boats in Suriname and neighboring countries, and (c) changes in the carrying capacity of the benthic habitat of these species.

*Seabob fishery (X. kroyeri)*

Catch per unit of effort (catch per trawler per day at sea) seem to be gradually declining from ~3.21 ton per day at sea in 1998 to 1.84 ton per day at sea in 2012. Current catch per unit of effort is still above the trigger CPUE point of 1.48 ton per day at sea. In this Marine Stewardship Council (MSC) certified fishery, effort restrictions are managed through a Harvest Control Rule (HCR).

*Snapper fishery of Venezuelan fleet*

Catch per unit of effort of the main species harvested by the Venezuelan fleet indicate that the most abundant of the species (*L. purpureus*) show a reduction of ~35% in CPUE in the last five years. This signal calls for detailed follow up of this fishery to avoid over-exploitation of the snapper stocks of Suriname.

*Industrial groundfish fishery*

In 2011 the multi-species industrial groundfish fishery of Suriname harvested 45 finfish species and mollusks like squids. From these, 10 species accounted for 80% of the harvest in order of their contribution: kandratiki (*Cynoscionvirescens*), black snapper (*Lutjanuesgriseus*), krokus (*Micropogoniasfurnieri*), grunts (*Haemulon spp*.), lane snapper (*Lutjanussynagris*), barracuda (*Sphyraena barracuda*), witwittie (*Cynoscionjamaicensis*), zilverbelt (*Trichiuruslepturus*), makreel (*Scomberomorus spp*.), dagoetifi (*Macrodonancylodon*).

An analysis of this fishery, indicate that overall CPUE for this fishery is fairly stable with mean CPUE of 1.73 ton/day at sea for the 1998-2011 period. However, looking at species specific CPUE, lane snapper (*Lutjanussynagris*) which provided the largest catch per day at sea in 1998 (498 kg/day) is currently yielding 103 kg/day. This indicates a reduction of 79% in its CPUE index of abundance. It should be mentioned that the species non-discriminatory nature of trawling gear could also have serious effects of less abundant species and therefore their indices of abundance (CPUE) should be monitored over time.

Artisanal fishery

In 2011, the artisanal fishery is composed of 1220 boats using different gears to harvest marine species in coastal and estuarine waters of Suriname. There are 318 coastal boats characterized as: decked Guyana boats (inboard engines), open Guyana boats (ouboard engines), and SK Bangamary boats. Concerning the 902 riverine an estuarine boats, seven types are classified in accordance to the fishing method and gear used. The status of the stocks of species harvested by coastal and riverine and estuarine fleets is not well known. It seems important to strengthen research and monitoring of the growing multi-species harvest of artisanal fisheries of Suriname. There is no clear time series data set to estimate CPUE for the different species harvested by the artisanal fishery.

Aquaculture

Concerning aquaculture, there is one major producer remaining out of four that began this activity about 10 years ago. Species cultivated by this producer are white shrimp (*Penaeusvannamei*) and tilapia (*Oreochromismossambica*). There is also a small number of individuals involved in subsistence aquaculture of tilapia (*Oreochromis spp*.) and other native Cichlidae species like Krobia. According to FAO (2011), Suriname does have the potential to increase its aquaculture production of shrimp and fish, but also a number of challenges and constraints that need to be overcome such as: (i) locally available materials are usually of inferior quality, for a high price, (ii) the possibilities for export are limited due to high cost for transport and the highly competitive nature of the world market for shrimp and tilapia, (iii) the majority of aquaculture products are exported whole or fresh on ice, which yields a relatively low price on the world market, and (iv) financing possibilities are limited, and if available it is usually against a high interest which can cause liquidity problems for aquaculture farms.

*Fisheries management plan and access rights system in place*

The Fisheries Management Plan (FMP) for Suriname in is currently being updated. There is a draft FMP developed in 2002 and a current ACP mission to develop FMP´s for Suriname as well as for Guyana.

There is a Fisheries Management Plan for the seabob (*X. kroyeri*) fishery with clearly identified Harvest Control Rules (HCR).

For the fisheries reported here the main attributes of the access rights system in place in Suriname are summarized as follows: Rights are conferred by the Department of Fisheries, through vessels specific licenses up to the maximum number of vessels specified to operate in each specific fishery as established in the Annual Decree issued by the Ministry of Agriculture, Animal Husbandry and Fisheries. The Annual Decree specifies exclusive spatial fishing access rights to vessel owners to harvest a list of species with pre-defined vessel capacity (tonnage and engine HP), fishing methods and gear. The duration of fishing rights is for one year. Concerning security of the title conferred through the license, as indicated before, it is only for one year and its renewability will depend on: a) the maximum number of licenses to be issued the following year in response to changes in fish stock abundance, b) compliance with rights restrictions and regulations, and c) compliance with general prohibitions in place for all vessels and boats operating in Suriname Territorial waters. Fishing rights granted through licensing in Suriname are non-transferable and non-divisible. Renting of licenses is not permitted. Concerning rights enforceability, the complexities associated with sharing shrimp and fish stocks with countries fishing in the Brazil-Guianas ecosystem call for more robust mechanisms to mitigate the presence of IUU fishing. There are current efforts in Suriname to establish a Coast Guard system to mitigate the above mentioned enforcement and compliance issue. Since 2007, industrial vessels are required to carry a Vessel Monitoring System (VMS).

The Fisheries Department has professional and qualified but insufficient personnel for the task of researching, and monitoring, controlling and surveillance (MSC) of the fisheries sub-sector. Additional capacity building identified during the missions for effective fisheries governance and ecosystem conservation include: (i) a periodic follow-up of quality of target catch and bycatch and effort data of regulated fisheries, (ii) the design and establishment of a Fisheries Information System of Suriname (FISS), including selection of an appropriate database software, (iii) training for using data base software, input fishery data, and a sustainable management of the FISS to be designed, and (iv) training on models used for stock assessment using data and information available from the FISS.

During the second Mission to Suriname, meetings with the Director of Fisheries and his staff were undertaken to identify personnel needs and technical cooperation to strengthen the monitoring, statistical analysis, fisheries research, and management functions of the Fisheries Sub-Sector. Personnel needs include: two fisheries biologists, two marine ecologists to study and deal with possible impacts of oil marine exploration, a fisheries economist, and 11 inspectors and onboard observers. Currently the Department of Fisheries has four inspectors of ~ 60 years of age. Concerning training, The Director of Fisheries also identified the need to train, in international fisheries law, the two lawyers currently members of the Department to properly deal with the transboundary nature of stocks and corresponding fisheries management of the Brazil-Guianas shelf.

*Marine biodiversity conservation in Suriname*

In general, sea turtle occurrence overlaps spatially with coastal fisheries, particularly the driftnets in near shore zones adjacent to Guianas rookeries. Because of this, fisheries was considered a source of mortality for leatherbacks (*Dermochelyscoriace*) and olive ridleys (*Lepidochelysolivacea*) as reported by Chevalier et al. (1999) and Hilterman and Goverse (2004). As a result, the Department of Fisheries has seasonal closure of these areas to fishing as evidenced in their 2012 Annual Fisheries Decree, which indicates that no fishing can take place in the Galibi Region during a closed season of March 1–July 31 to protect turtle nesting. In addition, in the MSC certified seabob fishery, by-catch monitoring and reporting of Endangered Threatened and Protected species (ETP) is stipulated in the Code of Conduct of the sea-bob fleet and should be entered in the log sheets in accordance with IUU fishery procedure as well. Vessels harvesting seabob (*X. kroyeri*) should report monthly to the Fisheries Department and WWF Guianas any by-catch of ETP species. There is a continuous systematic monitoring required on ETP species. The use of By-catch Reduction Devise (BRD) is also required in this fishery.

*Main issues identified through interviews with stakeholders*

Main issues identified in meetings and interviews with small-scale and industrial fishers and other stakeholders of Suriname fisheriesinclude, in priority order:

1. Piracy in fishing areas within Suriname Exclusive Economic Zone,
2. Illegal, unregulated and un-reporting fishing (IUU fishing),
3. Perceived equity issues associated to duty free for oil and gas assigned for industrial vessels, but not for small-scale boats,
4. Lack of recent stock assessment of main Suriname fisheries including transboundary fish resources,
5. Absence of a Fisheries Information System for Suriname (FISS) designed to efficiently monitor the state of fisheries and aid decision-making associated to fisheries management.

*Recommendations*

Identified relevant policy recommendations associated with the main issues and challenges described in this study, are the following:

1. Establish and coordinate with the National Coast Guard a Monitoring and Surveillance System (MSC) to eliminate piracy to ensure fishers security at sea, deal effectively with illegal, unregulated and under-reporting fishing in Suriname Exclusive Economic Zone,
2. Establish and commit to the implementation of an updated Fisheries Management Plan (FMP) for Suriname with consideration of main principles an ecosystem approach to fisheries management (EAF),
3. Periodically update abundance indices of the main species harvested by Suriname multi-species and multi-fleet fisheries,
4. Calculate current fishing mortalities of main species harvested, some of which are shared stocks of the Brazil-Guianas shelf,
5. Undertake bilateral/multilateral cooperation for joint research, management and conservation of the highly productive Brazil-Guianas shelf ecosystem.
6. Design an aquaculture development strategy.
7. Strengthen Fisheries Department personnel (fisheries biologists, fisheries ecologist, marine environmental specialist, personnel for data collection and analysis, and fisheries observers onboard fishing vessels) to be able to periodically assess the status of stocks, to monitor and control domestic fisheries, and to have certifiable sustainable fisheries management capacity and effectiveness for the main fisheries.
8. Design and establish of an appropriate Fisheries Information System for Suriname (FISS).
9. Revise and integrate the Fish Stock Protection Act and the Fisheries Act, last revised in 1981.

Sustainable Management of Suriname Fisheries

# Introduction

The shrimp, seabob and finfish resources of Suriname are comprised within the highly productive North Brazil Shelf Large Marine Ecosystem (NBSLME). The NBSLME extends along north eastern South America from the Parnaíba River estuary in Brazil to the boundary with the Caribbean Sea and has a surface area of about 1.1 million km2. Its responsible use requires ecosystem considerations to fisheries management to deal with the complexities of heterogeneous fleets harvesting shared stocks of a diversity of species (Phillips *et al.*2009; Chakalall*et al.* 2002; Seijo *et al.* 2000).

The purpose of the study is to generate an analytical outline of the fisheries sub-sector, with special emphasis on identifying conditions for sustainable management, identify policy and/or institutional reforms, and identify needs of further technical cooperation to help Suriname achieve an internationally recognized sustainable fisheries program.

To achieve these objective, during this first and second missions the following was undertaken: (i) meeting with authorities and staff of the Fisheries Department to explain mission objectives and review program of activities including meetings with fisheries department staff, fishermen collectives, industrial fishers association and fish processors, (ii) obtaining existing documents onstock assessments, and time series of catch and effort data for the main species harvested by small-scale and industrial fleets, (iii) reviewing existing drafts of Fisheries Management Plans, (iv)field trips to fish landing sites and fish market to observe processes and meet with fisheries collective of New Amsterdam District to identify main small-scale fisheries issues and policy recommendations, (v) field trip to observe existing extensive and semi-intensive aquaculture production of shrimp (*L. vannamei*) and tilapia, (v) obtaining results of recentCLMEsurvey and workshop reports  which had the participation offisheries, and aquaculture stakeholder, and (vii) reviewingthe status of MSC certification of the seabob (*X. kroyeri*) fishery. Concerning current legal framework for the fisheries sector, a meeting took place with legal officers of the Department of Fisheries to review current fisheries law,which I sentfor translation from Dutch to English (See attachment). Also, a detailed review of the annual Fisheries Decree of 2012 associated with management and regulation of the different fisheries of Suriname. Meeting with the Director of Fisheries and his staff to identify current main issues of this sub-sector and associated policies needed to solve or mitigate them. In the second mission meetings with the Director of Fisheries and his staff were undertaken to identify needs of further technical cooperation to strengthen the monitoring, statistical analysis, fisheries research, and management functions of the Fisheries Sub-Sector. In this second mission a detailed review of fishing effort (days at sea) and species specific catch data was undertaken for the multi-species groundfish industrial trawl fishery. Data was also collected for the large pelagic fishery targeting yellow fin tuna (*Tunnusalbacares*) and associated high value incidentally harvested species (i.e. dolphin fish *Coriphaenahippurus*,wahoo *Acathocybiumsolandri*,among others) by Panamenian vessels fishing in Suriname waters.

The main findings of the two missionsand of reviewing and analyzing the data and information collected are the following:

# 2. Suriname Fisheries

The fishery sector of Suriname represented ~ 2.3 % of GDP in 2006 and employment generated in this sector, for the same year, was of 5,169 jobs (FAO, 2008). In 2011, Suriname harvested 36,225 ton of crustaceans and fish, and had an aquacultureproduction of 86.7 ton. A preliminary fisheries data analysis for Suriname, indicate that the gross value offisheries output is $US36.6 million. In 2012,shrimp, seabob and fish harvest was undertaken by fleets of 239 industrial vessels, 318 coastal small-scale boats, and 902 inland and estuarine boats and canoes (Fisheries Department, 2013). Figure 1 shows the trajectory of licenses issued in the 1994-2012 period to these types of fleets.

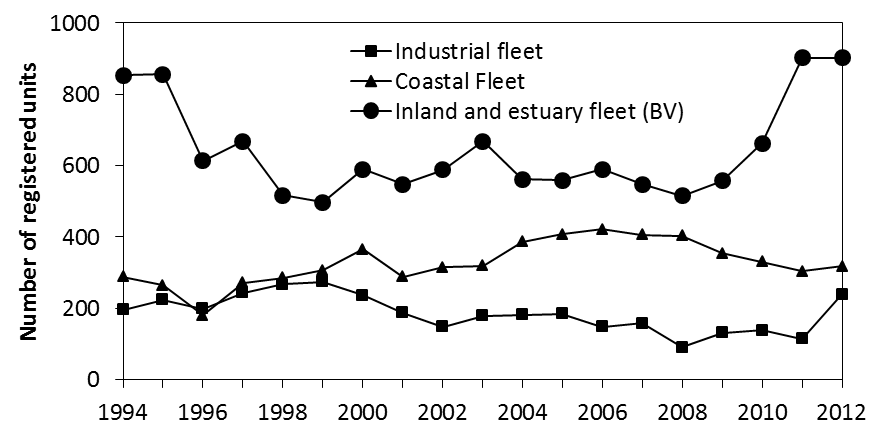


Figure 1.Number of registered units of industrial, coastal, and inland an estuary fleets for the period 1994-2012.

## 2.1 Export of shrimp, seabob and finfish products

Concerning trade, the value of fish exports has remained fairly constant in Suriname in the first decade of the 21th century (Figure 2). In 2010, export of shrimp *Penaeus spp*., seabob (*X. kroyeri*) and finfish species represented US$ 31.005 million, and the average for the period 2000-2010 was US$ 32.445 million (Fisheries Department, 2013).



Figure 2.Export value (US$) of shrimp, seabob and finfish products of Suriname.

## 2.2Shrimp fishery

Penaeidshrimp species harvested in 2011 included 572 ton of shrimp such as hopper (*Penaeusbrasiliensis*), pink shrimp (*Penaeusnotialis*), brown shrimp (*Penaeussubtilis*), white shrimp (*Penaeusschmitti*), and deep water orange shrimp (*Solenosera spp*.), scarlet shrimp (*Pleisopenaeusedwardsianus*), and royal red shrimp (*Pleotiocusrobustus*). Figure 3, shows the harvest trend of the fishery for the period 1972-2011.



Figure 3. Catch trajectory of shrimp (*Penaeus spp*.) in Suriname for the period 1973-2011.

A maximum shrimp harvest of 3950 ton was registered for 1977. Since then, annual catch has been decreasing up to a minimum of 247 ton in 2009, when CPUE (annual catch per vessel) decreased to 8.9 ton, from an average CPUE of 19.8 ton for the period 1994-2011. Some signs of recovery are shown in the CPUE for 2010 and 2011 which is calculated as 21 and 22 ton per vessel respectively(Figure 4). It should be pointed out however, that the number of licenses issued to fish for shrimp have also decreased since 1994 when 119 licenses for shrimp trawlers were issued to harvest shrimp species. The catch per unit of effort for the period 1994-2011 shows a slight decrease instock abundance (Figure 4). For the same period, mean CPUE was 19.8ton with a corresponding standard deviation of 4.3 ton.

This situation seems to indicate that the expected stock recovery from systematic reduction in fishing effort of the industrial Surinamese shrimp fleet (from 119 shrimp trawlers in 1994 to 30 in 2012) is not occurring and is likely of being offset either by: (a) increasing fishing mortality by other shrimp fleets harvesting the spawning stock of main species harvested (*P. brasiliensis*, *P.notialis, P.subtilis, and P.schmitti*) in the Brazil-Guianas shelf, (b) increasing fishing mortality of juveniles of these species caught estuaries and coastal lagoons by artisanal boats in Suriname and neighboring countries, and (c) changes in the carrying capacity of the benthic habitat of these species.



Figure 4. Catch per unit of effort (CPUE) of shrimp species caught by industrial trawlers of Suriname.

Concerning export of shrimp products,the value of shrimp exports has decreased by ~50% in the period 2001-2007 from 25 million USD to less than 12.5 million.

## 2.3Seabob (*Xyphopenaeus* kroyeri) fishery

In 2012, the seabob (*X.kroyeri*) fishery landed 7137 ton head-off of this abundant coastal/estuarine crustacean (Figure 5). The highest annual catch reported was of 12000 ton



Figure 5.Catch of seabob (*X. kroyeri*) for the 1998-2011 period.

It should be pointed out however that catch per unit of effort (catch per trawler per day at sea) seem to be gradually declining from ~3.21 ton per day at sea in 1998 to 1.84ton per day at sea in 2012. Current catch per unit of effort is still above the trigger CPUE point of 1.48 ton per day at sea.



Figure .Catch per unit of effort (CPUE) of the seabob (X. kroyeri) fishery of Suriname for the period 1998-2012.

In this Marine Stewardship Council (MSC) certified fishery, effort restrictions are managed through a Harvest Control Rule (HCR). The HCR is aimed at the target species and it is part of a dual strategy in relation with the multi species character of the fishery.With the current HCR strategy, the number of days-at- sea is determined as follows:

1. 5,100 days-at-sea in case the current CPUE equals or is above the trigger CPUE. The trigger CPUE shall be determined on 1.48ton per day-at-sea
2. A linear decreasing number of day at sea on the basis of the formula:

Number of days-at-sea = (current CPUE – Limit CPUE)\*8.625

1. Zero (the fishery is closed) in case the current CPUE equals or is below the Limit Reference Point (LRP) for CPUE set to 0.89t per day-at-sea

The current CPUE for each year shall be calculated as the average of the year prior to the current year. The CPUE shall be calculated as the total landing divided by the total number of days-at-sea of the fleet. The total landing shall be expressed in kilogram full weight; the catch that is immediately unloaded upon landing of the vessel. The number of days-at-sea shall be calculated as follows: (date of arrival – date of departure) + 1. According to MSC (2011), the Target Reference Point (TRP) for CPUE shall be set to 1.65 ton per day-at-sea and the limit CPUE shall be 0.89 ton per day-at-sea.The MSC recommendations towards the second surveillance audit fromits 2012 seabob (*X. kroyeri*) fishery assessment will be presented in the final report of this study.

## 2.4 Finfish harvest

Artisanal and industrial finfish harvest for the period 2000-2011 shows a growing trend from 8871 ton in 2000 to 28622 ton in 2011 (Figure 7). The number of riverine and estuarine boats has increased ~ 75%, from 515 fishing units in 2008 to 902 in 2012 (Figure 1).



Figure 7.Artisanal and industrial multi-species finfish harvest for the period 2000 – 2011.

This trend call for more detailed analysis of catch per unit of effort trends of main finfish species harvested by both, the artisanal and industrial fleets.

### 2.4.1 Industrial groundfish trawlers

In 2011 the multi-species industrialgroundfish fishery of Suriname harvested 45 finfish species and mollusks like squids. From these, 10 species accounted for 80% of the harvest in order of their contribution:kandratiki (*Cynoscionvirescens*), black snapper (*Lutjanuesgriseus*), krokus (*Micropogoniasfurnieri*), grunts (*Haemulon spp*.), lane snapper (*Lutjanussynagris*),barracuda (*Sphyraena barracuda*), witwittie (*Cynoscionjamaicensis*), zilverbelt (*Trichiuruslepturus*), makreel (*Scomberomorus spp*.), dagoetifi(*Macrodonancylodon*). For 2011, annual catch of these 10 species is reported in Figure 7. It should be noted that, of the 45 species harvested, the largest catch of industrial groundfish trawlers was 987.1 ton of kandratiki (*Cynoscionvirescens*), and the smallest one (30 kg), corresponded to the mutton snapper (*Lutjanusanalis*).



Figure .Catch of main species of the multi-species industrial groundfish fishery of Suriname in 2011.

The species non-discriminatory nature of trawling gear could have serious effects of less abundant species and therefore their indices of abundance (CPUE) should be monitored over time. It is critical to obtain the data and analyze at least a 10 year time series of multi-species harvest and corresponding fishing effort of the industrial groundfish fishery and calculate their corresponding trends in CPUE.

An analysis of this fishery indicate that overall CPUE for this fishery is fairly stable with mean CPUE of 1.73 ton/day at sea for the 1998-2011 period (Figure 9.).

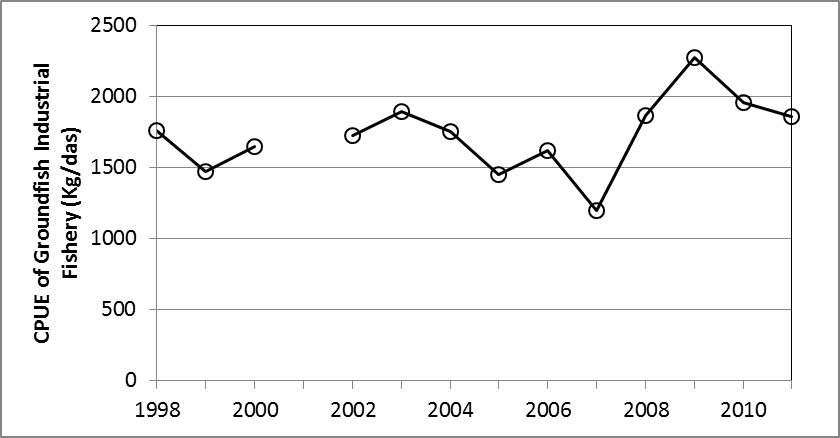


Figure 9. Catch per Unit of effort (kg/das) of the industrial groundfish fishery of Suriname for the period 1998-2011.

However, looking at species specific CPUE, lane snapper (*Lutjanus synagris*) which provided the largest catch per day at sea in 1998 (498 kg/day) is currently yielding 103 kg/day. This indicates a reduction of 79% in its CPUE index of abundance.

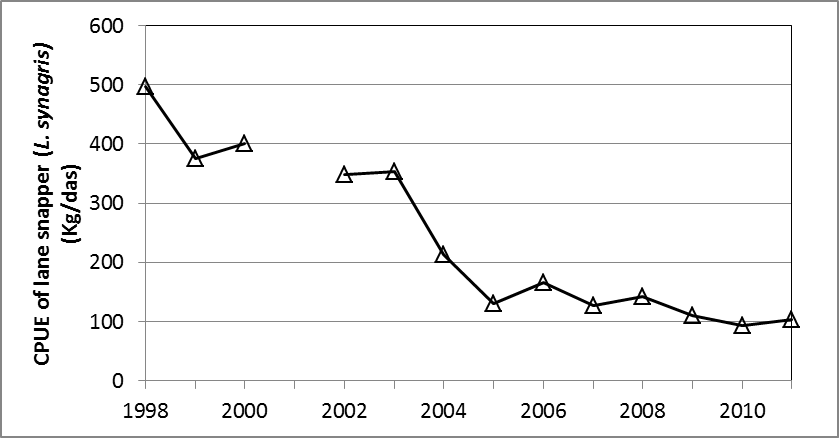


Figure 10.Catch per unit of effort of lane snapper (*Lutjanus synagris*) harvested by the groundfish industrial fishery of Suriname.

The lane snapper (*L. synagris*) is also harvested buy the Venezuelan snapper fleet, as will be shown in following sections of this report.

Concerning the currently must abundant species, kandratiki (*Cynoscionvirescens*), being harvest by the industrial groundfish fishery, CPUE index of abundance indicate a diminishing trend from

~400 kg/das in 1998 to less than 150 kg/day in 2008. It should mentioned however, that the last three years the stock of kandratiki is showing a substantial recovery to CPUE levels in the interval 300-350 kg/das.

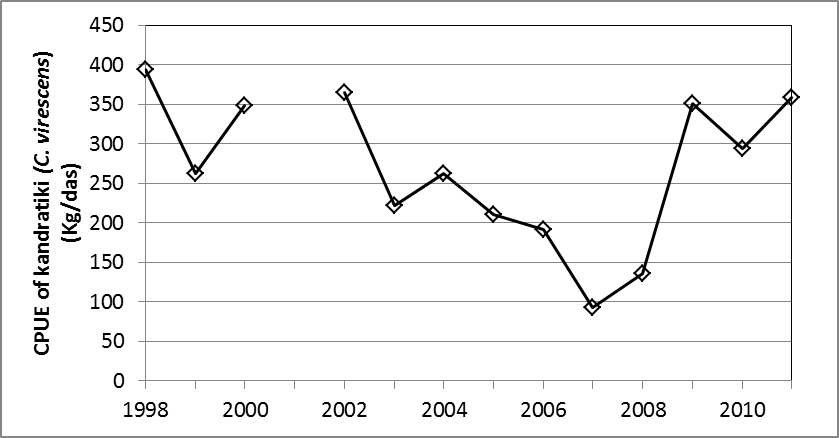


Figure 11.Catch per unit of effort of kandatriki (*Cynoscion virescens*) harvested by the groundfish industrial fishery of Suriname.

It should be mentioned that the species non-discriminatory nature of trawling gear could have serious effects of less abundant species and therefore their indices of abundance (CPUE) should be monitored over time.

## 2.5Artisanal fleet

In 2011, the artisanal fishery is composed of 1220 boats using different gears to harvest marine species in coastal and estuarine waters of Suriname (Table 1). There are 318 coastal boats characterized as: decked Guyana boats (inboard engines), open Guyana boats (ouboard engines), and SK Bangamary boats. Concerning the 902 riverine an estuarine boats, seven types are classified in accordance to the fishing method and gear used: Chinese seine (BV, Fuiknet), longline (BV, Lijn), drifting gillnet (BV, Drijfnet), sport (BV), fixed gillnet (BV, Spannet), riverseine (BV, Zeegnet), and lagoon gillnet (Kieuwnet). The multi-species harvest by these fleets include, among others, weakfish (*Cynoscionacoupa*), kandratiki (*Cynoscionveriscens*), Bangamary (*Macrodonancylodon*), catfish (*Arius parkeri*), and other Scyaenidaespecies. Gallbladderof many of these species is sold in the Chinese market and generate an important additional source of income to small-scale fishers.

Table 1. Number of licenses issued in 2011 for gear specific artisanal boats



Source: Department of Fisheries of Suriname.

The status of the stocks of species harvested by coastal and riverine and estuarine fleets is not well known. It seems important to strengthen research and monitoring of the growing multi-species harvest of artisanal fisheries of Suriname.

## 2.6 Venezuelan snapper fleet

A Venezuelan fleet, with licenses to fish for snapper fish species using hand lining and long-lines, harvest red snapper (*Lutjanus purpureus*),B-liner or vermillion snapper (*Rhomboplites aurorubens*), lane snapper (*Lutjanus synagris*), dog snapper (*Lutjanus jocu*), and grey snapper (*Lutjanus griseus*), among others. Catch and catch per unit of effort of the three most important species harvested by the Venezuelan fleet are included in Figure 9a, 9b and 9c.

|  |
| --- |
| (a) |
| (b) |
| (c) |

Figure 12.Annual catch (kg) and CPUE (kg/day) of the main species harvested by the Venezuelan snapper fishery for the period 2004-2011.

Catch per unit of effort of the main species harvested by the Venezuelan fleet indicate that the most abundant of the species (L. purpureus)show a reduction of ~35% in CPUE in the last five years. This signalcalls for detailed follow up of this fishery to avoid over-exploitation of the snapper stocks of Suriname.

## 2.7Large pelagic fleet

A Panamanian fleet is landing in Suriname a diversity of large pelagic species which are being processed and sold in international market as frozen and fresh. In 2012, ~3810 ton were processed and exported. Eight species accounted for 97% of the large pelagic species landed in Suriname (Figure 10): yellow fin tuna (*Thunnusalbacares)*, sail fish (*Istiophorusalbicans*), mahimahi (*Coriphaenahippurus*), wahoo (*Acanthocybiumsolandri*), albacore (*Thunnusatlanticus*), skipjack (*Katsuwonuspelamis*), blue shark (*Prionaceglauca*), and other bill fish species (*Istiophoridae and Xiphiidae*).The remaining three percent landed include short fin mako shark (*Isurusoxyrinchus*), a mix of sharks (*Carcharinidae*) and the escolar fish (*Lepidocybiumflavobrunneum*).

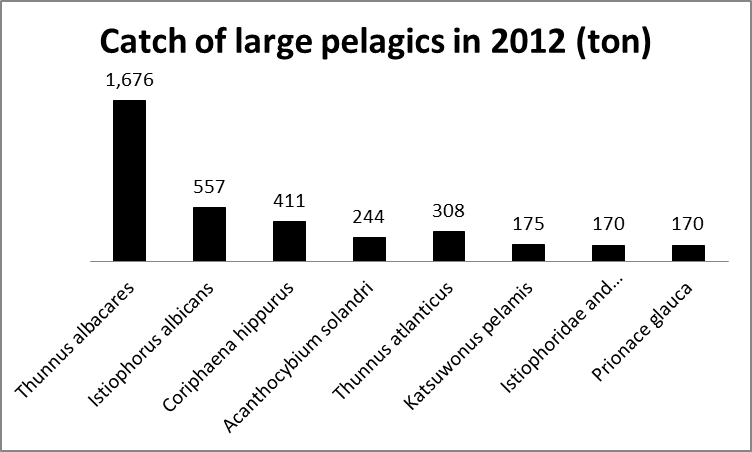


Figure 13. Catch of large pelagic species landed and processed in Suriname in 2012.

Large pelagics are trans-boundary highly migratory resources researched and managed by theInternationalCommission for the Conservation of Atlantic Tunas (ICCAT), which periodically assess the stocks through the Standing Committee on Research and Statistics (SCRS), anddetermine the corresponding total allowable catches for country members of such commission. Suriname has requested entry to ICCAT. Currently Suriname has a Status of Cooperating Non-Contracting Party, Entity or Fishing Entity in ICCAT.

# 3. Aquaculture production

Concerning aquaculture, there is one major producer remaining out of four that began this activity about 10 years ago. Species cultivated by this producer are white shrimp (*Penaeus vannamei*) and tilapia (*Oreochromis mossambica*). There is also a small number of individuals involved in subsistence aquaculture of tilapia (*Oreochromis spp*.) and other native *Cichlidae* species like Krobia. According to FAO (2011), Suriname does have the potential to increase its aquaculture production of shrimp and fish, but also a number of challenges and constraints that need to be overcome such as: (i) locally available materials are usually of inferior quality, for a high price, (ii) the possibilities for export are limited due to high cost for transport and the highly competitive natureof the world market for shrimp and tilapia, (iii) the majority of aquaculture products are exported whole or fresh on ice, which yields a relatively low price on the world market, and (iv) financing possibilities are limited, and if available it is usually against a high interest which can causeliquidity problems for aquaculture farms.

In order to reach a sustainable development of the aquaculture sector in Suriname, the followingactions have been proposedby FAO (2011):

1. Adoption of aquaculture legislation

2. Lowering the cost of feed for the aquaculture sector

3. Inventory of pollution in Surinamese rivers

4. Zoning for agricultural areas including aquaculture

5. Setting up an aquaculture research and training center

6. Setting up an aquaculture information system

7. Setting up a monitoring system for aquatic animal diseases

# 4. Rights-based management

To summarize the main attributes of the rights-based system in place in Suriname, five key aspects need to be specified (Anderson and Holiday (2007), Anderson and Seijo (2010):

1. Procedure for conferring the rights
2. Exclusivity of participation in the fishery,
3. Duration of the rights conferred,
4. Security of the title conferred by the rights,
5. Transferability and divisibility in the use of the rights, and
6. Actual rights enforceability and corresponding compliance with use rights limitations.

For the fisheries reported here the main attributes of the access rights system in place in Suriname are summarized as follows: Rights are conferred by the Department of Fisheries, through vessels specific licenses up to the maximum number of vessels specified to operate in each specific fishery as established in the Annual Decree issued by the Ministry of Agriculture, Animal Husbandry and Fisheries. The Annual Decree specifies exclusive spatial fishing access rights to vessel owners to harvest a list of species with pre-defined vessel capacity (tonnage and engine HP), fishing methods and gear. The duration of fishing rights is for one year. Concerning security of the title conferred through the license, as indicated before, it is only for one year and its renewability will depend on:a) the maximum number of licenses to be issued the following year in response to changes in fish stock abundance, b) compliance with rights restrictions and regulations, and c) compliance with general prohibitions in place for all vessels and boats operating in Suriname Territorial waters.Fishing rights granted through licensingin Suriname are non-transferable and non-divisible. Renting of licenses is not permitted. Concerning rights enforceability, the complexities associated with sharing shrimp and fish stocks with countries fishing in the Brazil-Guianasecosystem call for more robust mechanisms to mitigate the presence of IUU fishing. There are current efforts in Suriname to establish a Coast Guard system to mitigate the above mentioned enforcement and compliance issue. Since 2007, industrial vessels are required to carry a Vessel Monitoring System (VMS).

## 4.1 Fisheries regulation

The diversity of rights-based management schemes reported for shrimp, groundfish and pelagic fisheries, seems to respond to: (i) local fishery contexts, (ii) institutional, resource and ecosystem dynamics, and (iii) governance capacities in place. At this stage of establishing rights-based schemes in Latin America and the Caribbean, a commonality found in virtually all study cases is the non-transferability of formal privileges (Orensanz and Seijo, 2013; Seijo *et al*. 2013). Suriname is not the exception. It seems to reflect the concerns for potential concentration of fishing rights on a few hands were transferability introduced. Enforcement and compliance seem to continue being a challenge for countries in the Brazil-Guianas shelf. Community self-policing in fisheries with limited number of participants (e.g shrimp, seabob, and industrial groundfish fisheries of Suriname) could facilitate compliance with regulations and granted rights.

The regulations in place in 2012 for industrial and artisanal fisheries of Suriname are summarized in Tables 2 and 3.

Table 2. Rights-based attributes of licenses granted under the current limited entry strategy for fisheries in Suriname.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rights-based attributes** | **Deepwater shrimp fishery** | **Shrimp fishery** | **Seabob fishery** | **Industrial groundfish fishery** | **Large pelagic fishery** |
| Number of licenses and restrictions | 4  No replacement without authorization | 30  No replacement without authorization | **22**  No replacement without authorization | 23  No replacement without authorization  200 das maximum | 60  No replacement without authorization |
| Transferability of fishing rights | Non-transferable.  No vessel rentingor lending. | Non-transferable  No vessel renting or lending. | Non-transferable  No vessel rentingor lending. | Non-transferable.  No vessel renting, lending. | Non-transferable No vessel renting, lending. |
| Duration of season | Jan 1 – Dec 31 | Jan 1 – Dec 31 | Jan 1 – Dec 31 | Jan 1 – Dec 31 | Jan 1 – Dec 31 |
| Main species | *Solenocera spp.*  *P. edwardsianus*  *P. robustus* | *P. brasiliensis*  *P. notialis*  *P. subtilis*  *P. schmitti* | *X. kroyeri* | *C. veriscens*  *C. acoupa*  *C. steidachneriM. Furnieri*  *M. ancylodon*  *R. canadum* | |  | | --- | | *Thunnusalbacares* | | *Istiophorusalbicans* | | *Coriphaenahippurus* | | *Acanthocybiumsolandri* | | *Thunnusatlanticus* | | *Katsuwonuspelamis* | | Istiophoridae and  Xiphiidae | | *Prionace glauca* | |
| Fishing method | Bottom trawling deep water | Bottom trawling | Bottom trawling | Bottom trawling | Longline |
| Minimum size restriction | 10 cm of total length | 10. cm of total length | Not specified | Not specified | Not specified |
| Gear specification | NET &TED  Mesh size: 5.7cm  Sac size: 4.5 cm | TED  Mesh size: 5.7cm  Sac size: 4.5 cm | TED &BRD  Mesh size: 5.7cm  Sac size: 4.5 cm | Mesh size: 12cm; 16cm; 10cm  Sac size: 8 cm | Hooks ≤ 2000  Max hook No.: 5 |
| Maximum HP | 500 HP | 500 HP | 500 HP | 500 HP | 1000 HP |
| Fishing area | ≥isobath 45 fathoms in Suriname waters | ≥isobath 15 fathoms in Suriname waters | Isobath 10 to 15 fathoms in Suriname waters | ≥isobath 15 fathoms in Suriname waters | ≥isobath45 fathoms beyond Suriname waters |
| Surveillance and research | VMS.  Two observers onboard | VMS.  Two observers onboard | VMS.  Two observers onboard | VMS.  Two observers onboard | VMS.  Two observers onboard |

Source: This study, summarized from LVV (2012) and the Department of Fisheries of Suriname.

Table 3.Rights-based management and regulations in place in 2012 for the Venezuela red snapper fishery, bank net intertidal and driftnet fisheries, inland bangamary fishery small-scale and the BV riverine and estuarine fishery of Suriname.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rights-based attributes** | **Red snapper Venezuelan fleet fishery** | **Driftnet and bank net coastal fisheries** | **Inland Bangamary fishery** | **BV riverine and estuarine fishery** |
| Number of licenses | 100  No replacement without authorization | 300  No replacement without authorization | 20  No replacement without authorization | 902 |
| Transferability of fishing rights | Non-transferable.  No vessel renting or lending. | Non-transferable.  No vessel renting or lending. | Non-transferable.  No vessel renting or lending. | Non-transferable.  No vessel renting or lending. |
| Duration of season | Jan 1 – Dec 31 | All year with the exception of the Galibi Region with a closed season of  March 1 – July 31 to protect turtle nesting | All year with the exception of the Galibi Region with a closed season of March 1–July 31 to protect turtle nesting | Jan 1 – De  c 31 |
| Species | *L. purpureus*  *L. synagris*  *L. jocu*  *R. aurorubens*  *L. griseus* | *C. acoupa*  *C. veriscens*  *A. proops*  *M. ancylodon*  *N. MicropsCentropomus spp.*  *Arius parkeri* | *Macrodonancylodon*  *Nebrismicrops*  and other Cyanidae | Scyaenidae spp.  *Arius parkeri*  *B. bagre*  *N. microps* |
| Fishing method | Long-line  Hand -line– | Driftnet fishing and bank net intertidal | Driftnet fishing | Gillnet, longline, dragnet, bangnet (2km long) |
| Minimum size restriction | Not specified | Not specified | Not specified | Not specified |
| Gear specification | Hooks ≤ 2000  Hook size: 6,7,8 | Driftnet: Minimal 20 cm of mesh size stretched  Maximum length: 2000 m  Bank net: Minimal 5 cm mesh size | Minimal 7.75 cm  mesh size  Maximum length: 2000 m | Minimal 7.75 cm  of mesh size  Maximum length: 2000 m |
| Maximum HP | 400 HP | Not applicable | Not applicable | Not applicable |
| Fishing area | ≥isobathfathoms | ≥isobath fathoms | Between 3 to 5 fathoms | Rivers and estuaries |
| Surveillance and research | Two observers onboard | Drift net boats: VMS system  Bank net: Cell phone system implemented  VMS still not in place | VMS system | Not specified |

Source: This study, summarized from LVV (2012) and the Department of Fisheries of Suriname.

For all fisheries and vessel permits, catch must be landed and processed in Suriname. Concerning maximum crew per vessel type,it should be in conformity with guidelines of Maritime Authority of Suriname (MAS).

Additional specifications of the Annual Decree include the following prohibitions and requirements:

1. It is forbidden to throw into sea plastics, glass, oil, and any potential dangerous products which can endanger humans and the aquatic environment.
2. All industrial vessels require a VMS (Vessel monitoring System) to register and report geographic position, speed, and direction. This information should be provided by vessel owner to the Department of Fisheries at no cost for the latter.
3. Required notifications: (i) change of landing place, (ii) when boat is inactive for more than 7 days, (iii) when a crew member is replaced, and (iv) when there is a change in the ´call´ sign or radio frequency to be reached, in at least 8 hours before vessel goes into the sea.

# 5. Organizational structure of the Department of Fisheries and capacity building needs.

The current organizational structure of the Department Fisheries of Suriname is presented in Annex 2. In the second Mission to Suriname, capacity building needs were identified for the different functional components of the organizational chart to strengthen the Department of Fisheries capabilities for responsible management of their fisheries and the ecosystems sustaining them. The Fisheries Department has professional and qualified but insufficient personnel for the task of researching, and monitoring, controlling and surveillance (MSC) of the fisheries sub-sector. Additional capacity building identified in this mission for effective fisheries governance and ecosystem conservation include: (i) a periodic follow-up of quality of target catch and bycatch and effort data of regulated fisheries, (ii) selection of database software appropriate for Suriname fisheries, (iii) training for using data base software, input fishery data, and a sustainable management of a Fisheries Information System of Suriname to be designed (FISS), (iv) training on models used for stock assessment using data and information available from the FISS.

During the second Mission to Suriname, meetings with the Director of Fisheries and his staff were undertaken to identify personnel needs and technical cooperation to strengthen the monitoring, statistical analysis, fisheries research, and monitoring and management functions of the Fisheries Sub-Sector. Personnel needs include: two fisheries biologists, two marine ecologists to study and deal with possible impacts of oil marine exploration, one fisheries economist, and 11 inspectors and onboard observers. Currently the Department of Fisheries has four inspectors of ~ 60 years of age. Concerning training, The Director of Fisheries indicated the need to train, in international fisheries law, the two lawyers currently members of the Department to properly deal with transboundary stock management of the Brazil-Guianas shelf.

# 6. Biodiversity conservation

Concerning biodiversity conservation, turtle and fish excluding devices are used by shrimp trawlers. In addition, from March 01 to July 31, there is a closed season in the Galibi region to protect spawning of marine turtles.

In general, sea turtle occurrence overlaps spatially with coastal fisheries, particularly the driftnets in near shore zones adjacent to Guianas rookeries. Because of this, fisheries was considered a major source of mortality for leatherbacks (*Dermochelyscoriace*)and olive ridleys (*Lepidochelysolivacea*) as reported by Chevalier *et al.* (1999) and Hilterman and Goverse (2004). As a result, the Department of Fisheries hasseasonal closure of these areas to fishing as evidenced in their 2012 Annual Fisheries Decree, which indicates that no fishing can the place the Galibi Region with a closed season of March 1–July 31 to protect turtle nesting.

Concerning the MSC certified seabob fishery, by-catch in the seabob fishery, monitoring and reporting of Endangered Threatened and Protected species (ETP) is stipulated in the Code of Conduct of the sea-bob fleet and should be entered in the log sheets in accordance with IUU fishery procedure as well. Vessels harvesting seabob (*X. kroyeri*) should report monthly to the Fisheries Department and WWF Guianas any by-catch of ETP species. There is a continuous systematic monitoring required on ETP species. The use of By-catch Reduction Devise (BRD) is also required in this fishery.

A stock recovery strategy for shrimp species is in place. The number of licenses has been reduced from 99 in 2000 to 30 licenses in 2012. Concerning fish species, the large catfish (*Arius parkeri*) is acknowledged by officials of the Department of Fisheries to show some signs of overexploitation and its protection is needed.

# 7. Fisheries and Aquaculture Management Plans

Fisheries Management Plan (FMP) for Suriname in place is currently being updated. There is a draft FMP developed in 2002 and a current ACP mission to develop FMP´s for Suriname as well as for Guyana.

There is a Fisheries Management Plan for the seabob (*X. kroyeri*) fishery with clearly identified Harvest Control Rules (HCR).

Harvest Control Rules (HCR) need to be in place for the shrimp fishery as well as the for the multispecies industrial groundfish fishery.The control rules state what management action should be taken under different conditions, often determined by the value of an indicator in relation to a target or limit reference point. The decision rules should include how the management measure is to be determined, what data must be collected and how data will be used to determine the measure. CPUE trends for the 10 main species accounting for 80% of the catch are being calculated and will be presented in the final report.

There is no Aquaculture Development Plan (AMP). FAO is currently exploring the potential of aquaculture in Suriname and the Department of Fisheries is in the process of designing a strategy to develop it.

Stock assessments of the main species of the Brazil-Guyana shelf ecosystem within Suriname EEZ, were undertaken in 1988 by the Fridtjof Nansen research vessel of Norway. FAO and CRFM have organized scientific meeting to estimate, through indirect methods of assessments, the status of the stocks of shrimp and groundfish fisheries of the Brazil-Guianas shelf (FAO 1998, 2000; Booth *et al.,* 2001; Ehrhardt, 2001).

## 7.1 Legal framework of Suriname fisheries.

The legal framework of Suriname fisheries can be summarized as follows:

1. *Fish Stock Protection Act*. This Act regulates fishing in estuaries and inland waters and contains the procedure for fishing licenses in the inland waterways of Suriname. Effective in 1961 and last revised in 1981.
2. *The Fisheries Act*: This Act contains the procedure for fishing in the Territorial Waters and the Exclusive Economic Zone. Effective 1980 and revised in 1981.
3. *The Fish Inspection Act*. This Act contains the guidelines for exporting fish and fish products to the European Union, Canada and the United States of America. This Act addresses seafood quality assurance and control, especially to meet the strict requirements of its important export markets in the European Union. This legislation is essential for developing the postharvest sector and earning foreign exchange. Effective in 2000.
4. *The Fish Inspection Decree*. This Decree is to implement some of the Fish Inspection Act. Effective in 2002.

According to FAO (2008), with the exception of the Fish Inspection Act and the Fish Inspection Decree, the other Acts need to be revised. The Act regarding Aquaculture is still a draft.

## 7.2 Principles governing granting of fishing access in Suriname waters: bilateral agreements

Under the provisions of the United Nations Convention on the Law of the Sea signed in 1982, coastal States are required to promote the objective of optimum utilization of the living resources in exclusive economic zones(Article 62, paragraph 1, of the Convention). To this end, they have to fulfill a number of obligations, the most important of which can be summarized as follows:

- Coastal States have to determine the allowable catch of the living resources in their exclusive economic zones. They must then determine their own capacity to harvest these resources.Where coastal States do not have the capacity to harvest the entire allowable catch, they have to give other States access to the surplus (Article 61, paragraph 1, and Article 62, paragraph 2, of the Convention). Suriname has granted, through a bilateral agreement, access to the Venezuelan snapper and mackerel fleet.

# 8. Main issues identified through interviews with stakeholders

The main issues identified through interviews with small-scale and industrial fishers, staff of the Department of Fisheries, and other stakeholders of Suriname fisheries, include in priority order:

1. Piracy in fishing areas within Suriname Exclusive Economic Zone,
2. Illegal, unregulated and un-reporting fishing (IUU fishing),
3. Perceived equity issues associated to duty free for oil and gas assigned for industrial vessels, but not for small-scale boats,
4. Lack of recent stock assessment of main Suriname fisheries including transboundary fish resources,
5. Absence of a Fisheries Information System for Suriname (FISS) designed to efficiently monitor the state of fisheries and aid decision-making associated to fisheries management

# 9. Recommendations

Identified relevant policy recommendations associated with the main issues described in the above sections are the following:

* Establish and coordinate with the National Coast Guard a Monitoring and Surveillance System (MSC) to eliminate piracy to ensure fishers security at sea, deal effectively with illegal, unregulated and under-reporting fishing in Suriname Exclusive Economic Zone,
* Establish and commit to the implementation of an updated Fisheries Management Plan (FMP) for Suriname with consideration of main principles an ecosystem approach to fisheries management (EAF),
* Update biomass estimates of the main species harvested by Suriname,
* Calculate current fishing mortalities of these species, some of which are shared stocks of the Brazil-Guianas shelf,
* Undertake bilateral/multilateral cooperation for joint research, management and conservation of the highly productive Brazil-Guianas shelf ecosystem.
* Design an aquaculture development strategy.
* Strengthen Fisheries Department personnel (fisheries biologists, fisheries ecologist, marine environmental specialist, personnel for data collection and analysis, and fisheries observers onboard fishing vessels) to be able to periodically assess the status of stocks, to monitor and control domestic fisheries, and to have certifiable sustainable fisheries management capacity and effectiveness for the main fisheries.
* Design and establish of an appropriate Fisheries Information System for Suriname (FISS).
* Revise and integrate the Fish Stock Protection Act and the Fisheries Act, last revised in 1981.

A possible schedule for policy decisions identified jointly with Mr. Rene Lieveld, Director of the Fisheries Department, To improve the LVV’s capacity to manage the fishery sector is summarized in the following table:

Table 4. Policy decisions, indicators and deadlines for their implementation

|  |  |  |
| --- | --- | --- |
| **Policy decisions 2013** | **Indicators 2014** | **Indicators 2015** |
| (i) Fisheries Monitoring, surveillance and Control (MSC) system designed and agreed by the Ministerial Board (August 2013) | Indicator: MSC system in operation |  |
| (ii) FMP validated by the Fisheries department and stakeholders (June 2013 | Indicator: Policies associated with the FMP included in the annual decree prepared by the department of fisheries and issued by LVV (January 2014) | Specify Harvest Control Rules for shrimp and groundfish fisheries |
| 1. Promote bilateral/multilateral   cooperation for joint research and management and conservation of the highly productive Brazil-Guianas shelf ecosystem. | Hold workshop of fisheries scientists and decision makers for joint research, management and conservation of the highly productive Brazil-Guianas shelf ecosystem  Indicator: Joint research plan for assessing stocks of the Northern Brazil Guianas Large Marine Ecosystem (LME). | Joint direct and indirect stock assessment of shrimp and groundfish fisheries  Indicator: Agreement signed for a specific research vessel to undertake the direct stock assessments  Indicator 2: Biomass estimates obtained from indirect assessments for shrimp and groundfish stocks |
| 1. Design an aquaculture development strategy.   Aquaculture development plan approved by LVV (December 2013). | Aquaculture Act submitted to Parliament (March 2014) |  |
| 1. Design and establish of an appropriate Fisheries Information System for Suriname (FISS) | Indicator: Select and install integrated fisheries information system with the proper reporting capabilities to aid decision making |  |
| 1. Submit a human resources proposal (profiles and justification) for strengthening the scientific and management capacities of the Fisheries Department including: fisheries biologists (2), fisheries ecologist(1), marine environmental specialist (1), personnel for data collection and analysis (2), and fisheries observers onboard fishing vessels (2)) to be able:  * To periodically assess the status of stocks, * To monitor and control domestic fisheries, and * To have certifiable sustainable fisheries management capacity and effectiveness for the main fisheries. | Indicator: Hire personnel included in the human resources proposal |  |

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**Annex 1**

Table 5. Annual license fees for 2012 (Department of Fisheries, 2012).

|  |  |
| --- | --- |
| **Vessel category** | **Annual license fee**  **(USD/vessel)** |
| Deepwater shrimp bottom trawler | 7,500 |
| Shrimpbottom trawler | 7,500 |
| Seabob bottom trawler | 5,000 |
| Industrial groundfish trawler   * Storage capacity: <130 * Storage capacity: [130 – 200) * Storage capacity: [200 – 300) * Storage capacity: ≥300 | 7,500  11,000  13,000  15,000 |
| Large pelagic vessel | 2,500 |
| Venezuelan snapper fleet   * Red snapper * Mackerel * Red snapper/mackerel | 2,500  2,500  3,500 |
| Outboard Guyana vessel type   * Driftnet * Schutbank * Bangamery | 250  250  250 |
| Inboard Guyana vessel type   * Driftnet t/m 125 HP engine * Driftnet > 125 – 225 HP engine | 350  750 |

**Annex 2**

**Organizational Structure Under directorate Fisheries**

Under directorate Fisheries

Legal Affairs

Budget and Financial Services

Personnel Services

Aquaculture

Monitoring en Inspection

Coastal, InlandandDeepSea Fishing

Statistics and Research

Technical Services and garage

General Affairs

Secretariat

Assistant Director Fisheries