Assessing the economic viability of small-scale fisheries
A Draft Framework

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1. Context

Any economic system has to be balanced between supply and demand for the system to function. The goal of most economic entities is profitability, they are considered 'financially viable' when profits are positive most of the time. However, 'economic viability' ('EV')refers not only to the sole profit of a private entity (firm or individual) but also to the whole society, such that EV is achieved when net benefit to the society is positive. This is especially important in small-scale fisheries (SSF) where the goal for the participants is not necessary only about financial gain, but includes a broader set of values, e.g., those related to traditions, culture and wellbeing (Adeogun et al., 2009; Berkes et al., 2001; Hospital and Beavers, 2012; Kronen, 2004; Pollnac and Poggie, 2008; Pollnac et al., 2001). This makes measuring EV challenging as it goes beyond assessing monetary values associated with SSF, to include other dimensions such as ecological, social, cultural or governance, as shown in Figure 1 (Adeogun et al., 2009; Barclay and Cartwright, 2007; Clay et al., 2013; Eisenack et al., 2006; Ünal and Franquesa, 2010).

At the onset, the coastal community should be considered the focal part of the SSF system and its viability (Jentoft, 2000). Additionally, the institutional structure plays a key role. For instance, a decentralized system, through co-management supported by participatory research, is crucial to promote integrated and participatory decision making processes, strengthening the ability of the communities to cope, adapt and achieve prosperity (Jentoft et al., 1998; Lane and Stephenson, 1995; Trimble and Berkes, 2013). While co-management brings its own challenges (see for example, Wilson et al., 2003), we argue here that the isolation and marginalization from policy and governance, which SSF often face (Trimble and Berkes, 2013; Chuenpagdee 2011), needs to be rectified as one of the steps to achieve EV. The objective of this document is to present a draft framework to assess EV of SSF. While maintaining a comprehensive view, the current framework focuses mainly on assessing the main components affecting EV, i.e., economic and social attributes.

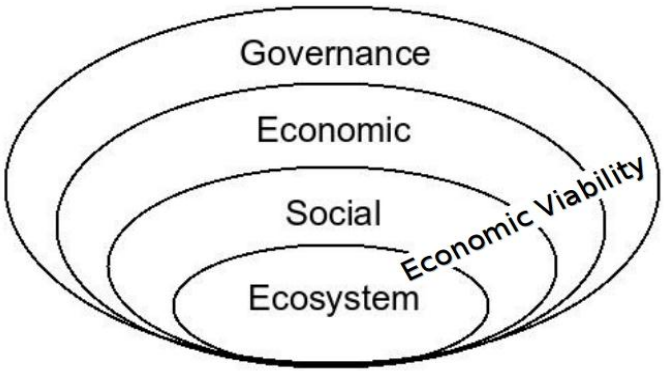

Figure 1) A framework describing economic viability for small-scale fisheries. All shown compartments (Ecosystem, social, economic and governance) need to be considered when assessing the economic viability of a small-scale fishery; they all influence each other and influence the economic viability of the fishery.

2. Methods

In the following sections we present: 1. How EV is defined compared to financial viability; 2. a framework including a list of the most relevant attributes, their definition and measurability, to consider when assessing EV; and 3. three different analytical techniques and approaches that would allow us to measure and analyze the impact of each attribute listed in Table 1 on EV of SSF.

2.1. Financial viability and economic viability

As mentioned above, EV is defined as the Net Benefit (NB) for society, whereas financial viability is the net benefit to a single fishing unit (which can be a single fisher or a company). Their calculations differ as follows:

i) For the **fishing unit,** the NB (financial viability):

$$NB_{unit} = TR_{unit} - TC_{unit} + S$$

where Total Revenue for the fishing unit (TR_{unit}) comprises of Ex-Vessel Price (P_{ExV}) times Landings (L);

ii) For the **society,** the NB (EV):

$$NB_{society} = TR_{society} - TC_{society} - S$$

where Total Revenue for the society ($TR_{society}$) comprises Ex-Vessel Price (P_{ExV}) times Landings (L).

In both cases, TC = Total Cost, i.e., the sum of variable costs and fixed costs; and S = Subsidies, the amount of subsidies if any paid by the government to the fishing sector.

When calculating NB for a single fishing unit, subsidies are added to the NB as the individual directly benefits from the government support. In the case of NB for Society, on the other hand, subsidies are subtracted because the taxes the people in the society pay are used for the subsidies the fishery receives. Hence, while an individual fisher or a firm might benefit from subsidies they can be harmful to the society. It should be noted the subsidies can be divided into three categories, which are beneficial, capacity enhancing or ambiguous (Sumaila et al., 2010).

2.2. Framework

Using attributes to measure the state of a fishery is a common technique used for a variety of goals, including assessing sustainability of a fishery. For example, attributes were identified and used to describe and understand different SSF in Europe (Guyader et al., 2013). In Brazil, an analysis was performed using socio-economic indicators to assess and compare the performance of different fishing fleets for ecosystem-based management (Gasalla et al., 2010). In the context of marine protected areas, Edgar et al. (2014) identified five key attributes that need to be considered to optimize conservation outcomes. Finally, a study by Fulton et al. (2005) shows how ecological attributes can detect the effects of fishing on marine ecosystems. Based on these and other examples, we use attributes as the foundation of our methods to assess EV of SSF.

After a thorough literature review and several consultations with scientists with economic, social, governance and ecological expertise in SSF within the *Too Big To Ignore* (TBTI) partnership, we selected a set of key attributes to assess EV, both at the ‘global’ level and at the ‘case-study’ level (Table 1) The selection criteria includes relevance, availability, measurability, and objectivity ,i.e., whether the same result is obtained when the attribute is measured by different scientists at different times (Boyd and Charles, 2006).

Table 1) Working list of attributes collected to assess the economic viability of SSF at both a global and a case-study scale. Depending on data availability and scale of assessment ('global' or 'case-study') we will define the time component (e.g., day, month or year) for each attribute.

Nº	Economic Attributes (unit)	Definition	Sources and measurements
1	SSF landings (t)	Amount of fish in weight landed at port in a given period (e.g., a day or year)	For national numbers see FAO and SAUP [1] (Sea Around Us Project, specifically catch reconstruction data) database For case studies check grey literature, e.g., government reports; conduct surveys; and monitor the landing.
2	Ex-vessel price ($)	Price received by fishers at the dock per unit weight of fish sold (Sumaila et al., 2007)	For national numbers see FERU database (Sumaila et al 2007 and Swartz et al., 2013) [1] For case studies check grey literature e.g., government reports, conduct surveys, log book, buyer record
3	Total Cost of fishing ($)	Total cost represents the value of inputs at the next alternative best use; it includes opportunity cost (different from accounting cost). Cost is split up into fixed cost which stay fixed with production (e.g., capital investment, sunk cost) and variable cost which can vary based on the output (fuel, crew, maintenance) per tonne of catch (Lam et al., 2011).	For national numbers see FERU database [1] (Lam et al., 2011). For case studies check grey literature, e.g., government reports and/or conduct surveys.
4	Subsidies ($)	Subsidies are defined here as financial transfers, direct or indirect, from public entities to the fishing sector which help the sector (society), make more profit than it would otherwise (Sumaila et al., 2010).	For national numbers see Sumaila et al. (2010) For case studies check grey literature, e.g., government reports and conduct surveys and interview key informants.
5	Proportion of SSF to LSF landing (%)	Landings of SSF divided by total landings of a given fishery.	Calculate the ratio of SSF landings to total landings of the fishery
6	Cost structure (ratio)	Cost structure is the ratio of variable costs (e.g., capital investment) to fixed costs (e.g., fuel).	For national numbers see FERU database [1] (Lam et al., 2011). For case studies check grey literature, e.g., government reports and/or conduct surveys.

[1] Data bases from FERU and SAUP can either be found online (www.seaarroundus.org) and/or on UBC internal server.

Nº	Social Attributes (unit)	Definition	Sources and measurements
7	Employment type	This describes how a worker is employed. Current International Labor Organization (ILO) classifications are: employees, employers, own-account workers, members or producer cooperatives, contributing family workers, workers not classifiable by status.	Use ILO classification type and classify the fishers and fishery related jobs, also use Teh and Sumaila (2013), especially for classification into part-time and full-time fishers, which might already be sufficient; for case studies carry out surveys (government agencies, NGOs and/or fishers).
8	Degree of economic dependence on fishing (%)	What fraction of total fishing unit or society income is generated by the SSF sector?	Use GDP assessment and calculate both the income of family member fishing and income of whole household from fishing and compare to the total income of the fishing community. Assess reports (government agencies) and/or conduct surveys and interview key informants.
9	Distribution of profit within the fishing community (coefficient)	A measure of equity among different groups in society or a community.	The gini coefficient could be calculated here to find out about the wealth distribution among the society.
10	Access to finance (various)	Defined by the possibility that fishers or fishing cooperatives can access financial services (such as credit, deposit, insurance). The main proxy variables that measures financial access include: the number of bank accounts per 1,000 adults, number of bank branches per 100,000 adults, the percentage of firms with line of credit;	World Bank: siteresources.worldbank.org/.../Resources/CalariParisSpeech.pdf (Abila et al., 2006; Allison et al., 2012; Charles, 2011).

Nº	Both social and economic attributes (unit)	Definition	Sources and measurements
11	Number of jobs (#)	Number of jobs dedicated to the fishery in commercial and subsistence SSF, including retailers, fish mongers, processors etc.	For national numbers see Teh and Sumaila (2013). For case-study use existing data from FAO, government reports and conduct surveys
12	Fish consumption per capita (g/capita)	How much is fish or seafood being eaten per capita in the assessed fishing community in a given period (a month, a year, etc.?	For both national and case –study level use existing data from FAO, government reports and conduct surveys.

2.3. Analysis approaches

Three approaches will be used to analyze the data, i.e., a Rapid Economic Viability Appraisal approach based on a scoring system similar to RAPFISH (Pitcher and Preikshot, 2001); a Principle Component Analysis, which gives us an estimate if the importance of a given attribute; and 3) an econometric method, which is based on regression models. The approach uses the data to explain how EV depends on certain attributes more than on others. They will be combined or used according to data availability to obtain a final assessment of economic viability of a fishery. More information about the analysis will be provided at a later stage.

The methodology for this framework is currently in its development phase and will be presented and discussed during the workshop to be held in Dar es Salaam, Tanzania, in April 2014. During this workshop, experts in the field will have the chance to share their opinions and give input to help improve the framework. We realize the challenge to collect the needed data at both the case study level and the national level, although several sources of data for the latter have been identified and may only need to be verified by the local experts and key informants. Given that this is the working document, any feedback and input from everyone is welcomed.

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