



Socio-economic monitoring and evaluation in fisheries

Nathan J. Bennett^{a,*}, Anna Schuhbauer^b, Daniel Skerritt^b, Naazia Ebrahim^c

^a The Peopled Seas Initiative, Vancouver, BC, Canada

^b Institute for the Oceans and Fisheries, University of British Columbia, Vancouver, Canada

^c The Real Macaw Strategy and Policy, Vancouver, Canada

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ABSTRACT

Many fisheries policies, management processes, improvement projects and funding portfolios have explicit or implicit socio-economic development or human well-being objectives. Thus, it is common for decision-makers, managers, practitioners, and funders to want to monitor and evaluate the socio-economic or human well-being aspects of fisheries before, during and after management or programmatic interventions at scales ranging from local to national. While numerous frameworks have been developed that focus on socio-economic assessments in fisheries, there is no such thing as a one-size-fits-all approach. Socio-economic monitoring and evaluation processes should be designed to fit the specific context, analytical purpose, and objectives of the fisheries policy, management intervention, program, or investment being studied. Furthermore, these processes need to include clear plans for evaluation, communication, deliberation, and application of recommendations so that results inform decision-making. Yet, comprehensive guidance on the development of bespoke socio-economic monitoring and evaluation plans for fisheries is lacking. This paper fills this gap through outlining the steps in the process of designing a socio-economic assessment plan, providing reference materials for various aspects (e.g., indicators, methods, analysis) of the process, and discussing how results can be communicated and used to better inform fisheries management, programs and investments. Our aim is to support the efforts of various organizations wishing to improve socio-economic and human well-being outcomes in fisheries. This paper will be useful to governments, non-governmental organizations, and funders working in fisheries – as well as applied marine social scientists who are working with them to develop socio-economic monitoring and evaluation plans.

1. Introduction: the need for socio-economic monitoring and evaluation in fisheries

Fisheries systems include both fish and people. Thus, their management should include biological, economic, social, and governance considerations. In the past, fisheries management and governance focused primarily on maintaining biological sustainability in order to ensure that the maximum harvest could be extracted in the most economically efficient manner possible (Anderson and Seijo, 2011; Finley, 2011; Giron-Nava et al., 2018; Munro and Scott, 1985; Punt and Smith, 2001). However, nowadays, governments, non-governmental organizations, community-based organizations, and foundations are striving to develop and manage fisheries that achieve both ecological sustainability and human well-being outcomes (Anderson et al., 2015; Hobday et al., 2016; Kittinger et al., 2017; Stephenson et al., 2018a). Indeed, many national fisheries policies, fisheries management

processes, improvement projects, and funding portfolios have explicit socio-economic development or human well-being aims and objectives. To achieve these social ends, evidence from the social sciences is needed to inform design and adapt policies, management, and programs (Bennett, 2019; Kittinger et al., 2013; Levine et al., 2015; Stephenson et al., 2018a; Symes and Hoefnagel, 2010). In particular, more and more decision-makers, managers, practitioners, and funders are recognizing the need to monitor and evaluate the socio-economic aspects of fisheries before, during and after management or programmatic interventions to inform decision-making.

Recognizing this need for applied research in this area, numerous authors have developed analytical frameworks for fisheries that either focus solely on or include socio-economic or human well-being assessments (Allison et al., 2012; Allison and Ellis, 2001; Amberson et al., 2016; Anderson et al., 2015; Angel et al., 2019; Britton and Coulthard, 2013; Christou et al., 2019; Chu et al., 2017; Conservation International,

* Corresponding author at: 6278 Logan Lane, Vancouver, BC, V6T2K9, Canada.

E-mail address: nathan.j.bennett.1@gmail.com (N.J. Bennett).

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2019; Eriksson et al., 2016; Hobday et al., 2016, 2018; Kittinger et al., 2017; Pitcher et al., 2013; Pitcher and Preikshot, 2001; Richmond et al., 2019; Schuhbauer et al., 2019a, b; Smith et al., 2019; Stephenson et al., 2018a, b; Sustainable Fisheries Partnership, 2016; Van Holt et al., 2016). A cursory review of the similarities and differences, as well as strengths and weaknesses, across a selection of these pre-existing frameworks provides a clear rationale for the current paper (see review in Supplementary Materials). First, the diversity of frameworks are all built on different theoretical framings including primarily social theories (i.e., socio-economics, human well-being, social sustainability, human rights, social responsibility, and economic viability) and more interdisciplinary theories (i.e., triple bottom-line sustainability, ecosystem approach to fisheries). Second, and perhaps due to the variation in framing, the focal categories of human well-being included in each framework differ substantially. Indicators related to Culture, Health and Physical Assets were the least represented, whereas indicators for Economic and Social categories were covered by all frameworks (See Table S2 in Supplementary Materials). Third, the purpose of the assessment frameworks range broadly from understanding the social context to guide management decisions or design programs, to understanding the general social performance or status of a fishery, to assessing the impact of fisheries management or programmatic interventions, to auditing for the purpose of certification. Fourth, the frameworks were designed to be applied to various scales ranging from local community fisheries (Eriksson et al., 2016), to sub-national fisheries management or improvement projects (Asche et al., 2018), to national fisheries policy (Hobday et al., 2016). None that we are aware of take a global approach. Fifth, across most, the social unit of analysis is “the fishery” - but they differ in whether the analytical focus is fishers or also households, fishing communities or the broader processing sector and supply chain. Sixth, methods and data use range from qualitative to quantitative - but most include a mixture. All frameworks use secondary data sources - with some also including the need for additional surveys, interviews, focus groups or participatory workshops. Seventh, the logistics of implementing the method and analyzing the data promoted by each framework would require substantially different data, fieldwork, time, expertise, and financial requirements. For example, the objective of Social Wellbeing in Fisheries Tool (Van Holt et al., 2016) is for rapid and practical assessments of social wellbeing, which leads to quite low time requirements and medium data requirements, whereas the Canadian Fisheries Research Network sustainability indicator framework (Angel et al., 2019; Stephenson et al., 2018a, b) promotes itself as being a broad and inclusive framework for assessing sustainability, which would lead to much higher time and data requirements. Eighth, each of the frameworks - when judged on comprehensiveness, complexity, indicator quality, efficiency, flexibility, scalability, and actionability - shows some potential advantages and disadvantages (see Supplementary Materials for further discussion).

Moreover, there are two big take-away messages from this cursory review. First, there is no such thing as a one-size-fits-all framework or approach for socio-economic assessments of fisheries since the purpose, scope and scale of the project, and the objectives of management interventions and programs will vary substantially by implementing partner, organization and context. Thus, governments, non-governmental organizations, and funders will benefit from developing their own approach to and framework for socio-economic assessments that is modified to fit their own purpose, program objectives, and the scale and specific context(s) of the fisheries that they are working in. Second, we are concerned that many socio-economic assessments are being done without a clearly articulated end goal or pathway to influence decision-making. This produces research projects that do not have sufficient attention to all of the elements and processes (e.g., evaluation, communication, deliberation on results) needed to ensure that socio-economic assessments will produce meaningful insights for management or enable adaptive decision-making. Yet, comprehensive guidance and reference materials for those individuals and organizations wishing

to develop a bespoke socio-economic monitoring and evaluation plan for fisheries is lacking.

In this paper, we fill this gap through: a) outlining the steps in the process of designing a context specific socio-economic monitoring and evaluation plan, b) reviewing key considerations and providing reference materials for the different aspects of the monitoring and evaluation plan (e.g., indicators, methods, analysis), and c) discussing how results can be communicated and used to better inform fisheries management, governance, programs and investments. Our aim is to support the efforts of various governments and other organizations wishing to understand and improve socio-economic and human well-being outcomes in fisheries at a range of scales.

2. Steps in designing a socio-economic monitoring and evaluation plan

A monitoring and evaluation plan is like a roadmap to guide the entire process. Developing a monitoring and evaluation plan progresses through a relatively standard set of steps to ensure that no elements are neglected, that the process and elements are well-designed, and that results are communicated and ultimately used in decision-making. Building on the broader monitoring and evaluation literature (e.g., Kusek and Rist, 2004; Markiewicz and Patrick, 2015), we provide the following ten-step process for developing a socio-economic assessment plan adapted to the specific context of fisheries and marine resource management:

- 1 Consider the level of participation and the constitution of the team
- 2 Define the purpose of doing socio-economic monitoring and evaluation
- 3 Describe and delineate the scope and scale of the project
- 4 Clarify the policy, management or programmatic objectives
- 5 Choose attributes and develop good indicators
- 6 Develop methods and identify data sources
- 7 Map the logistics and timeline for implementation
- 8 Articulate a plan for analyzing and presenting the results
- 9 Discuss how results will be evaluated
- 10 Develop a plan for communicating results
- 11 Formulate a process for deliberation and deciding future actions

While we have ordered the steps, the planning process will likely be somewhat iterative. Below, we unpack and explain each step and provide additional resource materials where needed. The entire process can be done by governmental or organizational staff, with or without support from outside experts, and in a manner that involves more or less participation of stakeholders.

2.1. Consider the level of participation and the constitution of the team

An important decision is the constitution of the team - i.e., who will lead and be involved in the process - which will depend on the level of participation in design of the monitoring and evaluation process and development of indicators. For example, monitoring and evaluation plans (as well as indicators) can be developed: a) in a top-down fashion by an individual researcher, consultant or team of managers or practitioners; b) through an expert-led process with some level of input through consultation or participatory workshops with stakeholders; or c) via a truly bottom-up and community-based process that is led by Indigenous Peoples, communities, or small-scale fishers organizations (Catley et al., 2013; Fraser et al., 2006; Gowda, 2012; Hernández Aguado et al., 2016; Reed et al., 2006). The benefits of greater participation (while sometimes more costly or time consuming) are increased ownership of the process and outcomes, increased likelihood that results will be accepted and applied, and higher salience of the indicators and relevance of the assessment to those impacted by decisions (Gujit, 1999;

Table 1
Descriptions of different types of monitoring and assessments processes (adapted from (Franks and Vanclay, 2013; Mascia et al., 2014)).

Type of Assessment	Description
Contextual or baseline assessment	Documentation of the status of specific variables or conditions at a moment in time.
Ambient monitoring	Systematic observation of the status of and changes in conditions over time.
Management evaluation	Measurement of the management inputs, activities, and outputs to assess strengths, weaknesses and needs.
Performance measurement	Measurement of implementation or progress toward specified project, program, or policy objectives, including inputs, activities, processes, outputs and outcomes.
Impact assessment	Rigorous and systematic assessment of the causal effects of a policy, program, project, activity, or investment.
Historical analysis	Study of the past to understand ambient changes in specific conditions or the impacts of historical events, management activities, or interventions.
Predictive assessments	Application of future oriented methodologies (e.g., scenario planning, forecasting, structured decision-making) to identify and forecast the future impacts of potential interventions and deliberate on alternatives.
Synthetic analysis	A structured and rigorous analysis of data from more than one case study or location or a meta-analysis of published studies to collate and synthesize empirical evidence and draw out broad lessons.

Imas and Rist, 2009; Kusek and Rist, 2004; Plagányi et al., 2013). In general, we recommend that representatives of local groups – especially small-scale fishers, Indigenous Peoples and local communities – are involved in the process of planning socio-economic monitoring and evaluation and developing indicators whenever they have rights to or are involved in the fishery being assessed (Donatuto et al., 2014; Gujit, 1999; Plagányi et al., 2013; Reid et al., 2020). Depending on who is driving the process and how the process unfolds, this step of defining the level of participation and the team may occur before or after the purpose, scale, and scope of the monitoring and evaluation process is initially defined by a project proponent. Either way, these topics should be revisited and revised as needed once the team is convened.

2.2. Define the purpose of doing socio-economic monitoring and evaluation

There are many types of socio-economic monitoring and evaluation, which have somewhat different aims, approaches and audiences, so it is important to clearly define the rationale or purpose from the outset of the process (Kusek and Rist, 2004; Markiewicz and Patrick, 2015). For example, the purpose for conducting socio-economic assessments in fisheries may include one or more of the following:

- To develop an understanding of the current socio-economic status to inform management decisions, project designs or programmatic investments (Allison and Ellis, 2001; Battaglia et al., 2010; Britton and Coulthard, 2013; Kittinger, 2013);
- To establish a baseline understanding of the contributions of fisheries to coastal communities (Barrowclift et al., 2017; Voyer et al., 2017);
- To monitor ambient change in socio-economic status of fishers or fishing communities over time to establish an institutional memory or knowledge base for policy-making (Haas et al., 2016);
- To audit the socio-economic performance of a fishery for the purpose of certification, to ensure accountability, or to track achievement of management objectives (Conservation International, 2019; Smith et al., 2019);
- To assess the socio-economic impacts of specific fisheries management activities, project interventions, or investments (Brandt, 2005; Eriksson et al., 2019; Hattam et al., 2014; Rees et al., 2021);
- To engage stakeholders, community members, or Indigenous Peoples in collaboratively establishing socio-economic priorities, assessing

conditions, as well as identifying, forecasting the impact of, and choosing interventions (Eriksson et al., 2016; Hernández Aguado et al., 2016; Plagányi et al., 2013); and,

- To investigate what management or programmatic factors lead to positive, negative or successful outcomes through synthetic scientific assessment of multiple contexts or initiatives (Evans et al., 2011).

Establishing the purpose will largely determine the approach or type of monitoring and evaluation activities to be undertaken (Table 1). It will also help to clarify other practical and logistical matters, such as who should be involved (the team) and how (level of participation), when (before, during, after) and how often (once, annually, every five years) assessments should occur, the spatial scale and scope of the assessment, and the type of analysis required.

Finally, the monitoring and evaluation team should draw on the purpose to define a higher order evaluation question to guide both the planning process and later reflections on results – for example, evaluation questions might include: “What are the management implications of the current socio-economic status of fishers in coastal communities?”; “Are our organization’s fisheries improvement projects achieving the desired objective of improving the well-being of small-scale fishers?”; or, “Which future programmatic interventions can best meet the desired socio-economic objectives of our community-based fisheries?”

2.3. Describe and delineate the scale and scope of the project

The next step is to describe and delineate the geographic, temporal and social scale and scope of the assessment. The geographical scale will likely be defined by the fishery or fisheries of interest to the project proponent (i.e., government, community, manager, practitioner, funder, etc.). For example, a government may be interested in understanding the socio-economics of a particular fishery in one region or of their entire national fisheries (Hobday et al., 2016, 2018). Whereas a community may be more interested in the diverse set of fisheries that occur within adjacent waters and that involve local people (Eriksson et al., 2016; Wiber et al., 2004), a funder may be interested in understanding different fisheries across multiple geographies. The temporal focus can be defined by the timeline of the project being studied and the purpose of the analysis – for example, whether the interest is on past trends or impacts of pre-existing initiatives, the current socio-economic or human wellbeing status, or the potential impacts of future interventions that have not been implemented. Defining the social scope of the project will depend on having a basic understanding of the social context of the fishery, for example the type of fishery (e.g., subsistence, community-based, small-scale, commercial, industrial), who and how many people are directly involved in the fishery (e.g., fishers, captains, workers), and who is involved in the broader fishery system (e.g., local communities, processing sector, the supply chain). This information can clarify the social unit of interest, which may range from individuals, households, groups (e.g., women, migrants), communities, or include the entire sector. In the case where the focus is on understanding the impact of a specific programmatic intervention, the social unit may already be specified in the objectives – for example, a project may aim to improve the socio-economic conditions of women working in the fish processing sector, hired workers on industrial fishing boats, or independent small-scale fish harvesters.

2.4. Clarify the policy, management or programmatic objectives

Having clearly articulated objectives – for the fisheries policies, management plans, NGO projects, or funding portfolios being assessed – is an important step towards being able to actually effectively monitor, evaluate and manage the socio-economic and human wellbeing aspects of fisheries (Evans and Guariguata, 2008; Gujit, 1999). While some fisheries-focused government agencies and organizations will already have these clearly articulated, for many others the social and/or

economic objectives will be generic or implicit in broader mandates or visions but not verbalized or formalized. Either way, objectives should be identified from available policy or programmatic documents, and updated if they are out of date, or, if they do not yet exist, articulated through internal visioning and program design processes or stakeholder engagement processes that include representatives of fishing groups and local communities. As a reminder, good objectives are characterized as being clear, well-defined, unambiguous, focused on a single activity or outcome, and measurable.

The type and format of objectives will, however, vary substantially by management process and project. Some objectives will include set targets that they hope to achieve and/or be time bound but this is not always appropriate. When objectives also clearly identify the target population (e.g., fishers, fishing families, coastal communities, women, Indigenous or subsistence fishers), this can help to define the social unit of assessment. Some organizations may have or opt to develop objectives that focus on desired socio-economic outcomes, while others may define objectives that represent key management or programmatic inputs (e.g., increased funding for market development), activities (e.g., increased capacity building initiatives, improved participation in management), or outputs (e.g., improved access to resources). For example, some NGOs and foundations working in conservation, resource management or fisheries will develop a “theory of change” - or program logic model - that identifies both what the organization hopes to achieve (i.e., outcomes) and how they plan to get there (i.e., enabling conditions, intervention points) (Andriamalala et al., 2013; Apgar et al., 2017; Biggs et al., 2017; Mayne, 2015). In such cases, all aspects of a theory of change might be monitored using a combination of input, activity, output and outcome indicators (see below). Similarly, governments have specific policies, programs, and management inputs, activities or processes that they hope will support the achievement of their objectives that they might monitor. Finally, objectives can be then used to develop targeted monitoring questions that focus on the specific topics that you want to “learn” about – for example, “What is the status of key management inputs and activities?”, “Do fisher’s have greater access to markets and fetch better prices?”, or “Did the project lead to improvements in food security for women?”

2.5. Choose attributes and develop good indicators

Indicators are measurable elements that show or communicate the status, condition, or trends related to a topic of interest (Biedenweg et al., 2014; Breslow et al., 2017). Choosing and developing good indicators is both an art and a science. As above, indicators can be developed in a more or less participatory fashion and conducted by individual consultants or organizations, produced in consultation with stakeholders, or led by Indigenous People’s or community fisheries organizations. Whichever process is used and whoever is involved, indicators are generally designed through a step-wise and iterative process that includes: 1) defining key domains of interest and related attributes from objectives, 2) identifying and selecting candidate indicators, and 3) refining indicators based on criteria for good indicators, in consideration of logistics (e.g. data availability, budget, methods), and potentially through stakeholder input.

First, key domains of interest and related attributes can be defined based on the objectives (defined in the previous step) of the fisheries management, program or investment – for example, domains of interest might include economic benefits or a broader set of domains of well-being (e.g., social, cultural, health, infrastructure, environmental, governance) (Biedenweg et al., 2016; Breslow et al., 2017; Kaplan-Hallam and Bennett, 2018; Weeratunge et al., 2014). Clear attributes, sub-aspects of each objective and domain of interest that clarify the meaning of each, are required to be able to measure the implementation of activities or the consequences of interventions (Keeney and Gregory, 2005). Keeney and Gregory (2005) suggest that good attributes are unambiguous, comprehensive, have a clear direction (i.e., better or

Table 2

A reference of example indicators related to different attributes for domains of human well-being (adapted from (Kaplan-Hallam and Bennett, 2018)).

Domain of well-being (and definition)	Example attributes	Example indicators
Economic - Pertains to economic activities, financial measures, and livelihood or employment outcomes.	Employment	Number of jobs by employment type
	Income and Wages	Fisher income by employment type Wages relative to living wage or minimum wage or poverty index (income from fishing vs national poverty level)
	Poverty or wealth	Availability of alternative livelihood options
	Livelihood security, diversification, flexibility	Fisher have freedom to choose who to sell to
	Markets	Financial performance measures such as revenue over investment
	Financial performance and profit	Economic viability as net benefits to society
	Economic viability	Income and economic multipliers (induced and indirect effects on society from fishing)
	Contribution to national economies	Level of participation of women in the fishery
	Gender considerations	Fair sharing of economic benefits between disparate groups in the fishery
	Equity	Level of conflict and/or competition over the resource
Social - Refers to the quality of social relationships, organizations, supports and assets.	Conflict or social cohesion	Sense of belonging in community
	Community relations and social capital	Presence of support from outside NGOs
	Organizational supports or bonding social capital	Level of formal education
	Education, training and experience	Access to assets (such as financing, boats, technology, skills, knowledge, social supports, strong institutions)
	Social Resilience or Adaptive Capacity	Presence of and access to knowledgeable elder fishers
	Traditions & Knowledge	Continuity of cultural fishing practices
	Cultural Practices & Activities	Sense of individual identity connected to fishery
Cultural - Relates to the customs, institutions, or products of a particular group of people	Identity	Multigenerational interaction with the environment
	Heritage	Protections of access to areas needed for cultural activities
	Access for cultural purposes	Evidence in management plans that stakeholder voices and concerns are taken into account in management decisions
	Participation & Voice	Access to scientific information about status of fisheries
	Transparency & Access to Information	Effectiveness of surveillance and enforcement mechanisms
Political Empowerment - Refers to the inclusiveness, quality and fairness of governance and decision-making processes	Accountability	Perceptions of being free from the influence of corruption
	Rule of law	Mechanisms are in place to determine fair allocation of harvesting or area rights to different fishing sub-sectors
	Fairness	
	Legitimacy	

(continued on next page)

Table 2 (continued)

Domain of well-being (and definition)	Example attributes	Example indicators
Health - Concerns the mental, psychological, or physical condition of people	Worker rights	Perceptions of fairness and effectiveness of fisheries regulations and management
	Human rights	Right to strike guaranteed
		Legal and enforced protections to safeguard against child labour
	Resource Access & Tenure	Presence of legal protections for access rights for food security
	Access to justice	Presence of functioning conflict resolution mechanisms
	Self-determination - Autonomy	Presence of legal recognitions of right to self-determination
	Physical health	Occupational and harvesting safety
	Mental health	Perceptions of life satisfaction
	Safety and security	Feelings of safety on the water
	Food security	% of time that households do not have access to food
Physical assets and infrastructure - Pertains to the physical assets of individuals and communities that support economic activities and other aspects of well-being	Time for fulfilling activities	Perceptions of work-life balance
	Community fishing infrastructure	Access to processing infrastructure
	Community social infrastructure	Access to schools and daycares
	Technology	Change in catching power/gear capacity (e.g. gear technology, improved sonar)
	Boats and gear	Information about gear types (in communities, per fleet or per sub-sector)
Environmental Sustainability - The status, functioning and productivity of the environment, and the processes and actions that people take to maintain it	Resource productivity and abundance	Species abundance or index of abundance
	Management effectiveness	Monitoring and enforcement capacity
	Stewardship initiatives	Involvement in stewardship initiatives
	Ocean conditions	Number of fishing days lost due to bad weather or change in ocean conditions (short and long term)
	Environmental quality and health	Water and substrate quality

worse), operational, and understandable.

Second, candidate indicators representing each attribute can be identified from the literature and/or designed through group deliberations (Biedenweg et al., 2014; Breslow et al., 2017). Indicators can be quantitative, qualitative, or contain elements of both (Bradshaw et al., 2001) and might focus on objective measures or subjective assessments (Biedenweg et al., 2014; Scott, 2012). For example, indicators for employment may focus on more quantitative and objective elements such as “# of jobs” or qualitative and subjective aspects such as “satisfaction with the work environment”. Table 2 provides a reference set of example indicators related to a broad set of domains and attributes of wellbeing or socio-economics in fisheries (for more comprehensive lists of candidate indicators see Angel et al., 2019 or the Supplementary data – Appendix B of (Breslow et al., 2016)). The objectives and domains of interest may not just be related to socio-economic outcomes, but also to management or programmatic inputs, activities, processes, or outputs, and thus indicators will need to be identified and designed accordingly to represent each type (Table 3). A programmatic evaluation based on a theory of change, for example, might necessitate a cross section of activity, process, output, and outcome indicators. An impact assessment,

Table 3

Types of indicators used in monitoring and evaluation (adapted from (Hockings et al., 2006; Mascia et al., 2014)).

Indicator Type	Definition
Context	The status and influence of social, economic, governance, or biophysical factors that are outside the scope of a policy, management, or programmatic intervention.
Status	The state of social, cultural, economic, governance, health, or environmental conditions, which can be monitored in a single moment or over time
Input	The financial, human, technical, knowledge and material resources that are used in a programmatic or management intervention.
Process	The quality and functioning of decision-making activities and governance institutions. Includes factors such as transparency, accountability, knowledgeable, participation, and representation.
Activity	Management or programmatic actions taken or work performed to produce outputs or achieve outcomes.
Output	The level of implementation of interventions or activities, and the delivery of products and services.
Outcome	The status or situation over time during an ongoing activity or after an intervention for social, cultural, economic, governance, health, or environmental conditions. Changes in outcome variables may or may not be attributable to the intervention.
Impact	The direct or indirect effects, intended or unintended, of a change or intervention on inputs, processes, or outcomes. Often refers to the achievement of desired objectives.

on the other hand, may focus squarely on outcome indicators.

A final step is refining the candidate indicators to choose the ones that are most relevant to the context, are the best fit to and cover the attributes they are trying to measure, and broadly conform with criteria for good indicators (Breslow et al., 2017; Keeney and Gregory, 2005). Guiding questions for assessment against criteria for good indicators, which are underlined below, include the following:

- Contextually and socially relevant - Is the indicator relevant to the social and cultural context and scale of interest? Does it refer to the social diversity of interest? Does the indicator apply widely to a diversity of people?
- Conceptual validity - Is it a social indicator? Is this indicator unambiguously related to the attribute it is intended to measure? Is there peer-reviewed evidence for its theoretical validity?
- Comprehensive - Does this indicator reflect the social goals, priorities, and/or thresholds of wellbeing as defined by the people whose wellbeing will be measured?
- Understandable - Is this indicator understandable or identifiable by decision-makers and stakeholders? Is it easy to understand the consequences and trade-offs revealed by this indicator?
- Concrete and measurable - Does this indicator represent a specific aspect of the world that can be measured directly?
- Conforms to rules of good scales – Is it the most appropriate type of scale, does it capture the full range, is it directional, and does it have clear ratios?
 - o Type of scale: Is this indicator natural, constructed or proxy?
 - o Range: Does this indicator capture a reasonably full range of possibilities?
 - o Directionality/reference points: Is it possible to specify which direction in trends is positive or negative, and to identify reference points?
 - o Unit ratios: Do points on the scale have a clear ratio of differentiation?

Data availability and other logistical considerations may also determine which indicator is chosen and the method that will be used.

2.6. Develop methods and identify data sources

Data collection is a crucial step in monitoring and evaluation, as the

ascertained. If secondary data exists for one or more indicators, then method selection is constrained to methods such as literature reviews and public dataset analysis, for example. However, suitable secondary data does not exist for many of the world's fisheries, particularly for social indicators. Subsequent considerations, for selecting methods for primary data collection, include: whether data collection is remote or in person, type of indicators, the social unit of analysis, whether data preferences are for quantitative or qualitative (or both), available time and budget, if data should be static (one point in time) or dynamic (timeline), and the specific fishery conditions. In general, managers will have to design their monitoring and evaluation plans and choose methods that fit within capacity constraints.

2.7. Map out the logistics and timeline for implementation

The next step is to map out the logistics and timeline for implementation (Imas and Rist, 2009; Kusek and Rist, 2004; Markiewicz and Patrick, 2015), which includes field-testing the method, conducting the research, doing analysis, evaluating results, communicating results, deliberating on improvements, and then concluding the process right down to data storage upon project completion. There are numerous logistical considerations that will need to be taken into account at each of these stages of implementation, including available and required budgets, expertise, personnel, and time. Resources and timelines will vary substantially based on methods (in particular whether secondary data already exists or fieldwork is required), the complexity of the analysis, and the scope of communications. It is often necessary, therefore, to adapt the scope and ideal approach to match what is possible given available resources and constraints. Timelines for fieldwork may also need to be adapted to seasonal variation in fishing schedules to ensure participants are available for interviews, surveys or focus groups (Fortmann, 2009; Neis et al., 1999). Allocating sufficient resources and time for all stages after data collection will ensure that the data and/or results make their way back into decision-making. To account for unexpected delays, a contingency should be built into the timeline and budget. Another key logistical step is to define the roles of project team members early on, to understand who is responsible for project management, data collection, data analysis, evaluation processes, communications and reporting, and data handling and storage. Indeed, data entry, handling and storage considerations are a vital but often overlooked concern.

2.8. Articulate an approach for analyzing and presenting the results

Analysis and presentation of the results will vary depending on the purpose of monitoring and evaluation (e.g., describe status, track change, show impacts), the temporal orientation (e.g., past, presentation or future), and the type of data (e.g., qualitative, quantitative or both). Approaches might include, for example, descriptive analysis of current status using qualitative data, forecasting of future impacts applying a mixed methods approach, or an impact assessment using quantitative data (Fig. 1). Qualitative data collected through interviews, focus groups or document reviews might be coded thematically – for example, to understand perceived social impacts of a management intervention such as a marine protected area (Bennett and Dearden, 2014; Hattam et al., 2014) – and presented as a narrative analysis with quotes, a table or chart with counts of mentions of key themes, or more creative formats such as word clouds. Qualitative data resulting from participatory or arts-based methods of monitoring and evaluation might also be analyzed collaboratively for themes as well as representative content, and subsequently presented in visual (e.g., pictures, art shows), auditory (e.g., stories, podcasts), or multi-media formats (e.g., videos, online visual stories) (Mahajan and Daw, 2016; Pierce, 2020; Willox et al., 2021). Quantitative data may be analyzed in a descriptive fashion to present the current status or historical trends of socio-economics in a fishery. For example, indicators that are on an ordinal scale, such as a Likert scale or

constructed-scale with clear thresholds, might be presented in bar charts, spider diagrams, or as a traffic light for social responsibility audits or certification schemes (Chu et al., 2017; Conservation International, 2019; Tesfamichael and Pitcher, 2006). Linear quantitative variables that are tracked repeatedly at intervals in time (e.g., # of jobs, mean salaries, net economic benefits) should be visualized to show change over time and trendlines (Schuhbauer et al., 2019a). For projects using quantitative methods to understand project or management impacts, rigorous research design (e.g., Before-After-Control-Impact experimental studies) and statistical methods will need to be used to be sure that changes tracked over time can be attributed to the intervention (Ferraro and Pressey, 2015; Mascia et al., 2017). Mixed methods and semi-quantitative analysis might also be used. For example, fuzzy logic might be employed to translate qualitative data such as interview transcripts into quantitative but non-Boolean results to help present peoples' opinions which are often not linear (Teh and Teh, 2011). Employing participatory workshops - for instance, to diagnose strengths and weaknesses in fisheries management from the perspective of communities or to forecast future impacts of interventions - might also produce a combination of qualitative information and quantitative scores that need to be presented (Eriksson et al., 2016).

2.9. Discuss how results will be evaluated

The process of evaluation builds on the information gained through monitoring – and includes but goes further than simple analysis and presentation of results (Jacobson et al., 2014; Markiewicz and Patrick, 2015). At this stage, members of the monitoring and evaluation team – ideally along with project proponents and impacted stakeholders (especially small-scale fishers, Indigenous Peoples and local communities) - should reflect on and interpret the results in light of the central evaluation questions and project goals. Topics for further discussion and analysis include summarizing the story the results tell, formulating a judgment or assessment of the policy or intervention, examining the reasons for the outcomes that are being produced and/or interpreting the potential implications of the results for future practice. For example, the results of a study that aims to assess the socio-economic impacts of a Fisheries Improvement Project should be assessed against the objectives of the project or intervention to understand both: a) whether the project or intervention is achieving its goals or objectives and b) whether the project or intervention is responsible for the changes through rigorous impact assessment (Asche et al., 2018; Chu et al., 2017). These assessments can help to determine the relative merit, worth or significance of an intervention based on evaluative criteria such as relevance, effectiveness and impacts (OECD, 2019). Further reflection on or assessment of why certain outcomes are happening or what aspects of the intervention – i.e., inputs, processes, activities, or outputs – are producing success or failure can also help to identify improvements. Lastly, results might be interpreted to understand group differences, stakeholder priorities and the influence of contextual factors. For example, certain groups may experience impacts differently and some outcomes may be more important than others such as individual incomes compared to the number of jobs.

2.10. Develop a plan for communicating results

An often forgotten aspect of socio-economic monitoring projects is designing effective communications to share the process and results with relevant audiences (Baron, 2010). Here we delineate a few key steps for developing a communications plan. A first step is to define the objective (s) for communications. While it may already be implicit in the purpose of the socio-economic analysis, the objective should be clearly articulated and used to shape the communications plan. A second and related step is to define the audience for communications, which might include policy-makers, managers, funders, practitioners and/or stakeholders. Each audience might have different interests, levels of knowledge of the

Table 5
Outputs from each step of the socio-economic monitoring and evaluation planning process.

Step	Output or information
1 Consider the level of participation and the constitution of the team	<ul style="list-style-type: none"> • Level of participation in developing the socio-economic monitoring and evaluation plan and indicators • List of groups and members of the team to be involved in planning and indicator development.
2 Define the purpose of doing socio-economic monitoring and evaluation	<ul style="list-style-type: none"> • Clearly defined purpose of the assessment. • Type of monitoring and evaluation activities to be undertaken. • Higher order evaluation question, or research question, for the process.
3 Describe and delineate the scope and scale of the project	<ul style="list-style-type: none"> • Description of social and governance context of fishery. • Geographic scale (local, national, multi-sited) of assessment. • Temporal orientation (past, present, future) of assessment. • Social unit(s) of interest and analysis.
4 Clarify the policy, management or programmatic objectives	<ul style="list-style-type: none"> • Clearly articulated objectives of fishery policy, management, program, project, or investment. • Theory of change or program logic model (optional). • Targeted monitoring questions.
5 Choose attributes and develop good indicators	<ul style="list-style-type: none"> • The process and team involved in indicator development. • Key socio-economic or human well-being domains and attributes of interest. • Candidate indicators from literature reviews or group processes. • Refined indicators based on relevance, fit, and quality.
6 Develop methods and identify data sources	<ul style="list-style-type: none"> • Review of data availability for indicators. • Assessment and selection of method(s) based on data availability, costs and benefits.
7 Map the logistics and timeline for implementation	<ul style="list-style-type: none"> • Timeline for method testing, fieldwork, analysis, evaluation, communication, deliberations, and data storage. • Logistical (e.g., budget, expertise, time) requirements and constraints. • Articulated the roles and responsibilities of team.
8 Articulate a plan for analyzing and presenting the results	<ul style="list-style-type: none"> • Analysis plan to match purpose and answer monitoring questions. • Data visualization and presentation plan.
9 Discuss how results will be evaluated	<ul style="list-style-type: none"> • Process for evaluating the policy, program, or project. • Team involved in the evaluation process. • Criteria for evaluating the merit, worth or significance.
10 Develop a plan for communicating results	<ul style="list-style-type: none"> • Defined objective for communications. • Clear audience (e.g., policy-makers, managers, practitioners, funders, stakeholders). • Timing and mediums of communications. • Key messages, supporting content, and formats.
11 Formulate a process for deliberation and deciding future actions	<ul style="list-style-type: none"> • Process for deliberating on future actions. • Team to involve in deliberation process. • Pathways to promote uptake of recommendations.

topic, and intended uses of the information. Communications should be tailored to reach each audience. A third step is to plan when and how to present the information – including defining timelines for communicating the process and results to each audience and choosing appropriate mediums (webinars or presentations, internal report, external publication of reports, peer reviewed papers, in a virtual story, via the media,

participation in Indigenous councils or community meetings, workshops with small-scale fishers' organizations). A fourth step is to define key messages that the audience needs to hear, which might be related to the process, the results, or their implications. A final step is to shape the content and format of communication materials. Key messages should be communicated first followed by supporting details. Consistently and transparently communicating information about the team, rationale, process, and methods is also important to engender trust and showcase how best practices were followed during the monitoring and evaluation process. As discussed above, a key consideration will be to ensure that results are communicated in effective and accessible formats (e.g., text summarizing qualitative data, tables, charts and graphs, infographics). Recommendations – for example, actions to take to improve current management interventions, programs, or investments – should be presented in communications done after deliberations on future courses of action have been completed.

2.11. Formulate a process for deliberation and deciding on future actions

Finally, it is important to beware of the “culture of auditing” – socio-economic monitoring and evaluation is for naught if it does not make its way back into decision-making processes (Franks and Vanclay, 2013; Kaplan-Hallam and Bennett, 2018). Thus, a final step is to formulate and articulate a process for deliberating on the implications of results and for ensuring that insights lead to adaptations to policy, improvements to management, changes to the design of programs, or shifts in organizational investments. Key considerations include who should be involved in the deliberation process and how decisions will be made. For example, the team that is involved in deliberating on the implications of the results might include government policy-makers or managers, practitioners responsible for NGO programs, or program staff from foundations. When appropriate and possible, we encourage the participation of representatives from small-scale fisheries organizations, Indigenous Peoples and local communities to provide input into potential improvements to ensure that they are grounded in local realities and appropriate to the social context. Depending on the proponent and the purpose of the socio-economic assessment, deliberations on what actions or adaptations are needed to programs or management might occur during internal strategy meetings, via extensive stakeholder engagements, or as part of collective decision-making processes in communities. These discussions might also be complemented with more structured analytical and decision-making approaches to examining the future socio-economic impacts of a set of potential interventions (Franks and Vanclay, 2013; Gregory et al., 2012; Kiker et al., 2005). The output of these deliberations process should be a set of actionable recommendations for policy or practice.

3. Conclusion: moving from measurement to management to improve social outcomes in fisheries

Our cursory review of pre-existing frameworks highlights that there is no such thing as a one-size-fits-all approach to assessing socio-economics in fisheries. We identified a need for comprehensive guidance on the development of bespoke socio-economic monitoring and evaluation plans for fisheries. Following the eleven steps that we have identified in this review will help governments, non-governmental organizations, and funders to develop individualized approaches to socio-economic monitoring and evaluation that will fit their purpose, objectives, and the scale and specific context(s) of the fisheries that they are working in. For clarity, Table 5 provides an overview of the eleven steps and the type of outputs or information that should be produced for each.

We also provide guidance and links to supporting reference materials to encourage more systematic consideration of each aspect of the socio-economic monitoring and evaluation process. This process and the tools described will be a useful reference for researchers or consultants working in this space, as well as for individuals within government

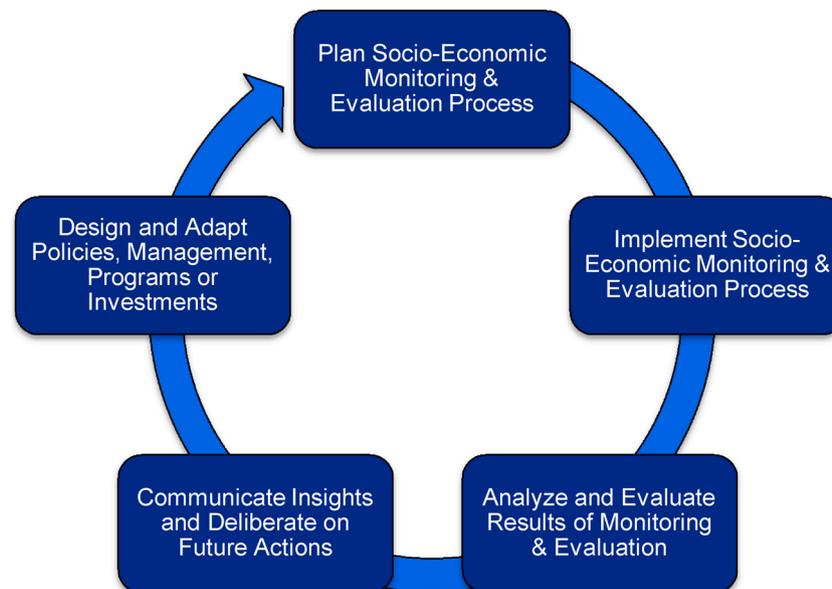


Fig. 2. Using socio-economic monitoring and evaluation to inform program design and adapt management.

agencies, non-governmental organizations, and foundations who are responsible for learning and innovation. Indeed, there are significant benefits to individuals within these organizations engaging deeply in the process of developing the monitoring and evaluation plan – as it can provide an opportunity for organizational reflection on programmatic objectives, clear articulation of intentions, and internal awareness of the process and results.

Ultimately, our hope is that these steps and guidance will help organizations to better understand and take actions to improve socio-economic and human wellbeing outcomes in fisheries management, projects, and investments. However, developing a monitoring and evaluation plan is only the first step in a typical adaptive management process or evidence-informed programmatic design (Fig. 2). Many current socio-economic monitoring and evaluation efforts are still academic or scientific endeavors that do not make their way back into decision-making. The ultimate aim of socio-economic monitoring and evaluation is to use the results for the design of new and adaptation of existing fisheries policies, programs, and initiatives. Thus, attention will be needed to all stages in the adaptive learning and management cycle to ensure that future socio-economic monitoring and evaluation efforts move from measurement through to management to improve socio-economic and human well-being outcomes in fisheries.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.fishres.2021.105934>.

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