

# An ecosystem-based value chain study

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A proposal by

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“Life Cycle Assessment of southern pink shrimp products from Senegal was published in 2009. An environmental comparison between artisanal fisheries in the Casamance region and a trawl fishery based in Dakar. SIK report 789, ISBN 978-91-7290-280-0. Authors: Ziegler, F., Eichelsheim, J.L., Emanuelsson, A., Flysjö, A., Ndiaye, V., Thrane, M.

This study initially proposed to divide the data into three categories:

- LCA
- Biological
- Socioeconomic

The LCA data is what we need to perform a traditional LCA according to the ISO 14040 and ISO 14044 environmental management standards. However, when the studied product originates from capture fisheries, this is not enough to describe/quantify the environmental impact of that product. Biological data about stock, by-catch, discard and seafloor impact is needed. The last two categories were not fully exploited.

The Collaborative Management for a Sustainable Fisheries Future in Senegal (USAID/COMFISH) is a five-year initiative (February 14, 2011 - September 30, 2016) supported by the U.S. Agency for International Development (USAID). The goal of the USAID/COMFISH Project is to support the Government of Senegal’s efforts to achieve reform of its fisheries sector as mentioned in the Fisheries and Aquaculture Sector Policy Letter of 2008 (LPS, for the French “Lettre de Politique Sectorielle”) by strengthening many of the enabling conditions necessary for improved governance and demonstrating effective tools and approaches for ecosystem-based collaborative management.

To support the elaboration of a sustainable management plan, a one off “stand by” itself study will be carried out based on results of the above mentioned LCA study. This “ecosystematic value chain” study will, in addition to the economic value chain, also study environmental aspects of values chains. The study will also refer to the total amount of fin fish and its value and importance: fin fish provide over 90% of all industrial landings, while the artisanal shrimp are taken with negligible amount of fin fish. The great majority of finfish caught in the industrial fishery is now believed to be used for human consumption in Senegal so that it is necessary to include the amount of protein added along the artisanal and industrial pathways in the study: this will provide a more comprehensive way of estimating the importance of industrial landings as a source of protein. Costs and benefits from managing the fishery so as to produce more fin fish and protein can then be objectively balanced with the benefits from managing the fishery for shrimp only.

This initiative will contribute to the implementation of measures to adapt fisheries to reduce their environmental foot print thereby mitigating the effects of climate change on e.g. CO2 production in other sectors. Terms of reference for the analysis of the value chain will include the following elements:

- Traditional economic value chain analysis;
- A consideration of gender and changes in women's roles at successive links in the value chain aspects;
- A review of pollution caused along the refrigeration chain, and how this relates to practices related to quality, conservation techniques (gutting, bleeding, refrigeration, smoking, fermentation, etc.), water use, the hygiene and health conditions in the landing and processing sites;
- The identification of one to two fish landing sites (including Cayar) to test the feasibility of fisheries product labelling with clear criteria for traceability and thus value added;
- An analysis of the value chain will also take into consideration the economic aspects and tariffs, as well as the consumption of energy, the production of CO2 and its contribution to industrial pollution in Senegal, and the detachment of information and power ("shadowing" and who controls who) throughout the market chain.

The data needed:

LCA data

Fishing

- Engines type/size/age
- Fuel type/amount per year or per month with landings during same period
- Fishing method, type/amount of material used and life-time of gear
- Vessel/Boat type/amount of material used and life-time
- Landings amount of different species landed during a year or average month
- Anti-fouling type (active substance) and amount of paint used per treatment and frequency of painting

Post-landing

- Logistics from landing site to consumer for both the artisanal and the trawl fishery (where does the product pass?)
- Transport mode (boat, truck, delivery van, car, aircraft, train)
- Mode of cooling at landing (cold storage or ice?)
- Processing
  - Amount of raw material processed
  - Type and amount of energy used
  - Amount of water used
  - Products (amount and value of main product and by-products)
  - Type and amount of waste
  - Amount of wastewater, treatment and resulting composition of nutrients
  - Type and amount of packaging materials used (primary and secondary)
  - Product yield (how much edible product is produced per tonne of shrimps processed)?
- Preparation mode in Senegalese households (cooked, fried...energy used?)
- Mode of home transport (from seafood market to household)= walking?
- Frozen storage in household?

- Senegalese electricity mix (percentage of different energy sources such as hydropower, nuclear power, coal, oil, biofuel)
- Product yield in household if unprocessed shrimps

## Biological data

### Background information

- Description/history of the development of the artisanal and the trawl fishery (also importance in relation to rest of Senegalese fishery)
- How is the fishery managed? Quotas or other regulations? As one stock or several?
- Who is using the resource? International fisheries or only Senegalese?
- Geographic location of trawl fishery
- Geographic location of artisanal fishery
- 10 most common species caught in industrial trawling and typical amount of catch landed/day
- 10 most common species caught in artisanal fishery and typical amount of catch landed/day
- Are the industrial trawlers equipped with echo sounders, GPS and a speed log? Do the trawls have trawl boards?
- Are there any marine seafloor maps of the area (indicating either type of substrate or type of marine community)?
- Seasonal variation in catch, by-catch, discard

### Data

- Stock assessment of target and by-catch stocks based on meeting with/literature from Fisheries management authority (Dakar?)
- Size of trawl opening in seafloor contact (industrial trawling)
- Speed and depth while trawling (industrial trawling)
- Type of seafloor habitat/marine community in area with industrial trawling
- Average trawl haul (industrial trawling, in hours)
- Weight of discard per species and per kg of catch landed (somebody onboard!)
- Number of discarded fish per species and per kg of catch landed (somebody onboard!)
- Seasonal variation in catch, by-catch, discard (how representative will data be?)

### Socioeconomic data

- Price received by fisherman at landing for different species
- Shrimp price in/out from processing industry
- Value of main product (shrimps) and by-products (mince, shells, fish meal...) out from industry
- Shrimp price in/out from seafood market
- By-catch, discard prices from (local) seafood market
- Salary fisherman (income from selling catch-costs)
- Fisherman safety (occurrence of accidents)
- Ergonomy (occurrence of wear and tear injury)
- Health insurance (any kind of life/accident/disease insurance?)

- Property insurance (any kind of boat or home insurance?)
- Unemployment insurance
- Salary and employment form in processing plant, working hours
- How many people depend of the passive fishery
- How many people depend of the industrial fishery
- Price in/out from wholesaler in Europe
- Price to retailer in Europe
- Shrimp/by-catch/discard prices paid by end consumer



## Intervenir pour le Développement Ecologique et l'Environnement en Casamance

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