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1 **GOVERNANCE INTERACTIONS IN SMALL-SCALE FISHERIES MARKET CHAINS: EXAMPLES FROM THE**
2 **ASIA PACIFIC**

3

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24 **RUNNING TITLE:**

25 Governance in fisheries market chains

26

27 **ABSTRACT**

28

29 Small-scale fisheries are subject to various governing institutions operating at different levels with
30 different objectives. At the same time, small-scale fisheries increasingly form part of domestic and
31 international market chains, with consequent effects for marine environments and livelihoods of the
32 fishery-dependent. Yet there remains a need to better understand how small-scale fisheries market
33 chains interact with the range of governance institutions that influence them. In this paper, we
34 examine how multiple governance systems function along market chains, in order to identify
35 opportunities for improved multi-scale governance. We use three small-scale fisheries with varying
36 local to global market chains operating in the Asia-Pacific region to develop a framework for analysis.
37 Drawing from Interactive Governance theory we identify governing systems that have come to
38 operate at particular sections in each market chain. We recognize four institutions that shape the
39 governance over the length of the chain; namely those centred on (i) government, (ii) private sector
40 and pricing, (iii) decentralized multi-stakeholder management, and (iv) culture and social relations.
41 The framework shows how diverse arrangements of these governing institutions emerge and take
42 effect along market chains. In doing so, we seek to move away from prescribed 'ideals' of universal
43 governing arrangements for fisheries and their market chains, and instead illuminate how governing
44 systems function interactively across multiple scales.

45

46 **KEY WORDS**

47

48 Fisheries trade, Governability, Interactive governance, The Philippines, Solomon Islands, Timor-
49 Leste.

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68 1 INTRODUCTION

69

70 Globally small-scale fisheries (SSF) form an important source of livelihood for the majority of
71 households in rural coastal communities, particularly those in the Asia-Pacific region (R. S. Pomeroy
72 & Andrew, 2011; R. S. Pomeroy et al., 2007). At the same time, today's global multi-billion dollar
73 seafood trade has doubled in value between 2010 and 2015 (Rabobank, 2015). SSF are responsible
74 for a significant proportion of the seafood trade (Chuenpagdee, 2011). The dramatic growth in trade
75 means small-scale fishers are also rapidly increasing their connection to traders, distributors and
76 consumers through domestic and international market networks and draws SSF more tightly into
77 global systems (Dicken, 2011). This growth also means increases to the number of actors involved,
78 the diversity of their interactions, and the complexity of market chains or networks (Crona, Van Holt,
79 Petersson, Daw, & Buchary, 2015). Whilst expansion of the seafood trade offers much promise for
80 net economic growth, there is parallel concern for pressure on fisheries resources and the equitable
81 economic distribution of benefits for the men and women most in need (Béné, Hersoug, & Allison,
82 2010; Berkes et al., 2006; Pauly, Watson, & Alder, 2005).

83

84 Recent debates have illuminated the dual concerns of sustainability and equity, but in doing so have
85 tended to position markets as either an economic opportunity or a threat to environmental
86 sustainability and equity objectives. The penetration of markets into SSF is regarded as a driver of
87 resource exploitation—manifesting in boom-and-bust cycles and/or serial depletions—, an unruly
88 risk to sustainable resource management, and a counter force to food sovereignty and food security
89 for those with few nutritionally equivalent alternatives (Cinner, Graham, Huchery, & Macneil, 2013;
90 Pauly et al., 2005). On the other hand, many development strategies suggest markets can provide
91 opportunities for people to increase income and create pathways out of chronic poverty (Béné et al.,
92 2015; Ponte, Kelling, Jespersen, & Kruijssen, 2014; Stevens, Irwin, Kramer, & Urquhart, 2014).

93 Although useful for distilling narratives about the role and character of markets, siding with either

94 polar perspective on the ‘threat-to-opportunity’ spectrum offers little meaningful guidance on how
95 to best govern SSF and their markets for any particular set of environmental or development
96 objectives.

97

98 In this paper, we build on the growing understanding that SSF governance should move beyond the
99 capture and production element of fisheries to encompass trade interactions across the market
100 chain (e.g. Bailey, Bush, Miller, & Kochen, 2016; Crona et al., 2015). Rather than treating markets as
101 a distinct external factor that fisheries management regimes and associated institutions need to
102 ‘deal with’, we position them as an integral part of SSF. This in turn has implications for how we
103 approach fisheries governance and what can be done to enhance governability. We argue that in
104 paying greater attention to the interactions that market chains develop with the expanding array of
105 institutions involved in SSF, governance holds the key to understanding, and ultimately promoting,
106 the productive functions of markets that can be used to benefit small-scale fishing communities
107 equitably and maintain or improve health of ecosystems.

108

109 Market chains span politically distinct scales, borders and institutions across local-level production
110 and national, regional or even global level trade and distribution nodes (Bush, Oosterveer, Bailey, &
111 Mol, 2014; Song, Scholtens, Stephen, Bavinck, & Chuenpagdee, 2017). Demand-driven consumer
112 markets in China have, for instance, intensified the exploitation of resources across large parts of the
113 tropics (Eriksson et al., 2015). Such drivers affect decision-making by small-scale fishers to target
114 particular species (e.g. groupers, sea cucumbers) or deliver products in particular forms (e.g. live,
115 smoked). Additionally, the commodity type, specific consumer demands and the distance between
116 supply source and consumer base all determine a market chain’s functioning and structure (Crona et
117 al., 2016). Pelagic and coral finfish fisheries that target mobile fish stocks, for example, may demand
118 higher capital investment, risk and operational costs for fishers than those involved in gleaning
119 fisheries targeting stationary species like sea cucumber, shellfish and molluscs. Similarly, processing

120 and transportation costs differ significantly in transferring live fish to international consumers in
121 comparison to dead fish or dried products (ADM Capital Foundation, 2016), or in trading products
122 from wild caught fisheries versus aquaculture.

123

124 Much of the existing literature focuses on documenting market chains, understanding the flow of
125 resources and/or noting the impacts of trade mechanisms (e.g. Cinner et al., 2013; Gephart & Pace,
126 2015). A more nuanced understanding is needed of the various contexts in which governance actors
127 (e.g. fishing communities and government agencies) function in relation to different sections of
128 market systems, and the multiple objectives these actors are pursuing (Béné et al., 2016; Kittinger et
129 al., 2015; Wamukota, Brewer, & Crona, 2014). Recent literature has analysed fisheries governance as
130 the outcome of complex interactions along market chains. One group of scholars have looked at the
131 dynamic, complex, diverse and multi-scaled nature of SSF market interactions (Crona et al., 2016;
132 Crona et al., 2015), resulting in a necessary disaggregation of a fisheries governance system into
133 multiple, albeit sometimes hybridized, entities that comprise private sector, formal legislative
134 bureaucracy and civil society-led arrangements. However, our approach involves examining market
135 chains not only as interactive pathways for trade and resource flows, but also as multi-level channels
136 within which different governance actors exert influence on a system, with different mandates and
137 for different objectives. Political economy research on environmental governance along whole
138 market chains, reveals the inadequacy of approaches that either idealise prospects for
139 environmental leadership by powerful firms, or blame fisheries managers for weak governance
140 (Havice & Campling, 2017). While that work focusses on industrial-scale fisheries and inter-firm
141 relations, we encompass multiple actors and institutions playing important governance roles in SSF
142 systems. Our paper joins these in addressing a significant and persistent research gap in the study of
143 fisheries trade to inform the design and maintenance of sustainable, equitable and effective fisheries
144 management.

145

146 To advance this aim, we draw from interactive governance theory (Thorpe, Johnson, & Bavinck,
147 2005) and develop an analytical framework that helps qualitatively assess the governance influences
148 along market chains. We first introduce the analytical framework and provide the rationale of each
149 of its components (Section 2). We provide a brief description of the methods (Section 3) and the
150 three case examples from the Asia-Pacific region—Timor-Leste, Solomon Islands and the
151 Philippines—and present an analysis of governance interactions (Section 4). We discuss the utility of
152 the framework for identifying opportunities for interventions that may make market chains more
153 governable (Section 5).

154

155 **2. ANALYTICAL FRAMEWORK**

156

157 We developed the analytical framework by drawing on the concept of governability as applied in
158 interactive governance theory. Governability is a measure of the ability to actively and intentionally
159 rebalance the ever-present interaction between societal needs on the one hand and governing
160 capacities on the other (Kooiman, 1993; Song, Johnsen, & Morrison, 2018). The concept analytically
161 organizes SSF systems into three main governance components (Jentoft & Chuenpagdee, 2015).
162 First, the ‘system to be governed’ (SG) involves the natural and societal systems associated with
163 fisheries that are subject to control, management and regulation. Second, the ‘governing system’
164 (GS) involves the various institutions, their day-to-day operations and the organizational values,
165 which together exert influence over the system to be governed (Chuenpagdee & Song, 2012). Lastly,
166 ‘governance interactions’ (GI) involves the interplay, relationships and mechanisms that allow for
167 exchange between these systems (see Figure 1). Jentoft and Chuenpagdee (2015: 21) argue that any
168 assessment of a fishery’s governability depends not only on the capacity of the governing systems,
169 but also on the fishery itself (i.e. the SG) and the interactions between these. To further enable
170 governability as a heuristic tool, here we develop approaches that represent the degree and quality
171 of exchange between a GS (e.g. institutions and resources at disposal) and a SG (e.g. livelihood needs

172 and market dynamics) (Jentoft & Chuenpagdee, 2015; Kooiman, Bavinck, Chuenpagdee, Mahon, &
173 Pullin, 2008). The analytical framework we propose interrogates in more detail the capacity and
174 characteristics of these components and their interactions.

175

176

INSERT FIGURE 1 HERE

177

178 **2.1 The system to be governed**

179

180 Because of the highly connected nature of market chains, we regard the SG as the whole of a market
181 chain comprised of market chain ‘sections’, as opposed to typical depiction in the literature as
182 commodity flows occurring between specific trade-points or ‘nodes’. A market chain section may
183 therefore encompass several nodes. We distinguish four market chain sections, wherein fish
184 products are subject to particular kinds of processing and/or exchange depending on the level of
185 social organization and trade motivations, which we label: ‘Supply’, ‘Domestic trade and
186 consumption’, ‘International trade and consumption’, and ‘(International) End-consumer market.’
187 This categorisation of market chain sections—instead of nodes—works to capture the plurality of
188 governance arrangements across varying scales and contexts; acknowledging a degree of ‘messiness’
189 in how commodities flow through networks. It is broadly consistent with the existing literature on
190 fish chains (Khan & Chuenpagdee, 2014; Thorpe et al., 2005) and global value chains (Gereffi,
191 Humphrey, & Sturgeon, 2005; Gereffi & Lee, 2012; Grunert et al., 2005; Humphrey & Schmitz, 2001)
192 that also analyse commodity flows across fish capture, post-harvest distribution and consumption,
193 including dynamics of global trade (i.e. beyond points of export and realms of national sovereign
194 government rule). Yet, what we propose is more suited for emphasising context and the ‘horizontal’
195 relations that are also central to understand seafood-related transactions and governance along the
196 chain (Bolwig, Ponte, Du Toit, Riisgaard, & Halberg, 2010). The points of division between the four
197 sections are in practice often blurred by the frequent functioning of actors across scales and through

198 overlapping jurisdictional boundaries. Importantly, as analytical divisions they allow us to identify
199 sufficiently distinct patterns through which trade-related governance arrangements emerge.

200

201 We define the 'supply' section as the capture fishery, i.e. activities running up to the point fish are
202 landed but before they are traded. This section of the chain therefore encompasses governance of
203 capture fisheries, the social organization around them and stock management. Governance action
204 here therefore focuses on controlling practices 'out on the water', with rules, norms, and conditions
205 moderating fishing behaviour. These may include clear and apparent regulations on allowed catch
206 volumes, fisher registration, property rights, or restrictive measures on gear, capacity, space and
207 time, but also more subtle (at least to outsiders), informal (culturally-defined) rules around access.
208 The jurisdictional frame of formal governance applied depends on the location of fishing, catch
209 landing sites and/or the origin of fishers.

210

211 The 'domestic trade and consumption' section involves the economic transactions taking place from
212 the point of first trade between fishers and traders to the point of final domestic consumption
213 (either within local or national boundaries) or, in the case of export chains, to the point that the
214 commodity leaves the country. This section is subject to national law and legislation of the country
215 where the SSF commodity is sourced. Depending on the type of resource and/or market chain,
216 activities in this section may either be highly informal (e.g. fisheries marketed locally to meet
217 demand for protein), or highly organised and trackable (e.g. fisheries feeding into products requiring
218 technical processing stages). Measures for control may, for example, centre on market actors (e.g.
219 licensing domestic traders or established exclusionary trade arrangements), commodities at local
220 markets (e.g. monitoring traded goods or cultural taboos on certain resources), food safety and
221 security (e.g. laws or cultural rules on consumption of fish), or species or area protection (e.g.
222 national trade bans on endangered species or access restrictions to fishing grounds through zonation
223 plans).

224

225 The 'international trade and consumption' section involves economic transactions across
226 (sometimes multiple) international borders as part of transit import/export trade, which may also
227 service (marginal) consumer markets along the trade path. Given that resources are in international
228 transit, transactions may form through application and evasion of international law, and through
229 opportunity provided by (in)coherence of rules across different jurisdictions and porous borders that
230 offer alternative, less resistant trade routes. Governance focus therefore centres around trans-
231 border commodity flow, including border control, international trade sanctions, and/or multilateral
232 conventions such as CITES.

233

234 The section of 'international end-consumer market' involves transactions taking place from the point
235 of import, involving distribution through wholesalers into the final main consumption market of
236 retail and/or restaurant sectors. Governance influences converge here mainly on promoting and/or
237 restricting consumers and consumption patterns. Measures may then involve campaigns by lobby
238 groups to raise awareness and curb the consumption of particular commodities, certification efforts
239 to assure consumer products meet ethical requirements, sustainability or food safety standards,
240 authenticity product branding and marketing to appeal to consumers (e.g. wild caught Atlantic
241 salmon versus farmed salmon), or traceability initiatives to make product sourcing transparent.
242 However, consumption requires supply, so actors in this section may similarly invest significantly in
243 ensuring supply matches market preferences, whether that be for specialised luxury commodities
244 like live reef fish or more widely consumed commodities like dried sea cucumber. In such cases cross
245 scale connections with international transit hubs or even supply sections require fostering, and
246 would warrant investment from trade actors at the consumer end.

247

248 **2.2 The governing system**

249

250 Governance is typically seen to be delivered in some form through three broad, functionally distinct
251 sectors: the state as the hand of 'reason', market as hand of 'interest', and civil society as hand of
252 'passion' (Meuleman, 2008; Offe, 2000). Where there is general consensus in the literature on what
253 constitutes the state and the market, civil society has been subject to more debate (Arato & Cohen,
254 1988; Jensen, 2006). In capturing a broad socially driven interpretation of civil society, Dabhi (2005:
255 39) suggests it entails everything that is not state or market, referring to it as 'that section of society
256 which is distinct from the state machinery and market and does not represent their interests'. Many
257 pragmatic definitions, however, refer to civil society simply as the role of non-government
258 organizations (NGO), while others include social institutions that make up the fabric of society as an
259 equally important dimension (Viterna, Clough, & Clarke, 2015). In the context of good governance of
260 SSF, both culturally-embedded institutions and platforms delivered by NGOs have proven to be
261 imperative (Jentoft, 2000). We therefore further elaborated the conventional three-way sectoral
262 conception for governance to explicitly involve a dual distinction within the civil society sector: firstly
263 the influential role of co-management platforms as typically driven by NGOs and secondly, the social
264 relations and cultural institutions that are inherent to fishing, trading and consuming seafood.

265

266 To represent different configurations of a GS, we focus on four institutions, namely (i) government
267 (e.g. the state), (ii) private sector and pricing (e.g. the market), (iii) multi-stakeholder management
268 (e.g. co-management platforms involving NGOs), and (iv) culture and social relations (e.g. an often
269 non-codified customary system) (Figure 1). Without implying that these institutions are mutually
270 exclusive of one another, we propose that these distinctions enable an understanding of how
271 different institutions function relative to one another and exert influence on the various sections of
272 the market chain. It is worth mentioning that although governance institutions presiding over the
273 international trade and consumption section of market chains may not hold the sustainability
274 objectives as a primary rationale for governing a fishery (but likely focusing on enhancing trade
275 efficiency and fairness, food safety, quality and profitability), their activities can still strongly

276 enhance or compromise the function of a fishery; even the actions taking place at the supply end.

277 Hence, they are included in the discussions pertaining to fishery sustainability and equity.

278

279 The 'government-centred' institution involves actions and influence of a formal government, with its

280 legislative and administrative frameworks, and form the primary means of regulating resources

281 within the jurisdictional boundaries of a country (i.e. the exclusive economic zone). Enforcement of a

282 government's laws on fishing rights, techniques, import tariffs and seafood processing standards, for

283 example, provide parameters within which various public and private actors should function. Factors

284 affecting governments' ability to control a fishery, may include the extent of accessibility to a fishery

285 (i.e. physical remoteness or elusiveness of a SSF due to illegality), how strong a government's rule of

286 law and perceived legitimacy is, political stability, sophistication of legislation, human and financial

287 resources of government agencies, and the presence or not of trade agreements.

288

289 The 'private sector and pricing' institutions involve actors that trade fishery commodities, affect

290 commodity price, to whom they are sold and in what form. Pricing affects the incentives for

291 involvement and likelihood of change in fishing behaviour, since it determines whether or not

292 markets exist, and how lucrative they are. Peaks and slumps in local and/or global commodity prices

293 influence fishing effort through commercial linkages between private sector actors. The interplay of

294 various private actors also creates political environments that affect the distribution of fishing

295 capacity and exclusivity of the market. Commercial enterprises influencing how resources are used

296 locally and channelled across systems or scales for example, provide services, technical support, and

297 infrastructure (e.g. ice, training in fishing and postharvest handling, and infrastructure) that

298 otherwise are not available. This determines to varying extents how SSF are managed. Private actors

299 are increasingly viewed as crucial players in efforts to improve fisheries management through

300 market-based measure such as certification schemes (Ponte, 2012).

301

302 The 'multi-stakeholder management' institution refers to structures, organizations and actors that
303 exert influence on principles of broad (democratic) inclusion. Co-management regimes, typically
304 understood to involve collaborations between resource user groups and technocratic government or
305 non-government agencies, are commonly applied to SSF; particularly in developing country contexts
306 (Cohen & Steenbergen, 2015; Evans, Cherrett, & Pems, 2011). Where singular management regimes
307 fail to adequately address disparate objectives, multi-stakeholder collaborative institutions seek to
308 negotiate multiple objectives across interest groups to achieve broad support (Johnson, 2006;
309 Jupiter, Cohen, Weeks, Tawake, & Govan, 2014). Here, local and external governance capacities are
310 harnessed in various combinations. Consequently, local fishing practices subject to such multi-
311 stakeholder engagement are often bound by a suite of measures geared towards sustainable
312 management that reflect broader paradigms like conservation and development (Cohen & Foale,
313 2013; Cohen & Steenbergen, 2015).

314

315 The 'culture and social relations' institution refers to people's affiliation to collective (cultural) norms
316 and other forms of social relations that influence practice and decision making. The norms, values,
317 individual agency, relationships and 'rules of engagement' by which people live significantly affect
318 how fishers participate in a fishery (Brosius & Hitchner, 2010; Weeratunge et al., 2013). Cultural
319 institutions and social practices that operate in wider contexts than the fishing sector are key to how
320 people understand and use fishery resources. Customary systems of resource access and
321 distribution, for example, are common across coastal communities in the region and often enacted
322 through societal hierarchies (Alonso-Población, Rodrigues, Wilson, Pereira, & Lee, 2018; Cohen &
323 Steenbergen, 2015). Fishing and trading behaviour in such cases may not only reflect economically
324 rational decision-making, but also indicate strong underlying social rules, dependencies and
325 accountabilities to which people are subject. These social relationships are also embedded in
326 relations of power, for example, between men and women, or between different ethnic groups.

327

328 **2.3 The governance interactions**

329

330 In applying the framework, we examine the relationships between the GS (focusing on governing
331 institutions) and the SG (SSF market chains). We make a qualitative and gradated assessment of the
332 relative influence of each type of institution within each section of the market chain by elucidating
333 the particular characteristics and conditions associated with each set of interactions (see methods
334 section for the assessment rubric). Examining then the situational fit between the governing and
335 governed actors and structures can suggest how and under what conditions SSF and their associated
336 market chains are more or less governable.

337

338 It is important to consider in what ways governance interactions are highly variable according to the
339 type of fishery resource, the scale of market, and other factors relating to socio-political and
340 ecological contexts. The framework therefore does not intend to prescribe a single form of fit
341 between governance arrangements and context as being superior or desirable. Instead, it explores
342 interplays that determine how multiple governance arrangements along a market chain influence
343 the sustainability objectives of SSF operations with different effects.

344

345 **3 METHODS**

346

347 In acknowledging that the systems we examined are complex, dynamic and changeable, and being
348 driven by an interest to understand particular governance functions, we analysed market chains
349 through a widely-applied qualitative case study methodology (Bennett & Elman, 2006; Bernard,
350 2013; Flick, 2018). To illustrate different entry points for governance three SSF case studies are
351 explored: local small-pelagic fish trade in Timor-Leste, national domestic reef fish trade in Solomon
352 Islands and international live reef fish trade originating from the Philippines (see Figure 2). Cases
353 were selected for geographic spread across the Asia Pacific region, to examine governance dynamics

354 of resource types, and to include market chains serving local (Timor-Leste), national (Solomon
355 Islands) and international (Philippines) consumers. These case studies also exemplify settings where
356 there is (governmental and non-governmental) impetus to improve economic development,
357 ecological health and local food security outcomes.

358

359

INSERT FIGURE 2 HERE

360

361 An extensive desktop review of primary science literature, government and non-government
362 reports, and publicly accessible statistical databases was conducted to understand SSF governance,
363 markets and management. The review fed into the development of the different components of
364 analysis in the framework. Specifically, this involved identifying key attributes of the SG (as
365 presented in Table 1, and drawing from Agrawal, 2001; Armitage, Marschke, & Plummer, 2008;
366 Baland & Platteau, 1999; Brewer & Moon, 2015; Carlsson & Berkes, 2005; Cinner, Wamukota,
367 Randriamahazo, & Rabearisoa, 2009; Ostrom, 1990; R. S. Pomeroy & Andrew, 2011; R. S. Pomeroy,
368 Katon, & Harkes, 2003; Wade, 1988), which subsequently framed our analysis of each case study. In
369 addition authors drew in their research, published and unpublished (e.g. Barclay & Kinch, 2013;
370 Cohen, Evans, & Mills, 2012; Fabinyi & Dalabajan, 2011; Fabinyi, Dressler, & Pido, 2017; Mills et al.,
371 2017). Case study assessments of governance constellations along the chains were made by each
372 author, and were then subjected to critical review by other authors to ensure interpretation and
373 application of the analytical frame was consistent. In line with the basic tenets of a qualitative
374 research approach (Creswell, 1998), our collective appraisal of these case studies is not based on
375 verified measurements of variables needed for generalizable comparison across cases. Instead, we
376 present systematic observations that are illustrative of the various dimensions of complexity in SSF
377 governance along market chains.

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INSERT TABLE 1 HERE

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Our analysis examined the relative influence that governing institutions comprising the GS, had on governability of the SG at the various market sections. We developed a qualitative scale (ranging from ‘very strong influence’ to ‘no influence’) to indicate the extent of an institution’s governance influence (Table 2). To apply governance influence scores to institutions we followed a deductive process, involving reflectively comparing and adjusting scoring parameters to ensure levels of influence were ascertained consistently across the cases. Importantly, these assessments were accompanied by detailed case study descriptions that further contextualized how this result affected governability at that market section.

INSERT TABLE 2 HERE

4 CASE STUDIES

Two of the three fisheries case studies present market chains serving domestic markets only (Timor-Leste small-pelagic fishery serving a local district market and Solomon Islands mixed coastal seafood fishery serving a national inter-island market). These two case studies highlight complexities of governance associated to the first two sections of SSF market chains, namely the ‘supply’ and ‘domestic trade and consumption’ sections. The Philippines live reef fish fishery is a market chain that extends into international market networks. We use this case study to highlight governance complexities in international trade processes, by focusing on the international ‘trade and consumption’ and ‘end-consumer market’ sections of the market chain (see Table 3).

INSERT TABLE 3 HERE

405 **4.1 The small-pelagic fishery from Timor-Leste**

406

407 The domestic small-pelagic fishery has been identified as an important contributor to address Timor-
408 Leste's rural chronic food and nutrition insecurity (Alonso Población, Wilson, Rodrigues, Pereira, &
409 Griffiths, 2012; AMSAT International, 2011a; Andersen, Pant, & Haraksingh Thilsted, 2013;
410 Democratic Republic of Timor-Leste, 2017). The government's state building development strategy
411 (Democratic Republic of Timor-Leste, 2011; Palmer & Amaral de Carvalho, 2008) includes a focus on
412 increasing investment in, and production from, coastal SSF, and simultaneously strengthening
413 governance systems and developing markets. Achieving these development targets is not without
414 challenges, including a low capacity centralised government, scarce fishery data, ill-defined marine
415 tenure, poor infrastructure and highly informal trade arrangements (Andrew, Kam, & Philips, 2011).

416

417 Within the supply GS local social networks in and among communities that form around kinship
418 relations, central points of local authority (power) and/or historical social ties between individuals,
419 strongly influence the distribution of fishing capacity (Alonso Población, 2013; Alonso Población,
420 Rodrigues, & Lee, 2013). Often smaller social groups in coastal villages enjoy higher customary status
421 through their roots in particular traditional kinship structures (Alonso-Población et al., 2018). Such
422 power hierarchies often appear through contemporary forms of formal village leadership (i.e. where
423 national government apparatus like village government administrations are absorbed into local
424 social structure) and can facilitate advantaged access to resources from outside aid, leading to
425 higher fish catch capacity. Investment in fisheries from the government includes fishing gear
426 handouts that tend improve capacity of particular social groups over others at village levels. The
427 differential fishing capacity as well as livelihood orientation of households in Timorese coastal
428 communities (Mills et al., 2017), reflects in often uneven distribution of returns from fishing effort
429 across households in coastal communities.

430

431 Given the challenges a post-conflict, developing government faces in effectively reaching coastal
432 communities, much of the Timor-Leste government's effort to manage capture fisheries at grass-
433 root levels is seconded to, or implemented in tandem with, NGO initiatives. These form multi-
434 stakeholder co-management platforms for broad engagement (Wever, 2008). These arrangements
435 at local level are primarily to ensure sustainable use of resources, and are less effective in controlling
436 trade transactions flowing from catch landings (despite attention for this in coastal rural develop
437 programs (Lentisco, Rodrigues, Pereira, Needham, & Griffiths, 2013)).

438

439 Primary trade transactions at catch landing sites typically occur between fishers and local
440 middlemen and/or mobile traders (Alonso Población et al., 2012). Trade channels extend through
441 district level traders and collectors to consumers at district markets. In some communities, fishers
442 who are part of a kin group have been observed to organize themselves along such social ties or
443 trade exclusively with a middleman from the same kin group (Alonso Población, 2013). Social
444 relations are thus highly important in steering human behaviour and decision making in the
445 domestic trade of fish. Similarly, trading paths out of coastal communities are largely determined by
446 established trading collaborations between local and district level traders, developed from
447 accumulated trust and dependability over time (Steenbergen, unpublished). Engagement of external
448 market actors at the village level is therefore strongly guided by established links between particular
449 middlemen and distributors at village level (see also Alonso Población et al., 2012). However, the
450 direct, immediate and personal accountabilities characterising trading relationships between
451 'neighbours' and within families at the supply end play out different further up the market chain,
452 where connections between actors extend over more expansive scales. Private sector and pricing
453 institutions are highly influential in shaping actor connections in these spaces where social relations
454 are diluted by space and time. Powerful, well-connected middlemen form significant nodes of trade
455 and distribution, and strongly influence where the fish is sourced, traded and ultimately consumed.
456 Connections over distance are maintained through trust and proven dependability (i.e. long term

457 trading relationships building on strong social capital), kin (i.e. inter-village kinship networks), and
458 loose patron-client dependencies (i.e. through loan provisions that oblige fishers to trade with
459 them). Trade is not regulated by any formal administrative governing capacity but rather appears
460 primarily subject to informal maintenance among private market actors themselves. There is little
461 evidence of multi-stakeholder platforms, like the NGO projects in villages acting on fish capture
462 systems, operating further down the market chain. Government institutions, although present
463 through, for example, village administrative bodies appear similarly weak in influence, whereby lack
464 of capacity to enforce relevant law and legislation means fish trade remains largely unregulated (see
465 Figure 3 for a schematic overview of governance influence on this fishery market chain).

466

467 **4.2 The mixed seafood coastal fishery from Solomon Islands**

468

469 Domestic seafood markets in Honiara have over recent decades expanded with the continued
470 growth of more extensive domestic seafood collection and trade networks (Lindley, 2007). Whereas
471 earlier, domestic fisheries in the Solomon Islands involved households mainly supplying local
472 consumers in villages, now market chains are feeding Honiara, including the Central Market, with
473 specialist traders buying fish from around the country. Fish are brought to market via public inter-
474 provincial shipping transport routes to and from Honiara. Traders communicate by mobile phone or
475 radio with provincial trade coordinators regarding catching and transport of the fish and payment to
476 fishers. These coordinators subsequently organize supply for a shipment, arrange payment to the
477 fishers and send the fish packed in ice back to Honiara for the vendor to collect (Krushelnytska,
478 2015).

479

480 Social institutions and influence from private sector actors are important in directing fishing activity
481 in the Solomon Islands domestic seafood fishery, as part of the supply GS. Depending on the
482 strength of customary institutions, fishers in coastal communities to varying degrees fish according

483 to customary rules associated with reef ownership and access. Peoples' position in local social
484 structures (e.g. kin or clan) often determine with whom, where and when they could fish (Foale,
485 Cohen, Januchowski-Hartley, Wenger, & Macintyre, 2011). Attractive price offers for bulk orders
486 stimulates increased fishing, while high prices in Honiara (plus a lack of alternative employment
487 options) creates an incentive to find ways to bring fish from rural areas to town, spreading fishing
488 pressure, in some cases unsustainably (Brewer, 2011; Brewer, Cinner, Fisher, Green, & Wilson, 2012;
489 Hamilton et al., 2016).

490

491 Government regulations have little effective reach into rural areas where much of the fishing takes
492 place (Cohen, Evans, & Govan, 2015). Monitoring and enforcing regulations on gear restrictions, for
493 example, is beyond the reach of national or provincial governments. Cultural practices (including
494 customary tenure) that govern access and use are, arguably, less able to govern in the face of
495 commodification of marine resources (Cohen & Foale, 2013). Community-based resource
496 management (CBRM) is a nationally prioritised approach to manage coastal fisheries (e.g. a main
497 strategy put forward in the Solomon Islands National Plan of Action for the Coral Triangle Initiative),
498 and is supported by government and non-government organizations alike. Regulations employed
499 under CBRM arrangements include periodically-harvested closures (modified forms of area taboos),
500 bans on taking undersized fish, use of nets and targeting spawning aggregations and re-stating
501 government regulations (Cohen, Cinner, & Foale, 2013; Schwarz et al., 2017). The degree to which
502 CBRM rules are locally implemented and enforced is variable (Cohen & Steenbergen, 2015), and the
503 outcomes rules have on resource status is poorly studied.

504

505 Within the domestic trade and consumption section of the market chain, governance influence over
506 trade appears highest from private sector and pricing institutions, followed by culture and social
507 relations and government institutions, with multi-stakeholder engagement being of lowest
508 influence. The prices of fish in Honiara markets drive regional fisheries supplying these markets.

509 Transport and availability of ice are key enabling factors for the trade – it is only possible to supply
510 urban markets from rural areas where these are present (Barclay & Kinch, 2013; Gillett, 2010). There
511 are a handful of ice centres across the country, all of which are government subsidized, as are the
512 regular transport routes, which cover only a few locations in each province. As such, private sector
513 traders using government-supported services determine where fishing is conducted (Lindley, 2007).
514 The national Ministry of Fisheries and Marine Resources (MFMR) has been monitoring reef fisheries
515 since 2012 through enumeration of market data via a project called Hapi Fis, whereby data on size,
516 species and pricing at markets is collected. These data indicates that vendors have significant
517 freedom to set prices, although prices are often fairly uniform across markets (R. Pomeroy & Yang,
518 2014).

519

520 Social relations and culture shape the market chains. For example, one study has found that
521 suppliers often sell to trusted traders over traders offering higher prices if there is not a trust
522 relationship (Brewer, 2011). A strong cultural influence on the Honiara market section of the chain is
523 that traders in Honiara do not buy from all over the country, but draw mainly from kin networks to
524 source from their home region (Brewer, 2011; Krushelnytska, 2015).

525

526 Local government provides market facilities and there have been some grassroots and donor-
527 supported projects to improve conditions for market traders, such as Mere Markets (organised by
528 Solomon Islands Women in Business) and the UN Women Markets for Change initiative. These, along
529 with subsidies for ice and transport, constitute government and multi-stakeholder efforts to
530 promote regional fisheries supplying urban markets. There has been no government or multi-
531 stakeholder engagement initiatives to improve fisheries sustainability around the domestic market
532 section of the chain. Instead, sustainability initiatives have thus far focussed directly on fisheries
533 management and resource use (see Figure 3 for a schematic overview of Governance influence on
534 this fishery market chain).

535

536 **4.3 The live reef fish for food fishery from the Philippines**

537

538 The live reef fish trade from the Philippines serves an international luxury food consumer market
539 mainly in Hong Kong and mainland China. Since the grouper species targeted are relatively long-lived
540 and slow-growing they are vulnerable to overfishing, which explains why the fishery is widely
541 considered to be unsustainable and overfished (ADM Capital Foundation, 2016; Sadovy de
542 Mitcheson et al., 2017). After capture, fish are typically sold either to local ‘middlemen’ or direct to
543 traders located in municipal towns and provincial capitals, who in some cases operate as agents of
544 exporting companies in Manila. The fish are flown by charter airplane to Manila, from where
545 exporting companies utilise commercial flights to Hong Kong to export them. The commodity enters
546 ‘international trade’ in Hong Kong. Although a significant portion of live reef fish is consumed here,
547 the majority—albeit unknown—amount of fish is re-exported to mainland China. The trade through
548 Hong Kong is deliberate to avoid tariffs imposed by mainland China, a practice known as ‘grey
549 trading’ that also affects other high-value fishery commodities such as shark fin and sea cucumbers,
550 many of which are also re-exported through Vietnam (Eriksson & Clarke, 2015). In the final
551 ‘consumer market’ section, the fish are traded via wholesalers and distributed to consumers as
552 luxury food in restaurants and at banquets.

553

554 The institutional configuration within the supply GS and domestic trade and consumption GS reveal
555 similar structural arrangements. Government and private sector and pricing institutions have higher
556 influence than socio-cultural or multi-stakeholder engagement institutions. Coastal fisheries in the
557 Philippines are mostly regulated by local governments at the municipal level, applying various
558 national laws such as the Fisheries Code of 1998 (Republic Act (RA) 8550, subsequently amended
559 with the RA 10654 in 2015) and the Local Government Code of 1991 (RA 7160). Specific provincial
560 laws and institutions in Palawan province, which supplies about half of the total live reef fish exports

561 from the Philippines (Padilla et al., 2003), also have authority and responsibility to manage natural
562 resources. There have been many attempts and initiatives to make the fishery more environmentally
563 sustainable, including banning use of cyanide and grow-out cages, instituting regulatory measures
564 (e.g. mandatory cyanide testing procedures, closure seasons, size limits and quotas), and
565 establishing marine protected areas (MPAs). Trade of certain particularly vulnerable species such as
566 the Napoleon wrasse (*Cheilinus undulates*, Labridae) and the Humpback grouper (*Cromileptes*
567 *altiveles*, Serranidae) has been banned. However, while some measures have been successfully
568 introduced, attempts by the government to regulate the trade have met with limited success and
569 the fishery is still considered unsustainable (Fabinyi & Dalabajan, 2011). Local regulations that are
570 successfully applied in one municipality mean that the fishery moves quickly to another area without
571 such regulation in the manner of a 'roving bandit' (Scales, Balmford, Liu, Sadovy, & Manica, 2006). A
572 lack of capacity, conflicts of interest and corruption among some government institutions hampers
573 efforts to control the fishery. Many fishers in the fishery have few alternative livelihoods and a high
574 financial dependence on the fishery, highlighting the role of the private sector and pricing in
575 governing this fishery. Traders play powerful roles in the trade at local levels (Fabinyi & Dalabajan,
576 2011), while fishers who are in financing arrangements with local traders get lower prices than
577 independent fishers. Because such financing arrangements are highly personalised and strongly
578 embedded within local socio-cultural norms, they are an example of how the 'culture and social
579 relations' institution also has some influence at this scale.

580

581 In the two international trade sections of the market chain, the 'private sector and pricing' and
582 'culture and social relations' institutions claim dominant influence on governance, reserving a
583 relatively limited role for government or multi-stakeholder institutions. Economic studies of the
584 trade have concluded that most of the 'value' of the value chain is captured by Hong-Kong based
585 actors (Cruz-Trinidad, Aliño, Geronimo, & Cabral, 2014), and successive studies have further
586 identified Hong Kong based traders as particularly powerful actors (Fabinyi, 2015). They extend

587 finance through exporters across Southeast Asia, including the Philippines, and even further down to
588 provincial level traders, making them dominant stakeholders along the supply chain. The established
589 trading links between these key market actors makes access into the market difficult for new market
590 actors. Entry into the market is protected on the basis that import-export transactions take place
591 almost exclusively along highly trusted and long-term trading connections between actors in the
592 Philippines, Hong Kong and mainland China. Social relations amongst market actors therefore
593 appear highly influential on the functioning and governance of international live reef fish trade.
594 Governance by governments in the international market has been hampered by the scale (beyond
595 national jurisdiction) and complexity of the commodity flow. In the end-consumer section of the
596 market chain, cultural norms such as ideas about the value of freshness and the institution of luxury
597 seafood banquets in China drive the demand for live reef fish (or ideas about health in the case of
598 sea cucumbers) (Fabinyi and Liu 2014) and hence play a significant role. Governments of consumer
599 markets such as Hong Kong and mainland China have few interests in strong regulation of the
600 fishery, but they still have influence particularly through an anti-corruption crackdown that has
601 reduced the practice of banqueting and hence live reef fish consumption. Monitoring, traceability
602 and transparent governance of the fishery by government agencies are hampered by the practices of
603 'grey trading'. Lastly, multi-stakeholder governance initiatives by international NGOs such as the
604 World Wildlife Fund (WWF) work at building coalitions, including traders and government officials to
605 collaboratively develop tools such as codes of conduct and certification. However most of these non-
606 government initiatives have had limited impact on supply and demand, arguably with the exception
607 of the successful exploitation of CITES as a tool to limit trade in the endangered Napoleon wrasse
608 (Sadovy de Mitcheson et al., 2017)(see Figure 3 for a schematic overview of governance influence on
609 this fishery market chain).

610

611

INSERT FIGURE 3 HERE

612

613 **5 DISCUSSION**

614

615 A key utility of the framework introduced in this paper has been to identify the different roles of the
616 four types of governing institutions, and to analyse their influences on the various sections of the
617 market chain that render the fisheries trade system relatively more (or less) governable. We stress
618 that the four types of institutions are only ideal types (hence overlap in practice), but they function
619 here as a purposeful heuristic that allows us to uncover empirical trends among the case studies and
620 across contexts.

621

622 **5.1 Illuminating relative influence of institutions along market chains**

623

624 The examination of the case studies through the framework reveals particular bottlenecks in market
625 chains—also termed ‘pinch points’ (Humphrey, 2005)—where commodities and actors gravitate
626 towards points of collection, transit and/or distribution, and form spaces of concentrated interaction
627 in the commodity flow. Identifying these bottlenecks, and their governance conditions and contexts,
628 reveals potential entry points where a new set of governance arrangements may offer an effective
629 means to control, monitor, and/or regulate transactions. The connections between the more
630 influential governing institutions that act at respective bottlenecks potentially provide further
631 avenues for interactive governance between scales.

632

633 The government-centred governing institution has shown limited influence in the supply section in
634 all three cases. In developing country contexts, the capacity of central government to implement
635 and enforce regulations over fisheries remains weak. There is little evidence of consistent
636 monitoring and regulation of catch. Despite there being national fishery-related laws in place in all
637 the case study countries, these are infrequently enforced at fishing levels. Even in the Philippines
638 where government fisheries legislation has been lauded globally for its innovation (e.g. Alcala &

639 Russ, 2006), the government influence over the live reef fish fishery seems low. At points of
640 import/export, however, government appears to have higher influence. Regulation of the export ban
641 on Napoleon wrasse, for example, functions well at the primary export point in Manila (albeit less so
642 at the export 'backdoors' in remote areas of southern Palawan and southwestern Mindanao).
643 Moreover, in China and Hong Kong—the consumer countries for the live reef fish trade case study—
644 government interventions in import and export transactions proved most accurate and effective in
645 estimating volume and species traded. This suggests then that although both Chinese and Hong
646 Kong governments currently have a limited influence over tightly regulating consumption patterns
647 and decisions, there is considerable scope for them to act on reducing the incidence of grey trading,
648 as recent reports have also emphasised (e.g. ADM Capital Foundation, 2016; Wu & Sadovy De
649 Mitcheson, 2016).

650

651 The private sector and pricing governing institution appears highly influential in contexts where
652 formal governing agents (e.g. governments or other agencies endowed with some form of mandated
653 authority) are absent or have limited control. In all the case studies, commodities enter the market
654 chain across dispersive supply networks rather than a singular physical node, since catch landing
655 sites are often remote and located relatively close to fishing sites. Across all the case studies
656 fisheries involved swift transport of the commodity towards market agents; either because fishers'
657 capacity (mobility and cold storage assets) is limited (e.g. Solomon Islands and Timor-Leste), or
658 because particular product market demands requires technical input for the commodity to be
659 tradable (the Philippines' live reef fish trade where fish must be kept alive until consumption). In
660 Timor-Leste and Solomon Islands major urban and district markets draw in end-consumers, implying
661 that minimal further distribution occurs afterwards.

662

663 Beyond domestic trading, the live reef fish international market chain case study shows how pivotal
664 transit bottlenecks in international trading networks form in trading entrêpôts like Hong Kong. Many

665 of the established networks of trade find their centre in Hong Kong, connecting source-country
666 supply markets with international consumer markets. As such, pricing power is seen to centre
667 around trade in Hong Kong. Prices for live reef fish in Philippines, for example, are reported to have
668 been set in most cases according to what exporters are offered by their Hong Kong trading
669 counterparts. Actors in these international trading hubs are highly knowledgeable of international
670 market landscapes. They navigate legislative and fiscal barriers along extensive and well-developed
671 regional networks to allow for minimal loss and efficient delivery of commodities to end-consumer
672 markets. Diversion of trade through Vietnam to reach southern China, for example, indicates the
673 scale these networks span. Furthermore, some collection and processing plants for live reef fish in
674 the Philippines are part of international trading companies operating out of Hong Kong, as opposed
675 to domestic export companies. In-country collection operations are thus highly influenced by market
676 dynamics in the Hong Kong hub.

677

678 The decentralized multi-stakeholder governing institution in the form of fisheries co-management
679 regimes have varying influence. In the supply section, the case studies indicate a patchy influence
680 dependent on the extent of supportive presence of NGOs. For example, in Timor-Leste, NGOs work
681 to substitute the limited capacity of central government to contribute to the management of
682 capture fisheries, indicating at least some influence of control over fishing by NGO-driven co-
683 management schemes. In our case studies multi-stakeholder coalitions to prevent overfishing have
684 not thus far extended their activities into the domestic trade and consumption section of market
685 chains. At an international level, however, multi-stakeholder coalitions are active on some trade
686 issues through consumer behaviour campaigns on CITES and certification, yet these are very context
687 dependent. The restaurant and luxury food industry in China, for example, forms an important
688 governance bottleneck and a focus of many lobby initiatives against consumption of critically
689 endangered and/or protected species, with arguably significant impact.

690

691 The cultural and social relations governing institution also has relatively high influence in particular
692 contexts. At the supply level, this governing institution can be key in determining social authority
693 over resources. For example, traditional authorities, rules and norms play significant roles
694 determining access to reefs and fishing grounds in many countries of the Asia-Pacific. Fishers and
695 local level market agents across all cases operate predominantly according to the social networks in
696 and between fishing communities, as evident in the make-up of crews on fishing boats, associations
697 between fishers and traders, and spread of catch capacity across a community's fishing fleet. The
698 distribution of the commodity from catch landing sites is often strongly determined by links that
699 local fishers, or in-community traders, have with outside market agents. Predetermined trade paths
700 from catch landing sites are common in two of the three market chains (Solomon Islands and
701 Philippines), where demand drives fishing activity. Only in the Timor-Leste case is the extent of
702 distribution variable depending on catch size, whereby high catches warrant farther distribution (i.e.
703 Dili, where prices are better) while small or medium catches are traded to closer district markets.

704

705 Even further along the market chain, many international trade channels are based on social
706 networks, often heavily influenced by language and kinship. At the international consumer end in
707 China, cultural and social institutions such as a belief in the importance of fresh fish that are kept
708 alive until the last moment, the banquet culture, and the perceived health benefits of certain types
709 of seafood are all key factors that underlie the strong demand for these products. Such strong
710 demand has driven the establishment of market chains in new geographies. Organization around
711 commodity collection and processing appears strongly embedded within social networks. This is
712 evident in that even domestically owned export centres in the Philippines case operate along
713 established trade links to foreign importers. Similar to relations between fishers and traders at catch
714 landing sites, the trade connections between exporters and importers are often determined around
715 demonstrated social capital, including trust, reliability, reputation and ethics (Fabinyi, 2015).

716

717 **5.2 Applying the framework across multiple SSF market chain contexts**

718

719 To further reflect on the applicability of the framework, we draw here on other contexts of SSF
720 markets chain from the literature, beyond the three cases presented above (e.g. both developed and
721 developing country settings). In contexts where rule of law is weaker, and where corruption is
722 present or suspected, government enforcement is likely ineffective. Such governance voids would
723 allow other institutions to assume more influence, as we often see market mechanisms serving as a
724 strong determinant of fishing patterns and exploitation rates around the world. This would suggest a
725 stronger role expected of the private sector in harnessing its market power to push for sustainability
726 measures, such as certification schemes in cases like the Philippine live reef fish SSF. However, in
727 Australia, where rule of law is considered stronger (World Bank, 2016), the live grouper fishery has a
728 different constellation of institutional influences at the supply section. More extensive government
729 oversight has managed to stabilize fishing levels, despite continued high market prices (Frisch et al.,
730 2016; Leigh, Campbell, Lunow, & O’Neill, 2014). The framework can herewith be used to illuminate
731 various possible arrangements towards governability of supply sections, despite different market
732 chains sharing the same end-consumer market.

733

734 Similarly, weaker government control over the supply section of the Timor-Leste and Solomon
735 islands market chain cases has resulted in actors in the social relations and culture institution
736 exerting relatively higher governance influence. Such outcomes are not only limited to the
737 developing country context. Examples of temperate water SSF in the Global North also indicate
738 importance of high social capital at supply ends of the market chain. Several North American SSF, for
739 example, have proven to be highly socially embedded (Foley, Mather, & Neis, 2015; Pinkerton,
740 1989), where co-operative management has been built on strong local social and cultural
741 institutions. Furthermore, in the EU, bottom-up voluntary fishery management systems, like the
742 ‘inshore potting agreement’ (IPA) developed between fisher groups in Devon, England, show similar

743 grass-roots capacity in managing fisheries where regional, top-down EU policy could not closely
744 intervene (Blyth, Kaiser, Edwards-Jones, & Hart, 2002). Stoll et al (2015) add to this by arguing that
745 co-operative bodies forming from local social capital may, in the presence of a supportive
746 government institution, develop into what they refer to as 'institutional starters'; i.e. collective
747 action groups sowing the seeds for co-governance arrangements that build on active civil society
748 participation. With respect to these cases where existing social relations and cultural institutions
749 operate alongside an active government institution, the current framework could be relied upon to
750 help elucidate opportunities for shared governance roles.

751

752 Finally, the ability of governance institutions to influence SSF market chains can also vary according
753 to the commodity type. For example, multi-stakeholder coalitions, along with other factors, have
754 contributed to reduced consumption of some luxury commodities; as shown in the live reef fish
755 case. However, such coalitions have so far produced little influence over the consumption of other
756 luxury species such as sea cucumbers (Purcell & Polidoro, 2014). This might be in part because live
757 reef fish consumption, like shark fin, is mainly restricted to high-end restaurants and banquets. Its
758 higher per kilogram market price owes to its (culturally-defined) perceived exclusivity and the
759 technical transport measures required to keep the fish alive (Fabinyi & Liu, 2014). Sea cucumber, on
760 the other hand, is far more extensively retailed, across both restaurants and households, as a dried
761 product with a longer shelf life. Well-defined consumption points for live groupers (e.g. banquets)
762 would likely offer a more accessible and actionable opportunity for direct intervention, as opposed
763 to the extensively disbursed consumption patterns of sea cucumbers. Whereas the effectiveness of
764 environmental campaigns against live reef fish or shark fin consumption is often associated with the
765 higher charismatic value of these over sea cucumber (Eriksson & Clarke, 2015), differences in the
766 market configurations can offer an additional explanation as to why environmental campaigns lead
767 to varying levels of governance leverage.

768

769 **6 CONCLUSION**

770

771 Notwithstanding their vital subsistence functions in many contexts, SSF globally are increasingly
772 being driven towards commercialization. Market interactions, occurring at all scales, are a largely
773 inevitable part of SSF functioning and fishers' concerns (Béné, Steel, Luadia, & Gordon, 2009). SSF,
774 on the whole, are intertwined with globalized seafood trade flows and a broadening of governance
775 mechanisms (Campling & Havice, 2018). It is therefore increasingly important to treat them as a
776 serious trade contributor and provide targeted research support. Given this outlook, our effort here
777 bypasses the somewhat diametrically opposing understandings of market effects on SSF – i.e. *either*
778 a cause of overfishing *or* an engine for development. Moreover, our position extends beyond the
779 common-pool resource frame that regards markets as the external environment to SSF, by which
780 their integration with markets then becomes a challenge to deal with 'after the fact' rather than an
781 expected reality of any commercial endeavour (Agrawal, 2001).

782

783 Here, we offer an analytical tool that can be used to proactively confront (and navigate) the socio-
784 ecological challenges that may arise from increasing market dependency and integration. In doing so
785 we respond to calls for more integrated perspectives of SSF governance (Bush et al., 2014) and for
786 broader principles of SSF governance to be applied to different extents and in different contexts
787 (Jentoft & Chuenpagdee, 2015; Ratner & Allison, 2012). Additionally, while Berkes *et al.* (2006)
788 advocate diverse, multilevel governance institutions, local to international, to cope with problems
789 emerging from globalized trade and sequential exploitation, our framework furthers this task, by
790 way of differentiating the multiple governing institutions and the market sections. Applying the
791 current framework to analyse the market system associated with SSF will help elucidate what kind of
792 governing institutions exert influence where along the market chains, and to what relative degree,
793 to account for various sustainability and equity outcomes. This approach will help highlight
794 opportunities for governing institutions to intervene and collaborate with others to achieve a

795 balanced and together more effective governance of market interactions. The current study has
796 already identified potential for governments with limited capacity to focus on enforceable pinch-
797 points such as export-import sections and for multi-stakeholder coalitions to affect changes in the
798 consumption patterns of international locations through lobbying initiatives. Also, recognizing social
799 relations as a crucial determinant of trade connections between local fishers and traders as well as
800 between exporters and importers opens up avenues for unique governance innovations.

801

802 The current framework by no means excludes the application of existing models of fisheries
803 governance; rather it highlights the need for application of context-driven governance tools that
804 take into account interactivity across scales and diverse types of actors. This offers an alternative to
805 blueprint frameworks that are either designed around, and/or driven by, a single governance
806 institution (e.g. government) or focused on single nodes of a market chain (e.g. capture fisheries
807 supply). Next to the recognized role for central governments, more prominent involvement of other
808 governance institutions in the form of social and cultural institutions, private sector market
809 institutions and decentralized multi-stakeholder institutions may offer a more transparent,
810 accountable and effective way of conceptualizing and practising SSF governability. To ensure that
811 the gains of market interactions are experienced more fairly and sustainably by those involved in the
812 capture and trade of SSF products, a holistic and expanded governance lens such as this will serve as
813 a critical asset.

814

815 **7 ACKNOWLEDGEMENTS**

816

817 This paper was supported by several projects and programs, including a North Australia Marine
818 Research Alliance (NAMRA) post-doctoral scholarship (NAMRA-02-2014) to D. Steenbergen and an
819 Australian Government funded ACIAR project (FIS-2016-300). K. Barclay, M. Fabinyi and A. Song
820 acknowledge funding support from an ARC Discovery Project (DP180100965). P. Cohen, D. Mills, H.

821 Eriksson and A. Song were supported by the CGIAR Research Program on Fish Agrifood Systems
822 (FISH). We are grateful to N. Andrew (ANCORS, University of Wollongong) for support and advice.
823 We would also like to thank the reviewers for their constructive comments.

824

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1135 Table 1 Collated guiding set of key ‘sustainability’ attributes of a System to be Governed as
 1136 extrapolated from literature (compiled from literature review, including Wade 1988, Ostrom 1990,
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 1138 et al. 2008, Cinner et al. 2009, Pomeroy and Andrew 2011, Brewer and Moon 2015).

| | |
|--------------------------|--|
| 1.0 Social | |
| 1.1 | <u>Strength of social network</u> : extent of social resilience, social group support, & sharing of risk/skills/knowledge |
| 1.2 | <u>Interdependent relationships (producers, traders, consumers)</u> : the extent of equitable (cultural & social) benefit distribution |
| 1.3 | <u>Cultural affiliation towards the resource</u> : The extent of cultural value & rules associated to resource use/trade/consumption |
| 2.0 Economic | |
| 2.1 | <u>Dependence on resource</u> : the extent of dependence on the resource (& trade) for livelihood & income |
| 2.2 | <u>Marketing system</u> : the extent of openness or exclusiveness of a market. |
| 2.3 | <u>Equity of economic benefit distribution</u> : the extent of equitable (monetary & material) benefit distribution |
| 2.4 | <u>Differential nature of product</u> : the extent of distinct commodity value & symbolic value |
| 2.5 | <u>Export Markets</u> : the extent of the commodity’s market chain length |
| 3.0 Political | |
| 3.1 | <u>Leadership legitimacy</u> : the extent of effective & legitimate leadership |
| 3.2 | <u>Equity of regulated access</u> : the extent of equitable & regulated entry to the SSF/trade |
| 3.3 | <u>Just rule of law</u> : the extent of legitimate control, management & regulation, & breadth of inclusion in decision making |
| 3.4 | <u>Tenure & property rights</u> : the extent of recognised tenure & property rights |
| 4.0 Ecological | |
| 4.1 | <u>Scale & definition</u> : the extent of size & clarity of boundaries of the supply SSF |
| 4.2 | <u>Fishery supply characteristic</u> : the extent of mobility of the resource, its seasonality, & requirement for processing |
| 4.3 | <u>Health status of the supply</u> : the extent of depletion, rate of depletion & potential for recovery of a resource base |
| 5.0 Technological | |
| 5.1 | <u>Consumer/Buyer choice</u> : the extent of knowledge by consumers & retail buyers to make informed purchase |
| 5.2 | <u>Traceability</u> : the extent of traceability of product source/trade/processing along market chains |
| 5.3 | <u>Fleet capacity in relation to resource</u> : the extent of catching capacity (technology & investment) of a fleet/SSF |
| 5.4 | <u>Exclusion technology</u> : the extent of processing activities, technology & distributive capacity enhancing exclusiveness |

1139

1140 Table 2 Criteria guiding the qualitative scoring of the 'extent of governance influence' of a governing
 1141 institution within a section of a market chain.

| Level of Influence | Basis of measure |
|---------------------------|---|
| 'Very strong influence' | <ul style="list-style-type: none"> - dominant (monopolising) control over market chain functionality by (formal or informal) rules & regulatory mechanisms - determinant enforcement/intervention with high compliance - evidence of exclusive transformative impact over market chain functionality |
| 'Strong influence' | <ul style="list-style-type: none"> - (formal or informal) rules & regulatory mechanisms for control in place and active - effective enforcement/intervention with high compliance - evidence of transformative impact over market chain functionality alongside other influencing institutions |
| 'Some influence' | <ul style="list-style-type: none"> - (formal or informal) rules & regulatory mechanisms for control in place but limited - limited enforcement/intervention - some evidence of impact over market chain functionality |
| 'Little influence' | <ul style="list-style-type: none"> - minimal (formal or informal) rules & regulatory mechanisms for control in place - minimal enforcement/intervention - little evidence of impact over market chain functionality |
| 'No influence' | <ul style="list-style-type: none"> - no (formal or informal) rules & regulatory mechanisms for control in place - no enforcement/intervention |

1142

1143 Table 3 Overview of SSF case studies and their associated market chains

| Supply | Dom. trade & consumption | Int. trade & consumption | Int. end-consumer market |
|---|--|--|--|
| Timor-Leste small pelagics fishery | | | |
| <p>Capture - including sardines (<i>Herklotsichthys quadrimaculatus</i>, Clupeidae), garfish (<i>Hyporhamphus affinis</i>, Hemirhamphidae), flying fish (<i>Cypslurus spp.</i>, Exocoetidae), long-tom (<i>Tylosurus spp.</i>, <i>Ablennes hians</i>, Belonidae) and scads (<i>Decapterus spp.</i>, Carangidae)</p> <ul style="list-style-type: none"> - seasonal variability in fishing access and species target - low capacity fishery, est. 3000 registered vessels in Timor-Leste (Alonso Población et al., 2012), and 4-5000 fishers (Mills et al., 2017) operating mainly from dugout canoes (with and without outboard motor), using nets and hand-line primarily within the 2 nautical mile northern coastal zone and around fishing aggregation devices. - national fisheries catch estimated at 5-6000 t (Barbosa & Booth, 2009). <p>Subsistence consumption - portion of fish is consumed or gifted within villages before sales</p> | <p>Retail - Infrastructural deficit means majority of catch is traded immediately and consumed within a short timeframe and in close proximity of catch landing sites (AMSAT International, 2011b; FAO, 2009). Marginal household processing of catch (i.e. salted or smoked)</p> <ul style="list-style-type: none"> - majority trade through in-village and district level trade actors, through informal unregulated market networks - significant trade direct from fishers/traders to urban consumer through 'open access' roadside sales <p>Consumption – most frequent within district to rural and peri-urban consumers. Significant portion filters through to Dili urban markets, however is dependent on catch volume to justify effort (Alonso Población, 2013).</p> <p>Export - none</p> | N/A | N/A |
| Solomon Islands mixed domestic seafood coastal fishery | | | |
| <p>Capture - extensive, multi-gear and multi-species:</p> <ul style="list-style-type: none"> - diverse finfish and invertebrates caught in lagoons, reefs and coastal pelagic areas from dugout canoes or dinghies with outboard motors, using lines, spears, nets and hand gathering. - boats and gear are owned by the fishers or family or community members. - pelagic fish caught by trolling or hand lining, including around fish aggregating devices (FAD). - gleaning in mangrove and reef areas for sales of crabs and shellfish. <p>Subsistence consumption - portion of fish is consumed or gifted within villages before sales.</p> | <p>Retail - direct sales to restaurants or catering companies.</p> <ul style="list-style-type: none"> - fresh fish sold in villages or urban/peri-urban markets. - cooked fish sold at markets (including unsold fresh fish cooked for sale the next day). - significant fish trade to Honiara Central market through specialist traders buying/collecting fish from fishers around the country. Fish transported by public inter-provincial transport routes to and from Honiara, using subsidized ice. <p>Consumption – fish is the 3rd highest food expenditure for households after vegetables and bread and rice, at around 17.8% (SINSO, 2015).</p> <ul style="list-style-type: none"> - est. value and volume of commercial coastal fisheries for domestic consumption in 2014 was USD12.8 million, 6,468 tonnes (Gillett, 2016) <p>Export - none</p> | N/A | N/A |
| Philippines live fish for food fishery | | | |
| <p>Capture - targets groupers (<i>Serranidae</i>): leopard coral grouper (<i>Plectropomus leopardus</i>, Serranidae) and other species from the <i>Plectropomus</i> and <i>Epinephelus</i> genera</p> <ul style="list-style-type: none"> - fishery considered overfished with a range of species listed as endangered or vulnerable on the IUCN Red List - fishing on shallow reefs with crewed boats using hook and line (and illegal destructive methods involving cyanide poisoning by divers using hookah gear). - fish stored alive during transit in aquaria on the boat (undersized catch - < 500gm - are grown out in cages (until 500gm-1kg)) <p>Subsistence consumption - no subsistence consumption (besides opportunistic bycatch and fish that may die during transit)</p> | <p>Retail - fish sold either to 'middlemen' or direct to traders in municipal towns and provincial capitals ('local traders', or 'exporters' as agents of exporting companies in Manila).</p> <ul style="list-style-type: none"> - patron-client relationships between some fishers and traders and/or exporters (financial support through provision of loans and gears to fishers) - trading hubs across the country, but approximately half of the national exports hail from Palawan province (Padilla et al., 2003) <p>Consumption – small amount in restaurants in Manila and other cities</p> <p>Export - fish are flown by charter airplane to Manila, where they are exported via commercial airplane to Hong Kong.</p> | <p>Import & Export - 'grey trading': a significant but unknown amount of fish are re-exported from Hong Kong to mainland China. The Hong Kong diversion avoids trade tariffs.</p> | <p>Import - via wholesalers to restaurants, where they are consumed in banquets</p> <p>Retail & Consumption - main end consumption for luxury food market in Hong Kong and China - est. 13,000mt annual trade (likely significantly underestimated), with value of total retail over US\$1billion (ADM Capital Foundation, 2016)</p> |

1145 **FIGURE LEGENDS**

1146

1147 Figure 1 The analytical framework presented in terms of (i) the System to be Governed (SG), (ii) the
1148 Governance Interactions, and (ii) the Governing Systems (GS) made up of their subsystem
1149 arrangements at each market chain section.

1150

1151 Figure 2 Three small-scale fisheries case studies from the Asia-Pacific.

1152

1153 Figure 3 Institutional governance arrangements in three SSF market chains (local small pelagic
1154 market chain in Timor-Leste, national mixed reef fish market chain in Solomon Islands, and
1155 international luxury live fish for food market chain from The Philippines), indicating relative influence
1156 of governing institutions, including (i) Government centred-, (ii) Private sector and pricing centred-,
1157 (iii) Multi-stakeholder platform centred- and (iv) Culture and social relations centred institutions.

1158





Governing Systems (GS)



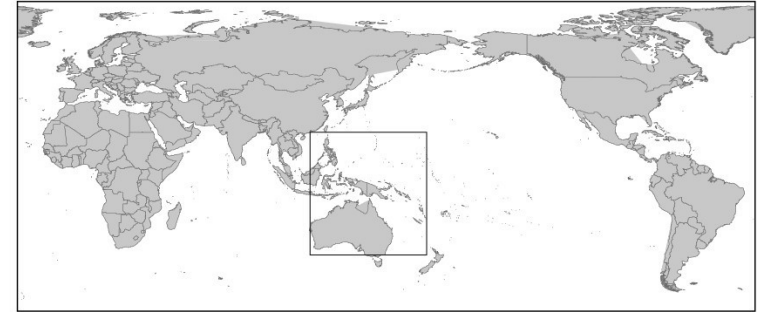
Governance Interactions (GI)



System to be Governed (SG)

-  - Government
-  - Private sector & Pricing
-  - Multi-stakeholder engagement
-  - Culture & social relations

Philippines: *International live reef fish exports to China*



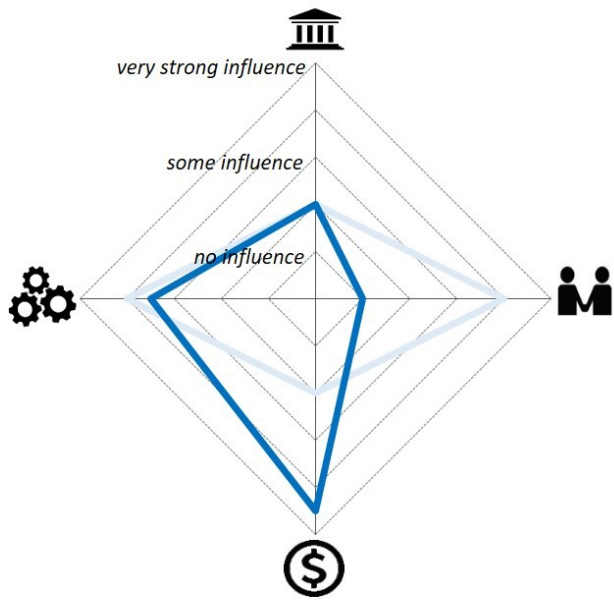
Timor-Leste: *Mixed small pelagic species trade for local market*



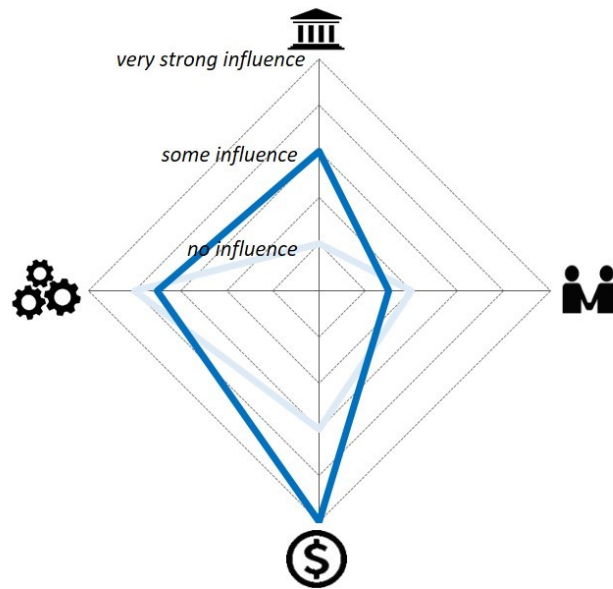
Solomon Islands: *National reef fish trade from rural areas to urban markets*



Timor Leste Small Pelagics SSF



Solomon Islands Domestic Seafood SSF



Philippines Live Fish Luxury Seafood SSF

