

Catching values of small-scale fisheries

A look at markets, trade relations and fisher behaviour

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Abstract

This thesis explores small-scale fisheries trade, markets and the accompanying relationships. It does so to understand how they contribute to human wellbeing and ecosystem health through fisher's behaviour in the marine environment. The capacity of small-scale fisheries to provide for fisherfolk and wider society is currently challenged by human induced ecological threats such as overexploitation and climate change. Small-scale fisheries are increasingly incorporated into the global trading system, which in part drive these ecological changes. At the same time these fisheries are important providers of food and livelihood security for millions of people worldwide. How to realise better fishery governance approaches and enactment is therefore paramount. This thesis attempts to address knowledge gaps in governance and research that centre around the market and actors within it- an area little included in governing fisheries. I draw on the value chain concept and use a mixed methods approach to address three gaps. First, the structure and functioning of small-scale fishery markets and relations. Second, how benefits are distributed in the market and affected by trade relations. Third, I examine how relations and benefit distributions influence fishing behaviour. Case studies are used throughout this thesis drawing on empirical work done in Zanzibar, Tanzania and Iloilo, Philippines. The role of global seafood markets is additionally recognised as a driver of change in all four papers of the thesis. **Paper I** shows that extending the value chain to combine economic and informal exchanges identifies a wider range of fishery-related sources for human wellbeing within seafood trade. It also highlights more marginal players. **Paper II** demonstrates how actor's abilities to access economic benefits are impacted by local gender roles and social relations. But these intersect with their value chain position and end-markets. In **Paper III** local norms appear to play a role in fishing behaviour, more so than market incentives. These dynamics are explored through behavioural economic experiments. Finally **Paper IV** examines how patronage can have contradictory influences for fisherfolk vulnerability and adaptability. It can also create tensions for overall system resilience when considered at different scales. Overall the thesis contributes to a better understanding of the local to global drivers and interactions in small-scale fisheries trade. The thesis also provides insights into some of the factors influencing the distribution of fishery-related benefits. These aspects have all been cited as vital for designing strategies for improving the wellbeing of people reliant on fisheries.

Keywords: *small-scale fisheries, value chains, gender, seafood trade, global markets, patron-client, human wellbeing, benefits, markets, local social dynamics.*

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E. Drury O'Neill

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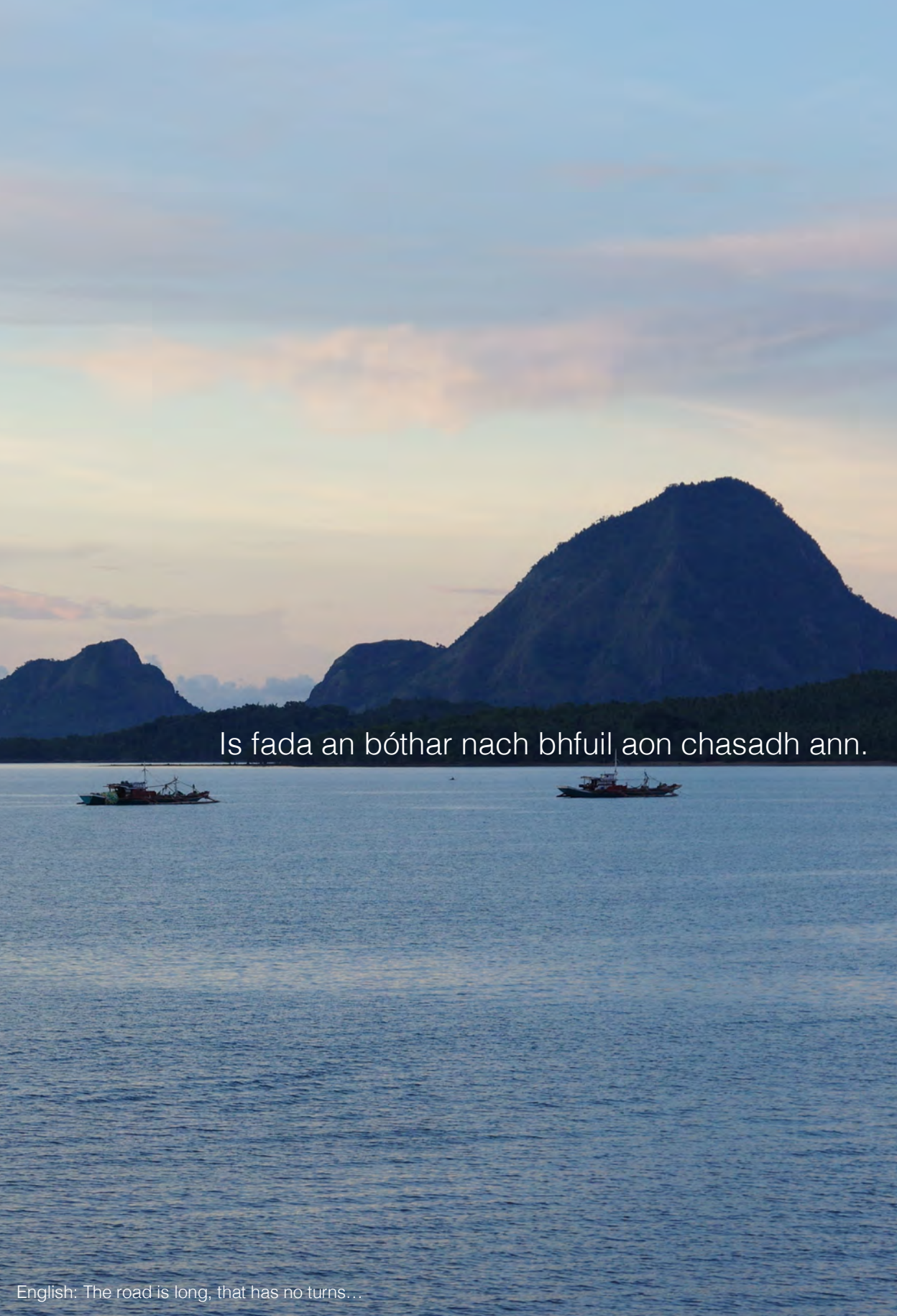
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To Meg, Jack, meu fofinho demais- Vitas and Granny Lizzy.....



A scenic view of a body of water, likely a bay or fjord, with two small boats in the foreground. In the background, a large, dark mountain rises against a sky with soft, colorful clouds, suggesting a sunset or sunrise. The water is calm and reflects the light from the sky.

Is fada an bóthar nach bhfuil aon chasadh ann.

English: The road is long, that has no turns...

Abstract English

This thesis explores small-scale fisheries trade, markets and the accompanying relationships. It does so to understand how they contribute to human wellbeing and ecosystem health through fisher's behaviour in the marine environment. The capacity of small-scale fisheries to provide for fisherfolk and wider society is currently challenged by human induced ecological threats such as overexploitation and climate change. Small-scale fisheries are increasingly incorporated into the global trading system, which in part drive these ecological changes. At the same time these fisheries are important providers of food and livelihood security for millions of people worldwide. How to realise better fishery governance approaches and enactment is therefore paramount. This thesis attempts to address knowledge gaps in governance and research that centre around the market and actors within it- an area little included in governing fisheries. I draw on the value chain concept and use a mixed methods approach to address three gaps. First, the structure and functioning of small-scale fishery markets and relations. Second, how benefits are distributed in the market and affected by trade relations. Third, I examine how relations and benefit distributions influence fishing behaviour. Case studies are used throughout this thesis drawing on empirical work done in Zanzibar, Tanzania and Iloilo, Philippines. The role of global seafood markets is additionally recognised as a driver of change in all four papers of the thesis. **Paper I** shows that extending the value chain to combine economic and informal exchanges identifies a wider range of fishery-related sources for human wellbeing within seafood trade. It also highlights more marginal players. **Paper II** demonstrates how actor's abilities to access economic benefits are impacted by local gender roles and social relations. But these intersect with their value chain position and end-markets. In **Paper III** local norms appear to play a role in fishing behaviour, more so than market incentives. These dynamics are explored through behavioural economic experiments. Finally **Paper IV** examines how patronage can have contradictory influences for fisherfolk vulnerability and adaptability. It can also create tensions for overall system resilience when considered at different scales. Overall the thesis contributes to a better understanding of the local to global drivers and interactions in small-scale fisheries trade. The thesis also provides insights into some of the factors influencing the distribution of fishery-related benefits. These aspects have all been cited as vital for designing strategies for improving the wellbeing of people reliant on fisheries. **Keywords: small-scale fisheries, value chains, gender, seafood trade, global markets, patron-client, human wellbeing, benefits, markets, local social dynamics**

Abstract Swedish

Avhandlingen syftar till att undersöka handelsrelationer och handelsstrukturer inom småskaliga fisken. Detta för att förstå hur de bidrar till människors välbefinnande och hur de kopplas till fiskares beteende i ekosystemet. Småskaliga fisken är viktiga för livsmedels- och försörjningstrygghet för miljontals människor världen över och integreras alltmer i det globala handelssystemet. Deras kapacitet att försörja fiskesamhällen och samhället i stort utmanas av mänskligt orsakade ekologiska hot som överexploatering och klimatförändringar. Många fiskare upplever att de marina ekosystems bärkraft minskar. Således är det brådskande att främja utvecklingen av bättre fiskeförvaltning. Denna avhandling adresserar kunskapsluckor inom marknaden och dess aktörer, ett område som fått lite uppmärksamhet inom fiskeförvaltning. Jag bygger på värdekedjekonceptet och använder blandade metoder för att bidra till att minska tre vetenskapsluckor. För det första, strukturer och funktioner av småskaliga fiskmarknader och relationerna där i. För det andra, hur förmåner distribueras inom marknaden och påverkas av handelsrelationer. För det tredje undersöker jag hur relationer och fördelningen av förmåner kan påverka fiskebeteende. Fallstudier används genom hela avhandlingen och bygger på empiriskt arbete i Zanzibar, Tanzania och Iloilo, Filippinerna. Den globala handeln av fisk och skaldjur ses som en pådrivande kraft för förändring i alla fyra artiklar i avhandlingen. Detta diskuteras uttryckligen i de två senare artiklarna. **Artikel I** applicerar ett brett synsätt på värdekedjan genom att kombinera ekonomiska och informella utbyten, och visar på så vis ett utvidgat perspektiv på hur handel med fisk bidrar till människors välbefinnande. Uppsatsen belyser även flera marginella aktörer. **Artikel II** visar hur aktörers förmåga att få tillgång till ekonomiska fördelar påverkas av lokala könsroller och sociala relationer. Men dessa påverkas även av deras position i värdekedjan och slutmarknader. Lokala normer tycks spela en större roll i fiskares beteende än marknadsincitament. Dessa dynamiker undersöks genom experiment i **Artikel III**. Slutligen undersöker **Artikel IV** hur beskyddarskap (patronage) kan ha motsägande betydelser för fiskesamhällets sårbarhet och anpassningsförmåga. Detta kan också skapa påfrestningar för systems resiliens när de beaktas från olika nivåer. De fyra artiklarna bidrar tillsammans till en ökad förståelse för handelsinteraktioner och lokala till globala drivkrafter inom småskaliga fisken, speciellt i förhållande till fiskares beteende och dess ekologiska inflytande. Artiklarna ger även inblick i några av de faktorer som påverkar fördelningen av förmåner från fiskhandel. Dessa aspekter har åberopats som avgörande för att utforma strategier för att förbättra välbefinnandet hos människor som är beroende av fiske. **Nyckelord:** småskaliga fiske, värdekedjor, genus, fisk- och skaldjurhandel, globala marknader, beskyddarskap (patronage), välbefinnande, förmåner, marknader, lokal social dynamik

Abstract Swahili

Tasnifu hii ina dhamira ya kuangalia mahusiano ya kibiashara baina ya masoko na wavuvi wadogo wadogo ili kuelewa namna wavuvi wanavyochangia katika hali ya kiuwezo wa binaadamu na tabia zao katika kujali mazingira. Wavuvi wadogo wadogo wana umuhimu katika kuchangia kwenye chakula na maisha ya mamiloni ya watu duniani na sasa yanaongezeka katika biashara za kidunia. Uwezo wao wa kutoa faida kwa jamii na wavuvi una changamoto zinazosababishwa na athari za kibinaadamu kwa mfano mabadiliko ya tabia nchi na uvuvi uliokithiri na pia uvuvi mwingi sasa unaona mabadiliko ya kushuka kwa hali ya ubora wa mazingira. Naona kuwepo na uongozi bora wa uvuvi na kukubalika ni muhimu. Tasnifu hii inataka kuonyesha mapungufu iliyozunguka masoko na washiriki waliopo katika maeneo ambayo hayaingizwi katika uongozi. Nina angalia dhana ya mlolongo wa thamani ya biashara na mbinu nyenginezo ya namna ya kukabiliana na mapungufu haya matatu. Kwanza muundo utendaji waa masoko ya wavuvi wadogo wadogo na wingi wa mahusiano yanayoathiri haya. Pili namna gani faida zinavyogawanywa kati ya wanaojihusisha na masoko na namna yanavyoathiriwa na mahusiano ya kibiashara. Tatu ninaangalia namna ya mahusiano ya namna faida zinavyogawiwa zinaweza kubadili tabia za kiuvuvi. Mifano mbali mbali inatumika katika tasnifu nzima kuonyesha kazi iliyofanyika Zanzibar, Tanzania na Iloilo huko Ufilipino. Umuhimu wa masoko ya duniani na biashara ya samaki unatambulika kama chanzo cha mabadiliko katika ripoti zote nne za tasnifu na pia katika mbili nyenginezo. Jarida la I linaonyesha ya kuwa kupanua mlolongo wa thamani na kuchanganya mabadilishano ya kiuchumi rasmi na yasiokua rasmi inatambulisha kwa upana aina mbali mbali ya vyanzo vinavyohusina na uvuvi kwa faida ya binadamu katika biashara za samaki na inaonyesha hata wale waliokuwa sio wachangiaji wakubwa. **Jarida la II** inaonyesha uwezo wao wa kufikia faida za kiuchumi kwa njia tofauti za tabia (k.m. jinsia), nafasi yao katika mlolongo wa thamani na masoko ya hatua ya mwisho. Maamuzi ya kupata rasilimali yanaonekana kutokana na ushirikiano kati ya mahusiano ya kijamii yanayohusiana na usimamizi, kanuni za mitaa na mienendo ya mazingira, na pia mienendo inaangaliwa kupitia majaribio mbali ambayo yanaoneka katika Jarida la III. Hatimaye Jarida la IV linaelezea namna ya wakubwa wanavyoweza kuwa na ushawishi wa kupingana kwa wavuvi katika namna ya kukabiliana na mazingira na uastahmilivu kwa ujumla huku zikiangaliwa kwa njia tofauti ukilinganisha na mlolongo wa thamani kwa ujumla. Majarida haya kwa ujumla yanachangia kuelewa vizuri zaidi mambo ya ndani na nchi na ya kidunia katika tabia na ushirikiano wa biashara ya uvuvi mdogo, na biashara ya uvuvi na ushawishi wa mazingira. Pia hutoa ufahamu katika baadhi ya saba zinazochangia usambazaji wa faida zinazohusiana katika uvuvi mdogo na milolongo ya thamani. Mambo haya yamesemwa ya kuwa ni muhimu katika kubuni mikakati ya kuboresha ustawi wa watu wanaotegemea uvuvi.

Maneno muhimu: wavuvi wadogo wadogo, muunganisho wa kibiashara, jinsia, bishara ya vitu vya bahari, masoko ya dunia, ubora wa maisha ya binaadamu, faida, masoko, mienendo ya kijamii

Abstract Hiligaynon

Ini nga pagtuon nagatuyo nga pagalantawon ang aktibidades kag pagpamaligya sang magagmay nga mga mangingisda para maintindihan ang ila kontribusyon sa kaayuhan sang kadam-an kag maangut ang epekto sang ila paghulag sa palibot. Ang magagmay nga pangisdaan ang isa sa mga importante nga nagahatag pagkaon, kag pangabuhian sa minilyon nga tawo sa bilog nga kalibutan kag padayon nga nagadamo ang kontribusyon sa pangkalibutanon nga pag pamaligya. Bangud sa indi insakto nga paggamit sang mga tawo sa dunang manggad ilabi na sa kadagatan, padayon nga naganubo ang panguhaon sang mga mangingisda hasta sa gilayon nga pagkaubos sini. May ara lamang magagmay nga ihibalo ang mga tawo nahanungod sa insakto nga pagdumala sang kadagatan. Ini nga pagtuon nagatuyo man nga mahatagan solusyon ang mga kakulangan sa impormasyon nahanungod sa pagdumala kag pamaligya sa sector sang pangisdaan. Ang konsepto sang value chain kag nanari-sari nga mga pamaagi amu ang gingamit para masolusyunan ang tatlo ka kakulangan. Una, ang estruktura kag aktibidades sang magagmay nga pangisdaan. Ikaduwa, kung paano ang partedahanay sang mga benepisyo sa pamaligya kag ang epekto sini sa pag baligya-anay. Ikatatlo, kung paano ang relasyon kag partedahanay sang benepisyo naga impluwensya sa pagpangisda sang mga tawo. May mga pagtuon sa Zanzibar, Tanzania kag Iloilo, Philippines ang nagamit sa kabilugan sang ini nga pagtuon. Ang katungdanan sang pang kalibutanon nga pagpamaligya sang (seafood) amo ang ginakilala nga naghatag sang madako nga bulig sa apat ka pagtuon. Ini nahatagan konsiderasyon paagi sa duwa ka na ulihi nga mga pagtuon. Ang nauna nga pagtuon nagapakita nga ang pagalab-ot sang *value chain* sa mga mangingisda amo ang nagahatag sang mas malapad nga sakop sang ginakuhaan sang pangabuhian sa pagpangisda. Ang ikaduwa nga pagtuon nagapakita kung paano nakaapekto ang pagkalalaki kag pagkababae kag subong man ang ila relasyon sa sosyedad sa ila abilidad sa pag-agum sang mga benepisyo pang-ekonomiya. Pero ini naga-angot man sa ila posisyon sa value chain kag sa pagbaligya-anay. Ang kinaadman sang komunidad nagapakita sang ila responsibilidad kag pamatasan sa pagpangisda, mas labaw pa gid sa benepisyo na ila makuha sa pagbaligya-anay. Ang ini na pagginawi napakita paagi sa nanari-sari na mga ekspiremento na makita sa ikatatlo nga pagtuon. Sa kata-pusan, ang ikaapat na pagtuon, nagalantaw kung paano ang mga nagahatag sang bulig may negatibo nga impluwensiya sa mga mangingisda sa ila kahinaan kag abilidad sa pagpakig-ayun. Ini maging tuna-an man sang tensyon sa pangkabilugan na sistema kung ikonsiderar ang nanari-sari nga mga basehan. Ang ini na mga pagtuon nagahatag sang dugang nga pag-intindi sang komunidad sa pangkalibutanon nga mga elemento kag interaksyon sa mga magagmay na mga mananagat kag pagpamaligya sang mga seafood. Labi na gid, sa sang pagginawi sang mga mangingisda sa mga impluwensiya sang palibot. Naghatag man sila sang ila kaugalingon nga ihibalo parte sa iban na rasun nga nakaimpluwensiya sa pagbinahin-bahin sang benepisyo sa pagpangisda. Ang ini na mga aspeto nakita nga kinahanglanon sa pag ubra sang mga stratehiya para maimprobar ang kaayuhan sang mga tawo na tuman gid ang pag depende sa pagpangisda. **Keywords: magagmay na pangisdaan, pagkalalaki kag pagkababae, pagpamaligya sang seafood, kalibutanon nga pagpamaligya, nagahatag sang bulig, kaayuhan sang kadam an, benepisyo, pama-ligya, kinaadman sang komunidad**

List of Publications and contribution

Paper I: Drury O'Neill, Elizabeth, and Beatrice Crona. "Assistance Networks in Seafood Trade – A Means to Assess Benefit Distribution in Small-Scale Fisheries." *Marine Policy* 78 (April 2017): 196–205. <https://doi.org/10.1016/j.marpol.2017.01.025>.

Paper II: Drury O'Neill, Elizabeth, Beatrice Crona, Alice Joan Ferrer, Robert Pomeroy, and Narriman Jiddawi. "Who Benefits from Seafood Trade? A Comparison of Social and Market Structures in Small-Scale Fisheries." *Ecology and Society* 23, no. 3 (July 23, 2018). <https://doi.org/10.5751/ES-10331-230312>.

Paper III: Drury O'Neill, Elizabeth, Therese Lindahl, Tim Daw, Beatrice Crona, Alice Joan G. Ferrer, and Robert Pomeroy* (submitted to *Frontiers in Marine Science*). "An experimental approach to exploring market responses in small scale fishing communities".

Paper IV: Drury O'Neill, Elizabeth, Beatrice Crona, Alice Joan Ferrer, and Robert Pomeroy* (submitted to *Environmental Research Letters*). "From typhoons to traders: the role of patronage under changing market and climate conditions".

*authorship to be decided

My contribution **I- IV:** Co-Idea generation. Data collection. Data analysis. Paper preparation. Writing as leading author.

Contents

| | |
|--|----|
| Introduction | 1 |
| Thesis scope | 6 |
| Theoretical background & framing | 9 |
| <i>Social-ecological systems</i> | 9 |
| <i>Small-scale fishery markets</i> | 12 |
| <i>Value chains in small-scale fisheries</i> | 14 |
| <i>Patrons and clients</i> | 16 |
| <i>Resilience, adaptability & governability</i> | 19 |
| Research & methodological approach | 21 |
| <i>Pursuing a Sustainability Science thesis at the Resilience Centre</i> | 22 |
| <i>Approach by paper</i> | 22 |
| <i>Data collection & methods</i> | 27 |
| <i>Analytical methods</i> | 30 |
| <i>Ethics & positionality</i> | 31 |
| Context | 34 |
| <i>Selecting the cases</i> | 34 |
| <i>Iloilo, Western Visayas, Philippines</i> | 36 |
| <i>Unguja, Zanzibar, Tanzania</i> | 40 |
| Key findings- results & discussion | 44 |
| Final insights & reflections | 53 |
| Thanks | 56 |
| References | 58 |

Introduction

Fisheries operate in all shapes and sizes by harvesting, raising, collecting or hunting a multitude of aquatic organisms in many types of waterscapes worldwide. The actors that take part, directly or indirectly (e.g. processing, market related, boat building) in the many activities associated with fishing reflect the huge diversity of human interactions with the aquatic world. One does not have to be a man to be a fisher and one does not need a boat. Some types of fisheries are a heritage and a tradition, with skills and knowledge passed down over generations, making up part of peoples' livelihood strategies and lifestyles. Other types represent last resort options for displaced populations. Sometimes they are subsistence-based, while at other times or places they are highly commercialized and connected to the global market. Fishing technology can constrain fishers within environmental cycles (e.g. tides, weather) or enable them to overcome natural limitations (Kooiman et al. 2005). These descriptions can all be applied to operations generally referred to as artisanal or small-scale fisheries (hereafter SSF), which are the focus in this thesis. SSF, however, are anything but small. They constitute about half of the global fish catch, which increases to two thirds when considering seafood for human consumption only (World Bank 2012, FAO 2015). SSF employ 90% of the world's capture fishers and fish workers, of whom almost half are women (ibid).

SSF are often romanticised in work on sustainability as a result of narratives accentuating their use of more traditional or artisanal gears, their focus on local trade, indigenous resource allocation systems, and the role of community institutions in their governance¹. Yet all of the above can undermine the resource base or be at odds with longer-term societal goals (Kooiman et al. 2005). Economic or social inequality, marginalization, subordination and forced labour can be

¹ Basurto et al. 2017 define governance as: "*the process of discussing, agreeing, designing, and implementing informal and formal rules (i.e., procedures, laws) to allow for members in society to have orderly and productive interactions with one another for a specific goal.*" Governance is about steering human behavior and social interactions (through combinations of civil society, state or markets) in the long-term (Kooiman et al. 2008, de la Torre-Castro 2012). Policy relates to specific guidelines and rules in a tighter period of time and management is the practical and operational implementation of policy (ibid).

prevalent within these "local communities, traditions and values" (Belton et al. 2018, Johnson et al. 2018). Such romanticised visions of SSF risk becoming even farther away from reality as these fisheries increasingly harvest high-value seafood in order to supply international markets² (Johnson 2006).

SSF have been incorporated into the expansion of international seafood production, trade and regulation (Thorpe and Bennett 2001) through processes of globalization³, which penetrate most societies worldwide today. The social and ecological outcomes of this incorporation are important due to the magnitude of livelihood opportunities and employment generally associated with these systems. SSF support over 100 million small-scale fishers and fishworkers, 98% of which live in low income countries. They are also important suppliers of human nutritional needs, particularly in areas of food insecurity (World Bank 2012, FAO 2017a).

SSF, and the markets they supply, and can be driven by, are important from a human wellbeing perspective⁴. Socially, SSF can increase wellbeing by creating livelihoods and providing animal protein. However, from an ecological standpoint, SSF are connected to relatively insatiable markets, which can threaten human wellbeing as a result of eroding ecosystem health in various ways. An example of this includes the geographic expansion (through sequential exploitation) by seafood corporations for particularly lucrative species, such as sea cucumber (Berkes 2006, Crona et al. 2015). Generally speaking, ecosystem health is threatened in many SSF today with evidence of over-exploited stocks, declining landing biodiversity, and at - a larger-scale - changing marine productivity patterns (Kittinger et al. 2013, Kolding et al. 2014, Barange et al. 2014).

Besides markets, which are themselves driven partly by population growth and demographic change (Barange et al. 2014), SSF face sustainability challenges as a result of multiple interacting drivers at different scales. The most evident driver is climate change, and the many interlinked alterations it brings for natural and human systems.

² Small-scale fisheries trade has been incorporated into global trade networks for millennia, and into the process of globalization over the last half a century. However, seafood demand has grown very quickly alongside a declining ability to meet such demands (Crona et al. 2016).

³ Globalization emphasizes the increased interdependence of social and economic relations and networks across (Cuterela 2012)

⁴ I do not take a wellbeing approach but use the term as a way to broadly describe the benefits that actors can capture, though not subjectively e.g. happiness, satisfaction- I talk broadly about material (e.g. income, assets) and relational (e.g. social networks, obligations) wellbeing (Coulthard et al. 2011).

These changes include demographic transitions, land-use change, population growth, coastal erosion and ocean acidification, to name a few (Kittinger et al. 2013, Barange et al. 2014, Seijo et al. 2016, Österblom et al. 2017, Ford et al. 2018).

How to accomplish better governance remains as one of the biggest challenges for fisher's abilities to secure their livelihoods, food security and endeavour for better resource management (see Basurto et al. 2017 for a detailed description on different challenges to SSF governance). Governance approaches have begun shifting towards more holistic, ecosystem- and participatory-based perspectives, in response to the recognized importance of SSF for human wellbeing e.g. (Coulthard et al. 2011, Weeratunge et al. 2014, Daw et al. 2016, Johnson et al. 2018). Yet, a previously narrow focus on; for example, production activities (e.g. gear restrictions, stock assessments), off-shore exploitation, employment maximization and infrastructure upgrading, still lingers in practice (Béné & Heck 2005, Kurien 2005, Béné, Hersoug, et al. 2010, Crona et al. 2010, Mignot et al. 2011).

What exactly the key SSF governance challenges are have been shifting alongside managers and academics' understanding of the problems. These scientific perspectives traditionally came from western rich industrialized countries. In the 1960's the problem-focus lay on "under-exploitation", linked to colonial administration's desires for increased fish production. Since then attention has gradually shifted toward "over-exploitation", and subsequently in the 2000s, the "value and use of resources" i.e. valuing the resource for tourism or industrial fisheries or conservation (Basurto et al. 2017, Blandon 2018). Ultimately, how SSF governance problems are defined is an ethical and political process (Basurto et al. 2017). A challenge is to provide a richer picture of SSF to enable better, more inclusive problem definitions, characterized by a broader group of actors. This thesis focuses on key perceived gaps in academic knowledge of SSF towards developing a richer picture of their complexity. This may contribute to a more effective articulation of the problems and enactment of future SSF management.

Three such gaps highlighted by SSF governance research as needed for governing SSF relate to: i) the structure and functioning of markets and the multitude of relationships they affect; ii) how benefits are distributed amongst actors in the market and in turn affected by trade relations; and iii) how relations and benefit distributions affect the use and subsequent health of ecosystems. These are outlined in more detail below.

Gap 1 highlights the need to improve understanding of market structures and dynamics (e.g. identity, size, and numbers of traders/fishers, product-types etc.) and the pattern of relations in which SSF and trade are embedded (Kurien 2005, Kooiman et al 2005, Crona et al 2010; 2015). These market features are inadequately understood and integrated in conventional fisheries governance (Kooiman et al. 2005). Notably, there are few accounts of the structure of seafood markets and the very multidimensional nature of the associated economic activities (Kurien 2005). Seafood market actors and value chains are still rarely included in fishery governance strategies (Bjørndal et al. 2015, Purcell et al. 2017). Non-economic aspects of markets such as cultural characteristics, social relationships and market participation are often undervalued in SSF governance, though they filter and structure trade and livelihood dynamics (Davis and Ruddle 2012).

Gap 2 accentuates the need to better understand how SSF derived benefits are distributed and affected by market structures and participation, social relations and market conduct (buying, selling and pricing). Knowledge around how seafood trade interacts with local production systems remains poorly discerned by managers and academics. This is in part due to of the lack of nuanced understanding of local trade arrangements, relations and benefits accrued (Crona et al. 2016). There is little on-the-ground evidence to show that communities reliant on SSF for food or work have benefited from growing trade demands and connections (Béné et al. 2010). The benefits of global seafood trade participation by local actors remains a debate (see Kurien 1998, 2004, Béné et al. 2010b, Bennett 2016) and benefit flows from SSF trade to actors involved remains obscure (Wamukota et al. 2014, Bjørndal et al. 2015). However, social relations are pathways through which benefits derived from trade can flow. Understanding them is therefore important for improved fisheries governance (FAO and Department for International Development U.K. 2005, Turner et al. 2014, Fabinyi et al. 2018).

Gap 3 relates to our (academia) limited understanding of the links between trade, the incentives trade creates for SSF actors, and its effect on the environment (Crona et al. 2010, Ferrol-Schulte et al. 2014). In many SSF systems, efforts to analyse the impacts of markets and market actors on fish populations and ecosystems have not been done (de la Torre-Castro 2012). Ample evidence exists on how fishers are implicated in overexploitation or destructive practices (Berkes et al. 2001, Béné 2003). But what is lacking is an analysis of

how such behaviour is linked to, and possibly driven by, market relations and even broader social system structures within which market actors, including fishers, are embedded (Andrew et al. 2007). In fact, deeply engrained fishery relations like patronage⁵, and their abilities to deal with short-term change, can conflict with ecosystem sustainability or governance objectives, when coupled with external drivers like global seafood trade (Máñez and Ferse 2010, Crona et al. 2010, Johnson 2010, Ferrol-Schulte et al. 2014, Ferse et al. 2014, Nurdin and Grydehøj 2014).

Filling these three knowledge gaps will contribute: a to better understanding of the drivers and interactions behind local and global seafood trade, fishers' behaviour, and its ecological influence, as well as the distribution of benefits, such as income. All of which are vital for designing strategies that improve the wellbeing of people reliant on fisheries (Rodrigues and Villasante 2016). To address these gaps, I rely on a market-centred perspective with a focus on social relations like patronage and reciprocity. The overall research questions explored by this thesis are thus:

- What are the relational patterns between SSF actors, and how do these affect participation in seafood market systems and subsequently benefit distribution (in terms of livelihood access, food and services)? (Paper I & II)
- Does the distinct socio-politically context in which local SSF markets are embedded affect how actors benefit from their connections and participation? (Paper II)
- How do market relationships, and the benefits they provide, influence fishing behaviour and ecosystem health? What does this mean for future SSF systems sustainability? (Paper III & IV)

⁵ I use patronage the same way I use patron-client relations- the informal relations developed between a patron (e.g. trader/buyer) and a client (e.g. fishers) which involves the client marketing to the patron in exchange for favours like loans. The patron receives loyalty, a steady supply of products and other benefits. Clients become indebted to their patrons- morally and financially. Patrons are usually of higher socio-economic status than clients. Traders/buyers are clients too with their own patrons, I explain these relations more in the 'Theoretical background & framing' section

Thesis scope

I aim to address the three outlined gaps through four papers, all of which draw from case study systems in either the Philippines, Zanzibar (Tanzania), or both. Figure 1 shows the conceptualization of the thesis study system and the relative scope of each paper.

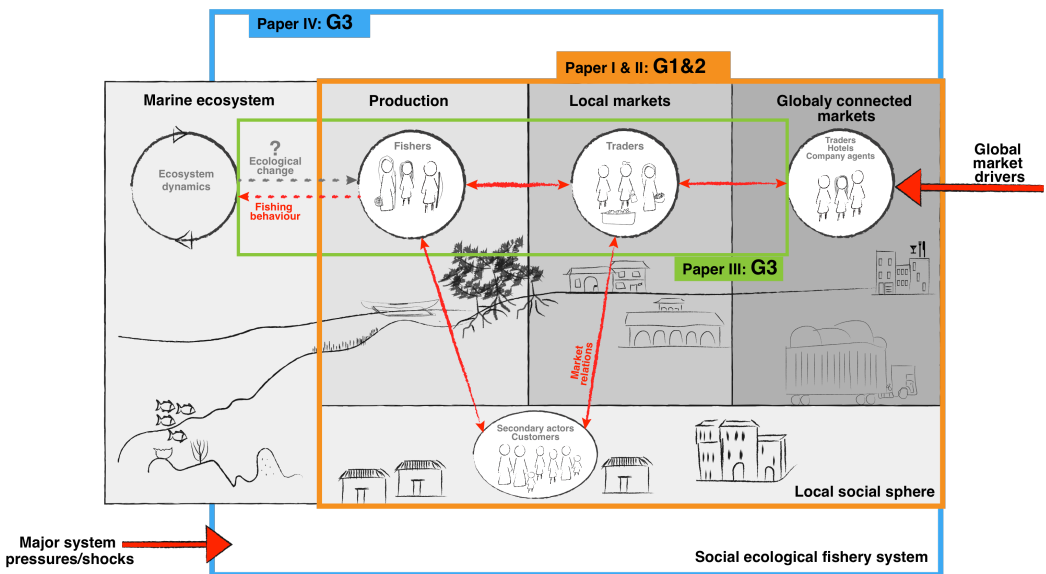


Figure 1: Conceptualization of the thesis focal system. Key research gaps and the scope of each paper is superimposed. The red lines represent the market relations from which actors can draw benefits, either financial or other. The dotted red line represents fishers' interaction with the marine ecosystem, determined in part by market dynamics. The grey dotted line represents potential ecological changes fishers face as a result of fishing behaviour. The local social sphere includes 'secondary actors' and customers not directly encompassed by trade relations. Production and market dynamics are embedded within the local social sphere, which sets the rules and roles in the market. Major shocks or pressures e.g. typhoons, impact the fishery system and ecological dynamics, and global markets are a driver of market relations and trade.

Paper I and II: The first two papers address market and related social structures (G1), as well as resulting benefit distributions (G2). They represent an initial step towards applying a broader lens to seafood trade dynamics. Focus is on unpacking relevant social and market dynamics that determine benefit flows stemming from sea-

food trade, and which are likely to impact resource extraction decisions. As I am looking at the market environment, market relationships and structures in particular, I use the value chain (VC) to bound my system. I focus specifically on the patron-client relationship (patronage) highlighted as a key and influential linkage in SSF literature. I also apply a social-ecological systems lens. This allows for the VC framing to both extend to the ecosystem, while at the same time consider the links of market actors to resource extraction dynamics.

Paper I focuses solely on Zanzibar, allowing me to explore the rich details of market related relationships, while Paper II is a comparison between SSF in Zanzibar and the Philippines. The latter allows me to compare and contrast two distinct socio-political settings. To address the research gaps both papers ask: *How are actors connected and how do they participate in seafood market systems? How do these connections subsequently influence the benefits they obtain (in terms of livelihood access, food and services)?* Adding in Paper II- *How do socio-politically distinct market and social structures surrounding SSF impact how actors benefit from their connections and participation in seafood trade?*

Paper III: Paper III examines the links between trade relations, fishing decisions and ecosystem effects (G3) and is based on a Philippine case study. It takes an experimental, mixed method approach to link global market dynamics to fishing behaviour through the patron-client link. This approach was chosen as the difficulty in assessing decision-making with survey methodology emerged during fieldwork for Paper I and II. Paper III is a direct attempt to try to assess how trade dynamics (price in particular) impact fishing activities and ecosystems, while considering contextual factors influencing how trade and fishing operates. Specifically, I ask: *To what extent does a change in the price (under uncertain catch rates) affect fishers' loan taking and fishing behaviour? What household and individual characteristics (e.g. nature of patron-client relationship, gender, gear type, and financial risk preferences) predict fishers' propensity to take fuel loans from patrons?*

Paper IV: The final paper is a synthesis that brings together experience and data collection from two fieldwork campaigns in the Philippines, contributing to Gap 3 and the links between trade, fishing dynamics and long-term ecological viability. Here I take a broader systems approach in examining these links in relation to the historical development of a Philippine fishery after a major shock. I use the patron-client relationship as a lens, as this informal fishery institution

is common and central to the organization of many SSF worldwide. As such the patron-client link has a large potential to determine the outcomes of external disturbances, such as typhoons. I draw on the concepts of adaptability, resilience and governability as means to reflect on short- and long-term fishery pathways. Paper IV is guided by the question: *How does the patron-client link mediate system changes triggered by an external shock, and how do the resulting changes impact fishing operations and overall system resilience?*

Theoretical background & framing

Social-ecological systems

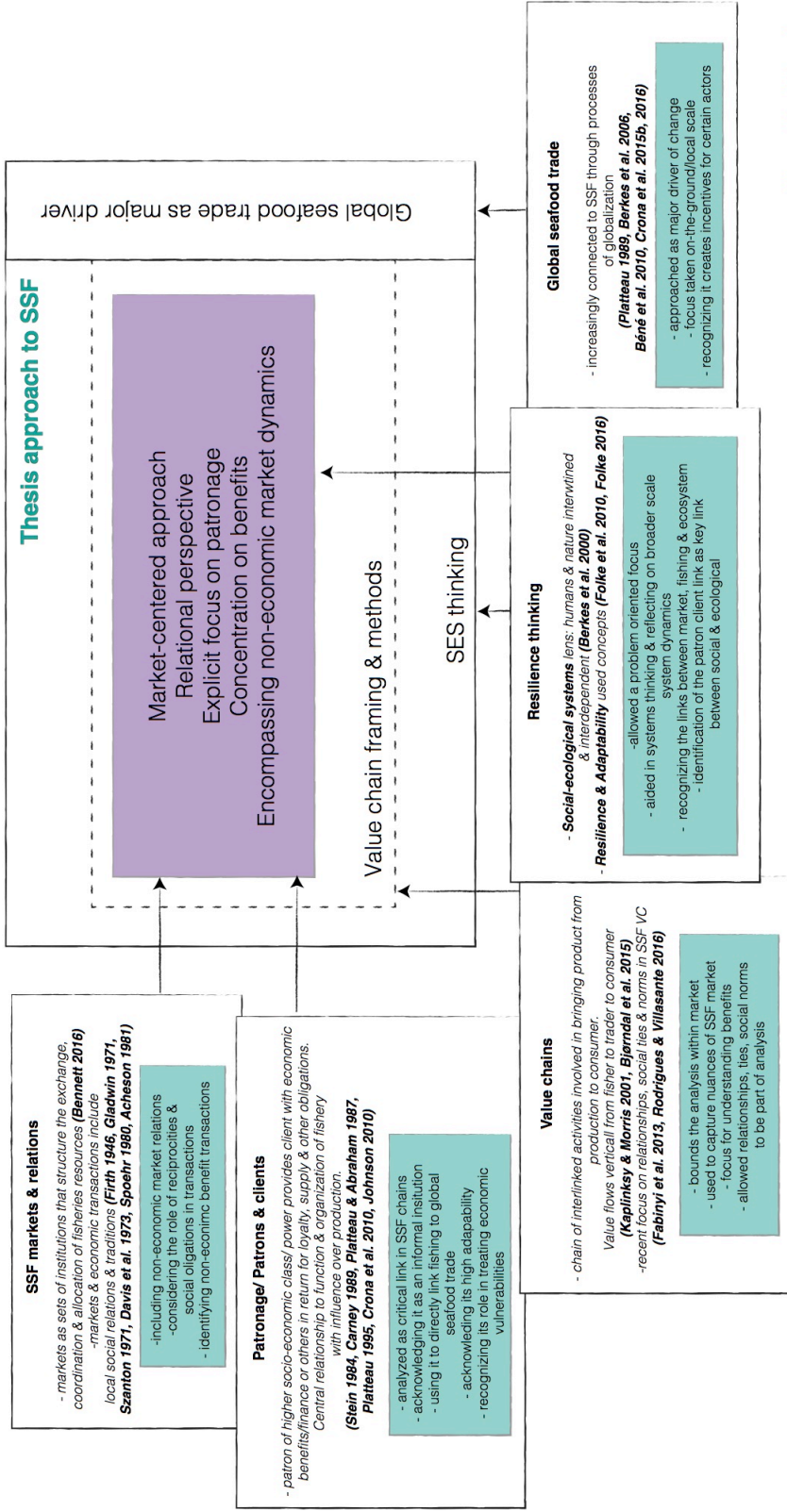
Social-ecological systems (SES) as a concept was defined within resilience thinking (explained in 'Research & methodological approach' section) to highlight the arbitrary and artificial delineation between humans and the environment (Berkes et al. 2000). This lens emphasizes humans as an integrated part of nature, and human-biosphere⁶ interdependence (Folke 2016). SES change overtime in response to multiple drivers and feedbacks between the social and ecological components, and as a result are described as complex adaptive systems (CAS) (Holland 1992). This lens represents my worldview throughout the thesis and serves as a way to organize and understand complexity. A SES lens is valuable in fisheries because its focus on human-nature interactions allows for insights that can contribute to more holistic governance perspectives (Berkes et al. 2001). The SES lens has also led scholars to examine issues of scale in governance (Berkes 2006), which illuminates external drivers of change for SSF (Kittinger et al. 2013), identifies important ecological dynamics in poverty-alleviation oriented SSF research (Nayak et al. 2014), as well as many other previously overlooked linkages of SSF systems (Cinner et al. 2009, Cinner 2011, Leslie et al. 2015).

Increased interest in how the connections (like trade or policies) between SSF and global markets affect local social and ecological outcomes have triggered a number of studies that examine links between the ecosystem, fishers and markets, and also speculate about feedbacks that are likely to determine longer-term system trajectories (Crona et al. 2010, Thyresson et al. 2011, Ferrol-Schulte et al. 2014, Ferse et al. 2014, Crona et al. 2015, Kininmonth et al. 2017). This thesis aims to contribute to this emerging body of work through four papers that build sequentially on each other. While the SES lens has guided the overall thesis scope, the first two papers have a narrower focus on the market, looking at local-scale social dynamics in two different cultural settings. These two papers therefore weigh more

⁶ the thin, fragile layer of life around planet Earth (Folke 2016)

heavily in the social realm of the SES. Paper III brings in the ecological sphere more directly by explicitly engaging with fishing dynamics. The final paper considers SSF at broader scales and as a complex system, conceptualizing the SES and its future trajectory as a result of interactions between external system changes e.g. climate change and internal dynamics e.g. patronage.

Figure 2 below outlines the theoretical framing I use and shows how I have brought together a number of scholarly disciplines to address my overall research aim.



Theoretical framing

Figure 2: The main bodies of theory on which this thesis draws, feeding into the approach taken (marked in purple in the centre box). The different bodies of literature provided different concepts and knowledge which are described briefly in the white boxes. The specific insights I took from each body are summarized in turquoise boxes. Global seafood trade is recognised as a driver of change throughout the thesis. Relational perspective in this thesis means a focus on the relationships in trade and the market.

Small-scale fishery markets

SSF markets⁷ have been studied for at least eight decades in research ranging from cultural studies, ethnography, anthropology and economics (Firth 1946, Gladwin 1970, Szanton 1971, Davis 1973, Quinn 1978, McGoodwin 1980, Spoehr 1980, Acheson 1981). This research has included work on market conduct and organization, as well as rich accounts of the relationships and social dynamics between fisheries actors, including patronage systems, customary exchanges and reciprocities [e.g. (Firth 1946, Gladwin 1970, Davis 1973, Stirrat 1974, 1988, Smith 1977)]. These diverse bodies of work have brought to light the informal credit systems prevalent in many SSF and the importance of local social ties and obligations in both trade transactions and wider fishery related interactions (ibid). Previous SSF research has also examined some of the changes associated with the penetration of capitalism into such systems (Stirrat 1974, 1988, Acheson 1981, Vercrujssse 1983, Platteau and Abraham 1987, 1987, Houtart and Nayak 1988).

The focus on globalization and SSF in part stems from a concern about its effect on small fishing societies previously disengaged from the insatiable demands, high prices, business models, policies and governance systems associated with the global economy (Platteau 1989, Kurien 1998, Gössling 2002, Berkes et al. 2006, Béné et al. 2010, Crona et al. 2015, 2016). One of the most direct ways SSF are incorporated into the process of globalization is through trade and transactions, which have been evaluated from many vantage points, including feminist, anthropological, sociological, fisheries science, and economic (Platteau 1989, Kurien 1998, Gössling 2003, Porter et al. 2008, Ferolin and Dunaway 2013, Bennett 2016, Crona et al. 2016).

The rapid development of international markets affect SSF governance and organization at all levels (Kooiman et al. 2005, Berkes 2006, Johnson et al. 2018) and manifests in more complex ways than economic or trade theory generally suggests (Gössling 2003, Wamukota 2015, Crona et al. 2015, 2016, Wamukota and McClanahan 2017). While empirical evidence is still limited, varied outcomes of market integration on SSF has sparked a decade-long debate regarding the effects and (dis)benefits of globalized seafood trade on local food security, poverty alleviation and trade-benefits (Béné et

⁷ This thesis conceptualizes the market as sets of institutions that structure the exchange, coordination and allocation of fisheries resources (sensu Bennett 2016).

al. 2010, McClanahan et al. 2015). One reason for this polarized debate is a lack of data on multiple variables (ecological, social and economic), especially over time. Lack of differentiation between market types and the high level of local complexity in terms of actors, products, processes and politics are additional challenges (Wamukota and McClanahan 2017). In particular, effects of market integration have not often been studied in relation to ecological impacts and long-term sustainability.

Since the 2000s, scholars have attempted to understand the effects of SSF market dynamics on the ecosystems that underpin them [e.g. (Brewer et al. 2009, Brewer 2011, Cinner et al. 2016, McClanahan and Abunge 2017)]. These works hold markets as drivers, shaping ecosystem conditions and various social and economic outcomes (Crona et al. 2015, Cinner et al. 2016).

Market prices, in particular, have received attention. There is evidence that the higher prices in virtually insatiable international markets have pushed fisheries to cross ecological thresholds in trying to meet demands (Kooiman et al. 2005, Berkes et al. 2006). A key hypothesis is that the economic incentives created by international markets can be difficult for small-scale operators to withstand, and can incite behavioural changes that negatively affect the ecological dynamics that sustain the fishery (e.g. changing target species, abandoning traditional fishing strategies, seeking finance and fishing harder) (Gössling 2003, Máñez and Ferse 2010, Johnson 2010).

This thesis contributes to this emerging scholarship on SSF markets in a changing global context by providing empirical evidence of global market impacts on local fishing communities. I do this by reflecting on how impacts are mediated by contextual features identified as important in the earlier works, such as patronage and customary exchanges. I recognise global markets as one large-scale driver of change that manifests itself in different ways depending on local contexts. In Paper I, global markets are represented as international tourism in Zanzibar and in Paper II global markets are evident from export dynamics in the Philippines. In Paper III I engage directly with the mechanisms of price driven by global markets and its effect on fishers' incentives and fishing behaviour, while in Paper IV global markets are conceptualized as an external driver, which interacts with local institutions (specifically patron-client relations) to alter SSF pathways.

Value chains in small-scale fisheries

To conceptualize and study SSF and global market interactions I used the concept of a value chain (VC). This concept has gained popularity in recent years, from its original conception in business (Porter 1985), to a wider application for understanding major changes in today's market conditions at the micro-scale (Kaplinsky and Morris 2001, Bush et al. 2015). It can be broadly defined as the full range of value-adding activities involved in bringing a product or service from conception to final consumption and disposal (Kaplinsky and Morris 2001).

Through globalization emerged global production and distribution networks, and with this new reality came complexity for decision makers. Policy had to link together distinctly different sectors, such as economic actors, labour organizations, geographies and governance systems in a way that had never been done before (Neilson et al. 2014). Explanatory frameworks were needed, especially by policy makers, to make sense of the newly organized means of global business. From this need emerged a range of chain-approaches and theoretical frameworks (Sturgeon 2008). Some of the most well-developed and widely used include Supply Chain Management (SCM), Global Value Chains (GVC), the Filière tradition, Global Production Networks (GPN), Global Commodity Chains (GCC) and Value Chain Development (VCD) (Gereffi et al. 2005, Bolwig et al. 2010, Lee 2010, Stoian et al. 2015). All are interlinked and build off one another although they originate in different disciplines and philosophies (Bush et al. 2015). Four separate approaches can be distinguished among them; the first based on business administration and economics (VC, SC) (ibid); the second and third from political economy, world systems theory and industrial sociology (GCC, GVC); and the fourth also based on world systems theory, but with a geographical perspective (GPN) (ibid).

While VC studies were developing, macro-scale chain studies began to emerge. First, commodity chains (Hopkins and Wallerstein 1977) were further developed to include a global perspective (GCC) by development scholars, most notably Gereffi, in the 1990s. GCC, which drew on the French Filière approach, classified modes of chain governance as buyer- or producer-driven, by focusing on internal conditions and organizational linkages, mainly around industries (Sturgeon 2009, Lee 2010). However, with increasing empirical evidence and field research showing the enormous complexity in most chains, GCC came under increasing critique as it was too diffi-

cult to assign these governance modes (i.e. buyer- or producer-driven) in a static way to specific industries (Sturgeon 2009). Thus in the early 2000s, Global Value Chains (GVC) were developed which adopted the VC term to emphasize value added and revenue distribution (Bush et al. 2015). Chain coordination became more socially embedded and shifted away from the 'drivenness' in the previously dichotomous modes of GCC governance (Bush et al. 2015). Network-related global research (e.g. GPNs) evolved at the same time (2000s) in response to the perceived simplicity of the chain framing, which did not capture the complex multidimensional and multi-layered lattices of economic activity surrounding the chain (Henderson et al. 2002).

In SSF research, the VC or Commodity Chain (CC) concepts and approaches are most widely adopted. Much of their use in SSF has focused on monetary value and the upgrading of actor's positions in a chain as a means to earn more (see Fabinyi et al. 2018 for a review). Value is examined as it flows vertically through the chain (Bjørndal et al. 2015, Fabinyi et al. 2018). However, more recent uses of the VC concept in SSF have recognized the importance non-financial values and local social relations in structuring actors behaviour and benefits from fisheries (Fabinyi 2013, Adhuri et al. 2016, Fabinyi et al. 2018). Thus, VC analyses in SSF have started to encompass a broader focus on the non-economic relationships between actors, subsequent norms and behaviours (Rodrigues and Villasante 2016) while maintaining and highlighting the importance of the market for SSF governance (Brewer 2011, Thyresson et al. 2013, Fröcklin et al. 2013a, Adhuri et al. 2016, Rodrigues and Villasante 2016).

In Paper I and II I use the VC approach as a tool to map the structure of the market, allowing a focus on the different actor types and their trading relations, while also defining and bounding the scope of inquiry. While it is broadly referred to in the papers as a value *chain* approach, the mapping quickly showed the emergence of a network. Thus, this work was also informed by a network conceptualization of GPN, which highlighted activities at different parts of the chain, but also the context in which the chain is embedded (Henderson et al. 2002, Neilson et al. 2014). The GVC lens draws attention to the dynamics emerging through the interaction among market actors and their inclusion/exclusion in the market place (Bolwig et al 2010). This, and the GVC attention to both vertical and horizontal relations (i.e.

across and within nodes⁸), was particularly useful in Paper I, and II, and helped guide the specific analysis of inequalities among and within groups of nodes of the VC. I delineate my system of investigation at the level of export and, importantly, I use value in a much broader sense than previously considered by VC research, adhering to the more recent SSF VC literature (Fabinyi 2013, Adhuri et al. 2016, Rodrigues and Villasante 2016, Fabinyi et al. 2018). Through this use of the VC concept I attempt to contribute to SSF governance literature, which has been notably poor in accounting for the influence of market dynamics on fisheries outcomes.

Patrons and clients

While the VC provides a useful tool to map the actors and interrelations that make up the seafood market at various scales, other literature and theories are needed to understand how specific relations affect multiple social, environmental and ecological outcomes of market interactions. One such field of inquiry is that surrounding patron-client relations (from here on PC).

PC feature prominently in many SSF and rural agricultural systems around the world. The concept of PC, originated in anthropological studies (Carney 1989) and has since been widely applied in economics and sociology to describe the mutual yet sometimes asymmetrical benefits derived from informal agreements among producers and traders in rural economies (Wolf 1966, Scott 1972, Stein 1984, Carney 1989). The PC system is usually voluntarily entered, asymmetrical in terms of power or socio-economic status, and typically marked by an affinity between the patron and client through ethnicity, religion, or some shared experience such as history or common threat (ibid). Descriptions of PC in fisheries date back to the 1940s and outline how a patron typically provides fishers with a range of services and support both for fishing and family life. In return, the client reciprocates with fish supply, loyalty, connections and other benefits (Firth 1946, Davis 1973, Platteau and Abraham 1987, Merlijn 1989). Since the 1940s, descriptions of close relations between fishers and patrons (traders, buyers, middlemen) have abounded showing the multidimensional role traders play in these societies, encompassing dynamics like debt bondage, patterns of

⁸ I use nodes to define a step in the VC where a group of actors fulfill the same or a similar function within the chain, e.g., production, drying, and retailing.

lending and power relations (Overå 1993, Thi Thanh Vinh Do 2008, Fabinyi 2013, Zamroni and Yamao 2013, Miñarro et al. 2016).

PC can be viewed as an informal institution⁹ as they play a central role in governing market interactions in many SSF (Johnson 2010, Basurto et al. 2013, Bennett and Basurto 2018). Patronage is a source of stability in the provision of food, income and livelihood security in fluctuating systems, both for fishers and patrons, as it has the capacity to respond quickly and flexibly to the needs of both parties (Johnson 2010). The relationship can be adaptable, constantly reconfiguring and reacting to the many seasonal, political and economic changes or shocks that impact a fishery (Platteau 1995). As a result, PC systems are nuanced by local contexts, seas-apes, cultures, community relations, individual ties, local economies as well as many other socio-economic and ecological dynamics. However, some of their core functions make them comparable. Namely their important financing function in low-income contexts where formal options (banks, building societies, micro-credit schemes) are few or relatively inaccessible. They provide essential capital to fish or trade and they put borrowers in-debt to lenders.

Contemporary SSF studies using a SES lens to understand markets highlight how patrons perform an essential linking function within these small-scale systems- through channelling flows between the market, fishers, and fish stocks (Crona et al. 2010, Thyresson et al. 2011, Ferrol-Schulte et al. 2014, Nurdin and Grydehøj 2014). This link constitutes the relationships patrons foster with fishers and through which they develop influence and pressure (intentionally or not) over fisher's behaviour through credit arrangements, reciprocal agreements and gratitude or social obligations (Platteau and Nugent 1992, Karuga and Abila 2007, Máñez and Ferse 2010, Crona et al. 2010, Pomeroy and Andrew 2011, Ferrol-Schulte et al. 2014, Nurdin and Grydehøj 2014, Wamukota 2015). This relational dynamic can have implications for both the social and ecological spheres, by influencing fishing effort and impacting on ecosystem dynamics, thus interfering with management goals and initiatives, and affecting SSF actors' abilities to derive long-term benefits from the ecosystem (Crona et al. 2010, Johnson 2010, Bailey et al. 2016).

⁹ An institution, broadly meaning the humanly devised constraints that structure political, economic, and social interactions. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights) (North 1991). E. Ostrom describes them as "the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighborhoods, markets, firms... and governments at all scales," (Ostrom 2005 pg.3).

Returning to the increasing globalization of seafood markets and its impact on local SES. It is evident that many of today's PC systems now come into direct contact with international trade channels. In such situations, patrons stand between small-scale fishers and the waves of globalization hitting their shores. The role these actors now play is historically unique as SSF have never before been so intensely embedded in global economics. Evidence suggests finance for fishing and trading becomes more prevalent in SSF systems as they become integrated into global markets. This integration normally requires increased fishing effort and higher levels of fishing technology, not easily accessible in SSF markets (Platteau 1989, Williams 2001). Patrons can respond to global prices by supplying their clients with necessary equipment (sometimes destructive), financing increased fishing effort, or by only buying the species in which they specialize and which are destined for high-value export markets (Thorburn 2001, Mañez and Ferse 2010, Johnson 2010, Minarro et al. 2016, Bennett and Basurto 2018). As such, these trading agents are often conceived of as drivers and facilitators of local overexploitation (Crona et al. 2015). Understanding and systematically studying the responses of both fishers and traders to changing demands and prices associated with market integration is key to identifying areas of possible intervention to improve resource governance (Kininmonth et al. 2017). Developing theoretical and empirical knowledge of such global market linkages is thus increasingly important for SSF (Bennett 2016). Yet, studies capturing the complex dynamics of PC and their effects on ecological dynamics remain rare.

This thesis takes a step towards contributing to an understanding of how PC may interact with both local ecosystems and governance. While Papers I, II and III examine the individual relations that comprise the PC system, Paper IV examines the broader social-ecological fisheries system, and PC as one component operating to buffer disturbance at the individual scale. However, in doing so this informal institution simultaneously impacts the ability of formal governance arrangements to effectively govern the fishery, plausibly affecting the long-term trajectory and sustainability of the SES. In the final section of this review and theoretical background I therefore examine the three key concepts used to understand the development of such trajectories in Paper IV.

Resilience, adaptability & governability

The concepts of resilience and adaptability, along with transformation, are key traits used to explain and study change in SES.

Adaptability represents the capacity to adjust responses to changing external drivers and internal processes, allowing the system to develop along the same pathway (Folke et al. 2010). In SES these responses are primarily driven by human actors and their actions, how they learn, experience and adjust to such changes to maintain the current system (Folke 2016). Adaptations can change the relationships and components in a system and thus have implications for overall system structure and resilience (Nelson 2011). *Resilience*, addresses longer-term trajectories and processes and, as it is concerned with the viability of whole systems, naturally incorporates broader scales (Nelson 2011). Resilience, as used in this thesis, is therefore defined as having the capacity to deal with change, to persist and to continue to develop with ever changing environments (sensu Folke 2016).

The cross fertilization of adaptability and resilience with the field of global change has highlighted a key tension - that although adaptation can help to build resilience at one scale, it can also undermine it at another, especially long-term (Nelson 2011, Redman and Kinzig 2003). The process of adaption takes place at different scales, both temporal and spatial, so there is always the possibility that one group can judge actions as succesful, while others, at different times or places, unsuccessful (Barnett and O'Neill 2010). Adaptation processes may provide short-term benefits, but at the same time can increase certain groups' or sectors' vulnerability (i.e their sensitivy and/or exposure to change) in the future. Such outcomes are often referred to as maladaptatation (Barnett and O'Neill 2010; O'Hare et al.). Understanding vulnerabilities of actors and ecosystems at different scales, and trade-offs between them, is a neccesary part of trying to maintain overall system resilience (Folke 2006, Nelson 2011). As such it is also a critical challenge for sustainable resource governance. I use adaptability and resilience to analyze plausible long-term systems trajectories of SSF in the Philippines in Paper IV.

While these concepts with regard to change and longevity have been applied to SSF research as a way to expand and reform management approaches (e.g. Berkes et al. 2001, Berkes 2003, Bene et al. 2009), the tension between specific adaptability and overall sys-

tem resilience has only recently been highlighted in a fisheries context. Specifically, the high adaptability of PC has been noted as threatening longer-term system resilience (Johnson 2010, Ferse et al. 2014). Paper IV therefore uses resilience and adaptability to address this tension by analyzing how PC interact with various system changes to affect future fishery trajectories. Furthermore, the paper discusses what PC means for SSF governance.

To achieve the latter I rely on the concept of *governability*. Governability was developed within the interactive governance community and refers to the overall capacity for governance in a system (Kooiman et al. 2005, Johnson 2010). Governors, the governed and the interactions between and within all groups contribute to the level of governability, along with external influences (Kooiman and Bavinck 2013). Governability is thus seen as an internal property of a fishery system as a whole (Kooiman and Chuenpagdee 2005), and the concept emphasizes that inherent characteristics of a fishery affect its own ability to be governed. Governability changes in response to both internal and external conditions, and each system is comprised of different human-nature combinations, thus not every situation is equally governable and this state changes over time (Kooiman and Bavinck 2013).

In my last paper I use the governability concept as a heuristic to conceptualize and discuss the possibilities for SSF governance, something which resilience and adaptability do not explicitly do. While the SES framework makes social-ecological connectivity explicit, it does not offer guidance for how to account for the interactions between markets and resource governance, nor the chainlike hierarchy through which actors in the market tend to be connected (Bennett 2016). Governability allows me to analyse and discuss how market structures, ecological dynamics and PC interact to affect the capacity for governance.

Research & methodological approach

This thesis was pursued within a larger project with predefined goals and questions; the STEP project (Seafood Trade, Ecosystems and People)¹⁰. Thus, my own questions and approaches were influenced in part by the larger project's objectives. The project was initiated at the very start of my PhD cycle (February 2014) and included partners from Sweden, Zanzibar, Philippines, U.S.A, Ireland, and Scotland. Thus, from the beginning I was influenced by questions asked by SSF expert researchers. The STEP project centred around empirical, case study based research which aimed to collect both qualitative and quantitative data at multiple sites across the Philippines and Zanzibar. My thesis work formed the main empirical data collection and analysis of the entire STEP project.

Paper I and II are primarily driven by empirical observations rather than theory, while in Paper III and IV I test hypotheses and rely more on theoretical concepts to analyse change over time. Overall, I have a strong empirical focus as mechanisms surrounding interactions between SSF actors, markets and marine ecosystems are not well understood. Therefore, I devoted effort to empirical grounding, through place-based case study research. The interactions and relations in focus in this thesis are inherently complex, involving both human behaviour and natural dynamics. I attempted to understand both social and ecological aspects of these SES interactions, and as such needed different ways to study these connections. In this interdisciplinary¹¹ thesis I therefore employed a mixed-method approach throughout all four papers by combining elements of qualitative and quantitative approaches in data collection, analysis and inference techniques (Johnson et al. 2007).

¹⁰A SIDA (Swedish International Development Cooperation Agency) funded project headed by Beatrice Crona and Robert Pomeroy. The project in a nutshell; Efforts to curb unsustainable exploitation of marine resources often focus on restricting fishers' effort. But increasingly global demand can create exogenous pressure that is hard for operators in local systems to withstand. Hence, management must extend up the commodity chain. Here we focus on one critical link in this chain, *the middleman-fisher bond*, which can aid in channeling sustainable practices but can also lock systems in unsustainable trajectories.

¹¹Interdisciplinarity integrates perspectives, information, data, techniques, tools, concepts, and/or theories from two or more disciplines (Cronin 2008)

Pursuing a Sustainability Science thesis at the Resilience Centre

Sustainability science is a use-inspired inter- and transdisciplinary research defined by the practical problems humanity faces today as well as theories and models of interactions between nature and society (Kates et al. 2001, Haider et al. 2018). Sustainability science is defined by the problems it addresses rather than the disciplines it uses to do so (Folke 2016). As a whole this type of science aspires to link knowledge with action, which is still a major challenge (Kates et al. 2001). However it is also based on understanding the structures and features of today's complex sustainability challenges through use-inspired basic science and descriptive knowledge (Wiek et al. 2015, Fang et al. 2018). My focus lies here, where I explore gaps found in academic literature without a transdisciplinary or action-orientated approach. The thesis is inspired by the logic of humility in the promotion of knowledge co-production in sustainability science (van der Hel 2016). Therefore, I made a particular effort to design participatory dialogue methods to feedback, validate and reflect on research findings with the communities and stakeholders of my study systems (this is described by Hakkarainen 2018).

Through pursuing a thesis at the Stockholm Resilience Centre, resilience thinking has remained an overarching umbrella for my research. Resilience thinking can be seen as an approach or sub-field in sustainability science which allows one to ask questions, learn and improve understanding of SES (Folke 2016). This subfield is rooted in ecology and shaped by the worldview that the biosphere is the foundation for all interactions in a SES - from the individual up to a global society (Folke 2016, Haider et al. 2018). My immersion into the Stockholm Resilience Centre provided the SES interdisciplinary methodological approach I have used over the last 4.5 years. In particular, it forced me out of my disciplinary foundations in the natural sciences to be able to better understand and study the sustainability challenges fishery systems face today.

Approach by paper

Paper I & II

The first two papers are observational case studies, using both qualitative and quantitative methods (see Table 1 for an overview of all

methods used in each paper). Quantitative and qualitative data collection were equally important, as I wanted to capture both a representative sample size of fishery actors, but also get a deeper understanding and feeling for the market, fishing relations and connections in context. Quantitative integration and inference of results took precedent while qualitative techniques provided only elaboration, validation or complementation. This was necessary due to the sample size and empirical focus on VC related data, such as costs, incomes, product quantities, as a result of the papers' research questions.

Paper I features a single place-based case study approach. I used this paper as a learning case to answer more open-ended, less theory-driven questions and as an introduction and immersion of myself into the empirical context of SSF, specifically on the Swahili Coast. I also used this work to identify factors of interest, generate more specific questions and build a more rigorous design for the second paper. In Paper II I took a second case study for comparison, based on similar VC characteristics, following a 'Most Similar Systems Design' (see 'Selecting the cases section' and Table 2). Thus, I could compare outcomes while having certain system dimensions remain 'constant'- as much as real life allows. This was to understand how the main difference, in my case the socio-political context, played a role in the comparative outcomes. The lengthy fieldtrips for Paper I and II, and the rich knowledge from each case setting allowed me to see how my observations and thoughts could be connected to the literature.

Documenting complex interactions, as I set out to do, was hard with the case study approach and the methods it entailed. The research design of Paper I and II did not allow for explicit investigation of links to the ecosystem or broader system dynamics. For instance, how the connections and relations in the market play out in a more realistic situation of a closely coupled SES. During fieldwork for Papers I and II, I attempted to collect data linking actor relations to consequential business decisions and their plausible effect on the resource base. This was done through interviews; by asking fishers and traders to state their perceived influence of their social relations on business and resource extraction decisions. However, during analysis it became clear that this interview-based data provided a limited understanding of the strategic decisions around fishing and trading. Actors, particularly fishers, were focused on their daily or seasonal tactical decisions related to weather, species availability and gear type. They rarely recognised (consciously or not) the market, social rela-

tions or patronage as factors shaping, in some part, fishing behaviour. They also appeared to be unwilling to admit to being influenced or dependent on market actors in their decisions, thus potentially biasing the data.¹²

Paper III

To deal with this hypothetical bias in asking people how they would behave given a certain situation (Schulze et al. 1981) and address less consciously driven behaviour in fishers, Paper III uses a behavioural economic experiment and looks at revealed behaviour of fishers as influenced by market features and relations. I chose an experimental approach as I was particularly interested in knowing to what extent economic incentives (in terms of price changes) influence behaviour. Thus, the research design was experimental and based on hypothesis testing.

Behavioural economics emerged as a field amid the growing evidence that the rational actor model of human behaviour was failing, and aims to explain deviations from *homo economicus* (Thaler 2016). Behavioural economic experiments (or economic experiments) use real incentives, most often monetary, to add weight or reality to the decisions actors make, with no deception made by experimenters (unlike some studies in social psychology). The experimental approach involves random assignment of people into control and treatment groups in order to test the effect of a specific variable of interest (the treatment) on individual- or group behaviour. If the randomization has worked, the only difference between the control and treatment groups should be the variable of interest, allowing for a casual determination of effect. There are many different types of economic experiments (Harrison and List 2004). In lab experiments, which traditionally was where economic experiments were held, the experimenter uses neutral language, the environment is abstract or out of context and the subjects are typically WEIRD students (Western Educated Industrialized Rich and Democratic) (Henrich et al. 2001). In Paper III I rely on a framed field experiment (sometimes referred to as a 'lab-in-the-field' experiment), complemented by interviews and focus group discussions, all done in the Philippines. The instructions had a contextual framing and I used field subjects.

¹² Fishing attracts and holds individuals manifesting active, adventurous, aggressive and courageous personalities (Pollnac & Poggie 2008). Such traits may prevent outsiders (i.e. researchers, policy makers, managers) from seeing the possible social pressures or influences that fishers are under as a result of their relationships. Yet they could also represent cognitive barriers for these distinctive personality-types in recognizing influence from the people around them.

Thus, compared to a traditional lab experiment, subjects, in our case fishers, are observed in a more natural setting, contextual instructions are used to add realism, and participants can vary widely in demographics and experiences (for more details on different types of experiments see Harrison and List 2004). In the research approach for Paper III we also used framed lab experiments with students as pilots, but with framed instructions i.e. we gave them context.

The experimental approach is limited by how much results can be generalized beyond the experimental setting, known as external validity (List 2011). To tackle this methodological challenge, I chose to use both experiments and a mix of complementary social science methods; such as focus groups, in-depth interviews, participant observation and structured interviews. These complimentary methods allowed me to use a realistic contextual description in the experimental design, and to unpack perceptions and other drivers of decision-making around markets, price changes and patron-client relations. This in turn helped me to interpret and better understand behaviour observed in the experiment. It also allowed me to collect information on contextual variables which may have influenced experimental behaviour.

Paper IV

Similar to Paper I this paper was an in-depth case-based study. It relies on primary and secondary data collected over two campaigns in the Philippines. This approach was chosen because I wanted to work with the in-depth knowledge I had accumulated during my time in the field and use it to unpack complex change processes over-time. This was hard to do with the more 'snap-shot' and large sample size approach of Paper I and II. The seed for this paper emerged during fieldwork, where themes relating to a major system change that had impacted the fishery and market (Typhoon Yolanda) became apparent during interviews. As interviewees talked about this change process over two field campaigns, I began to iteratively synthesize a narrative of the major events occurring in the system. Using this data, I built a case-based understanding of what is likely to have caused the observed change in the case study fisheries by describing potential causal mechanisms behind it. I do so according to the experiences of research participants occupying various roles in the study system i.e. trade, production, regulatory. By synthesizing their experiences and validating them with external data (such as interview-based findings, participant observations and secondary data in the form of reports and other archival information) this research ap-

proach uses elements of process tracing, focusing on building up different stories and within-case explanations of a given outcome (Collier 2011, Beach 2017). Secondary data included reports by universities and charitable organizations about the Typhoon Yolanda event, which helped to triangulate and validate some of the accounts from the field. More than in the previous papers, this final paper invokes theory as a means to explain the complex dynamics observed between system components, and to infer plausible future trajectories.

Table 1: Summary of the methods I used by paper. ***Bold italic*** shows which approach was prioritizes in which paper

| | Paper I | Paper II | Paper III | Paper IV |
|-----------------|--|--|--|---|
| Approach | Mixed- <i>qualitative & quantitative</i> | Mixed- <i>qualitative & quantitative</i> | Mixed- qualitative & <i>quantitative</i> | Mixed- <i>qualitative</i> & quantitative |
| Research design | Single case study-observational/explorative | Comparative case study | Experimental | Single case study-systems understanding |
| Methods | | | | |
| Data collection | Structured interviews Semi-structure in-depth interviews Participant observations Observation Informal interviews Value chain mapping | | Behavioural economic experiments Post-experiment structured interviews Focus group discussions Participant observation Observation Semi-structure in-depth interviews | Structured interviews Focus group discussions Participant observation Observation Semi-structure in-depth interviews Desk review |
| Analysis | Coding interview responses Descriptive statistics Statistical tests (difference between groups) | Coding interview responses Descriptive statistics Statistical tests (difference between groups) Lorenz curves & Gini coefficient construction | Coding interview responses Descriptive statistics Statistical tests (difference between groups) Regression models | Thematic coding Tracing causal processes |

Data collection & methods

Enumerators

For all data collection methods used in field during this thesis, I collaborated with and trained a team of local enumerators. I spent one to two weeks working with them before beginning data collection. All field instruments were translated to Swahili or Hiligaynon, and subsequently back-translated. All team members were trained by practising and accustoming them with the project objectives, the approach and the instruments themselves.

Both Zanzibar and Concepcion, Iloilo data collection for Paper I and II was done with a team of three local men of various academic backgrounds. The first round of fieldwork was conducted in both countries. In Zanzibar, enumerators were somewhat proficient in English. In Iloilo only one spoke English and acted as a field manager for the other two. During the second field season, which occurred only in Iloilo (mainly in Concepcion), experimental data collection was conducted with a team of three women, all of whom had university level education in economics, had extensive work experience in survey and participatory methods, and had an extremely advanced level of English.

Interviews, observations & discussions

Paper I and II focus on survey methods employing a range of interview and observation types. The most commonly employed method across the entire thesis was the interview.

The bulk of the data for Paper I and II was collected (2014/2015) using structured interviews with a mix of open and close ended questions centred around the VC. This was designed to elicit data on income, market conduct, relational aspects and respondent characteristics. I started with these interviews after mapping the VC and conducted approximately 600 in total across both cases, and about a third of them personally. All interviews were done orally. When conducting interviews myself I asked my questions in English through the enumerator, and transcribed directly during the process.

The second interview type, used in conjunction with the structured interview, was a more in-depth semi-structured interview, carried out with key informants, such as governmental data collectors or village secretaries (n= 50). These in-depth interviews allowed for longer

discussions on the same topics as the structured interviews but with more space to explore major system changes over time and the perceived factors influencing fishery actors and their relationships.

Throughout all fieldwork campaigns, I also conducted participant observation that entailed me getting actively involved in the system. For instance, sitting at markets, living in the vicinity, buying fish at auctions, eating seafood in local restaurants, etc. This allowed me to notice the subtler behaviours and nuances happening at markets and landing sites. I also used informal interviews, where I casually asked people if it was ok to talk quickly about certain topics and carefully recorded these afterwards.

Before field experiments were started for Paper III (2017) I used participant observation, informal interviews and semi-structured in-depth interviews at the main port with patrons. I did so to make sure that our assumptions for the experimental design were reasonable, i.e. about the business set-up and trading dynamics between the fishers and the patrons as well as about system changes impacting prices. Experiments were complemented by structured interviews with all participants immediately after the experiment ended (n=251, involving 10 fishers each experimental session). This allowed for us to collect background and contextual data I would later bring into the statistical analyses. During these interviews I also asked participants to interpret the game and how they reasoned with the different decisions and values involved

After every third experimental session a focus group discussion or a semi-structured in-depth interview was done, which I alternated systematically. All these methods collected data on fishers' experiences with real-world price changes or system changes and aided inference from the experimental observations. Separate from the experimental data collection, we carried out structured interviews with fisher's patrons (n= 25) at the major ports, as well as throughout the island villages. These interviews were structured in a similar way to the experiment, as we logistically could not carry out the experiment with trading actors, yet still wanted to understand their market behaviour. We asked patrons to walk us through how they respond to price changes in the market and what that means for their finance and loaning systems with clients and their own patrons.

Material for Paper IV was drawn from all data collected during this second field period. During all field visits both in Zanzibar and Iloilo, I visited local fishery departments, government offices, marine related NGOs and other organizations to conduct interviews and get their

perspectives on the VC, the fishery and other topics relating to my overarching research gaps and questions.

Experiments

The main method for Paper III is the behavioural economic experiment conducted in Concepcion (Iloilo, Philippines). This involved approximately 1 year of design and hypothesis building before going to the field in late 2017. Pilot lab experiments were carried out, first with WEIRD students at Stockholm University to refine design, logistics and familiarize myself with experimental methods. In the Philippines, the experiments were then piloted twice, once in a University in Iloilo with economic students, and then in a fishing village with both male and female fishers.

To summarize the experimental design; patrons filter the market prices from the global market to fishers. Fishers then make individual decisions to take a bigger, smaller or no fuel loan for fishing from a patron (a financier), repeatedly over 12 rounds. The treatment corresponds to varying ex-vessel prices (price per unit fishers receive for their catch on landing) and participants were divided into three treatment groups. The control experienced no price change, treatment 1 had a price increase and, treatment 2 a price increase and decrease. Fishers could only avail of the price increase by taking the bigger fuel loan from their patron.

The hypothesis guiding the experimental design was that in response to a price rise; fishers would take bigger fuel loans from their patrons for the potential to increase fishing effort (spatially and/or temporally). After a price decrease, they would switch back to smaller loans. Other variables hypothesized to affect this decision-making were risk preferences, gear type/fishing style, gender, household savings, and the relationship type with a patron.

The catch varied randomly each round and the entire experiment was played privately, so fishers refrained from talking and were not able to see the income, prices or catches of their fellow participants. We captured their financial risk preferences after the experiment through a gamble with real money, and all fishers were paid their earnings from the experiment and risk task in private.

Analytical methods

Analysis of surveys (Paper I & II)

The 600 surveys were input as a database in Microsoft Access. I iteratively coded responses for easier data management and analysis but also recorded full answers in the database for later clarification. Analyses of survey data included descriptive summary statistics of survey response in Paper I, while in Paper II statistical tests were also conducted to analyse differences in net income across different groups based on gender, location, sales paths, presence of business arrangements and VC position. These variables were chosen based on hypothesized impact on benefit distributions as identified in the literature (Thyresson et al. 2013, Fröcklin 2014, de la Torre-Castro et al. 2017). Paper II also relied on the construction of Lorenz curves and the calculation of the Gini coefficients (Gastwirth 1972, Kakwani 1977) to assess income inequalities within and across VC nodes. In-depth semi-structured interviews that were collected during these fieldwork campaigns were transcribed into MaxQDA and coded according to relevant research questions depending on paper.

Experiment and complimentary data analysis

The experimental data was analysed primarily using inferential statistics, mainly regression models. Simple statistical tests were initially used to crudely check for treatment effects and, along with descriptive statistics, were employed to assess the randomization and actor demographics across treatments. Regression models were built accordingly, based on predefined hypotheses and used to test the likelihood of relationships between variables, as well as general patterns in the data over the course of the experiment.

Structured interviews were transcribed and coded where relevant for inclusion in the regression models in R and statistical analysis in Microsoft Excel. Descriptive statistics were used to present results from the structured interviews with traders. In-depth interviews and focus groups were written up as documents and used as references and support for writing Paper III.

Qualitative data analysis Paper IV

Structured interviews, in-depth interviews, focus groups and participant observation collected during the experimental campaign were used in a qualitative analysis for Paper IV. Analysis was based on a general systems diagram (see Figure 2, Paper IV) I mapped out in the field according to themes emerging from these methods. Thus, I set out to test if the events and changes I had iteratively understood found support in independently gathered data. Narratives from interviews with fishing, trading and governmental actors were synthesized and crosschecked against published reports from NGOs and governmental agencies. I firstly familiarized myself with all transcripts, reading and re-reading all files and also checking the in-depth interviews from the first field season in 2015. I then summarized the main patterns across the sources. Then reasons mentioned for the patterns were identified and the descriptions of the perceived causal mechanisms behind system changes by respondents were noted. In terms of the overall system changes, I placed weight in the data from the experienced brokers (10-20 years) at the main ports and focus group discussions with fishers. I then cross-validated the resulting narrative that emerged with various system experts with many years' experience in the Concepcion fisheries in Iloilo.

Ethics & positionality

For ethical considerations regarding social research, specifically consent, confidentiality and data-use, I followed ethics guidelines developed at the University of East Anglia. I also reviewed and kept in mind the SRC ethical principles that were under development when I started the PhD. This included reflecting on my own work in terms of meeting legal/institutional requirements, integrity and actuality of my research. I also reflected on my relationship with others: the privacy and safety of research participants, the voluntary nature of the research, openness about findings and methodology, as well as a duty of care for the enumerator teams. Finally, reflecting on the places where I work: addressing local interests and perspectives, and also minimising negative risks from my work, such as conflict as a result of involvement.

All structured interviews, informal interviews and group discussions, except with academics, NGOs and governmental officials, were carried out in local dialects. Before any engagement in research activities, a plain language statement was read out. This emphasized four

main points: i) I was a student carrying out my thesis project and I wanted to ask some questions about their work; ii) their participation was voluntary and they could leave or withdraw at any time; iii) the interview or discussion was anonymous and would never be traced to them in any work published; and iv) there was no direct benefit to them or their communities from this research.

For the experiments, where participants actually earned money, I made sure to explain that this was not a payment for participation, but rather a means to make their decisions more real. In terms of informal interviews and participant observation, no statement was read out, but I considered the nature of what I saw or talked about and made sure it did not oppose the ethical guidelines. For example, if an individual mentioned something very personal I did not record this.

I experienced several ethical challenges during fieldwork, despite following ethical guidelines. Many of these challenges were to do with my position as a WEIRD female student, some of which are explored in the next section.

Ethics and humility also lead me to design dialogues for feeding back the knowledge I had extracted. I used this time in both countries to thank actors (fishers, traders, government official), and hear their opinions, complaints, advice or agreement with my findings (see Hakkarainen 2018 for an in-depth study of knowledge transfer in SSF based on this work).

A WEIRD white Irish female out of context

Research can be seen as a shared space, a process, not a goal, which is shaped by both the researcher and participants (England 1994). In this sense it is important to reflect on one's own position within the research process and creation of knowledge as a means to recognise the impact it had.

During fieldwork, in particular, I was always acutely, often uncomfortably, aware of being out of place as a WEIRD white Irish female student. Continuous reflection on the colonial histories of the people and places I was working in made me very conscious of my position and relations, especially the role and legacy of science in these histories [e.g. see (Whitt 2009)]. In terms of knowledge, socio-economic status, educational background and skin colour, I often held a rela-

tively powerful position. These reflections and histories formed part of the research space and journey, in particular how participants related to me and I to them¹³.

In an effort to try and shed some of these aforementioned associations, I employed a few strategies or approaches. For example, I made sure to go to local bars, engage with local sub-cultures, not visible superficially, and to travel by local transport when possible. I employed or emphasized different identities of my position at different points in the research process; for example, my gender, being Irish (the colonial history), or a student. I aimed in my position as a WEIRD research student to be humble (i.e. recognizing the limits of my knowledge and perspectives), open, and used my role to learn and listen. In the field, I approached data collection as open-mindedly as possible, distancing myself as much as I could from the academic literature, concepts and theories and taking on an almost investigative approach. I used my overall research questions as a guide, not a concrete mission or objective to complete.

In the post fieldwork analysis stage, my positionality became important to recognize as I interpreted and reported research findings. Participant's voices and their experiences were translated and interpreted by enumerators. I then in turn interpreted them for myself. Thus, leaving my own, and the enumerator's signature on this project. It was both my team of enumerators and myself, with the participants, that created the shared research space - not I alone. Thus, my position in relation to the enumerators was also part of the process which quite frequently involved my identity as a woman. For example, with one Zanzibari team this led to lack of control over activities and training. Their positions to participants also mattered, as again they held the more powerful positions due to their socio-economic status and education.

¹³In the Philippine context people can desire and seek recognition from a foreigner to whom they show deference, it can be referred to as "white love" (Rafael 2000, Ong et al. 2015). In Zanzibar there is also a more specific relationship to the position of white western women in terms of gender and sexuality (for example see Hoogenraad 2012).

Context

Selecting the cases

The two case studies of SSF VCs in Zanzibar and the Philippines, were selected in line with the bigger STEP project, in which this thesis is embedded. They were also selected according to the rich experience of the project partners in both country's SSF. Additionally, they were used in a comparative design in Paper II, based on the comparability of the fishery operations, the ecosystems, species caught and livelihoods, described in Table 2. While these fishery VCs exist within two distinctly different cultural, social, political and economic settings (described briefly below), they were deemed to be similar across features of key relevance for the particular comparison. Box 1 describes the VC products in more details and reasons for their focus.

Table 2: System dimensions for cross-site comparison

| | |
|---------------------------------------|---|
| Ecosystem | Associated with tropical coral reef-mangrove-seagrass ecosystems. |
| Fishery Type | Dominated by multigear, low-tech, multispecies operations at different scales- gleaning, canoe use up to vessels with 10-15+ crew and engines. |
| Livelihood | Communities very dependent on fishing activities for income, livelihood and food security. |
| Species/VCS | Landings in decline (both in terms of weight and diversity of species composition), similar functional groups traded in selected VC (common families include <i>Engraulidae</i> , <i>Siganidae</i> , <i>Leiognathidae</i> , <i>Gerreidae</i> , <i>Mullidae</i> , <i>Clupeidae</i>). See information of species in Box 1. |
| Informal institutions | Presence of informal market institutions that govern actor behaviour. In our cases this refers to reciprocal agreements between fishery actors, e.g. loans, credit arrangements. Specifically, the patron-client relation. |
| Markets | Global seafood market demands are felt in both systems. As export in the Philippines and international tourism in Zanzibar. Both systems have larger local or regional markets also. |
| <i>Socio-political context</i> | <i>This is the key differentiating variable as the two systems are nested in different socio-economic and political settings (Zanzibar vs Philippines). The historical background in the sections below describe the differences in terms of culture, geographies, politics, economic development and marine resource governance.</i> |

Box 1. Value chains under investigation

We selected the same three groups of species to focus on in both countries due to their similar ecological functions and/or role in the SSF market place.

1) Small mixed reef or coral associated species e.g. *scaridae*, *siganidae*, *lethriniidae*. As this thesis is trying to understand ecological outcomes of markets, trade and actor relations on the nearby marine ecosystems, it was important to pick this fish group as they are directly linked to the local ecosystems. They have relatively little mobility through their life histories, and are among the most landed fish in tropical SSF, also making them important for local livelihoods and food security- especially in Zanzibar. Ecological functions include: controlling for algal and seagrass recruitment/growth, which is important for coral recruitment and larvae growth (*scaridae/siganidae*). Bioturbation and echinoderm predation, which indirectly affects grazing pressure (*lethriniidae*).

2) High value cephalopods, octopus (*cyanea*) in Zanzibar and squid *Photololigo duvaucelii* in the Philippines. These chains in both countries are high value and represent an important income source. Both chains are increasingly exported but also just as demanded locally in dried or fried forms. They do not necessarily have similar ecological functions however octopus is not commonly caught in Iloilo. Therefore, squid were chosen for their similar market function instead.

3) Small pelagics e.g. *engraulidae*, *carangidae*, *clupeidae*. This chain was primarily chosen due to the big export opportunities, both regionally and internationally, associated with these species in Eastern Africa and the Philippines. These fish provide an important link in the trophic food chain, through converting planktonic biomass into forage for piscivorous fish.

Iloilo, Western Visayas, Philippines

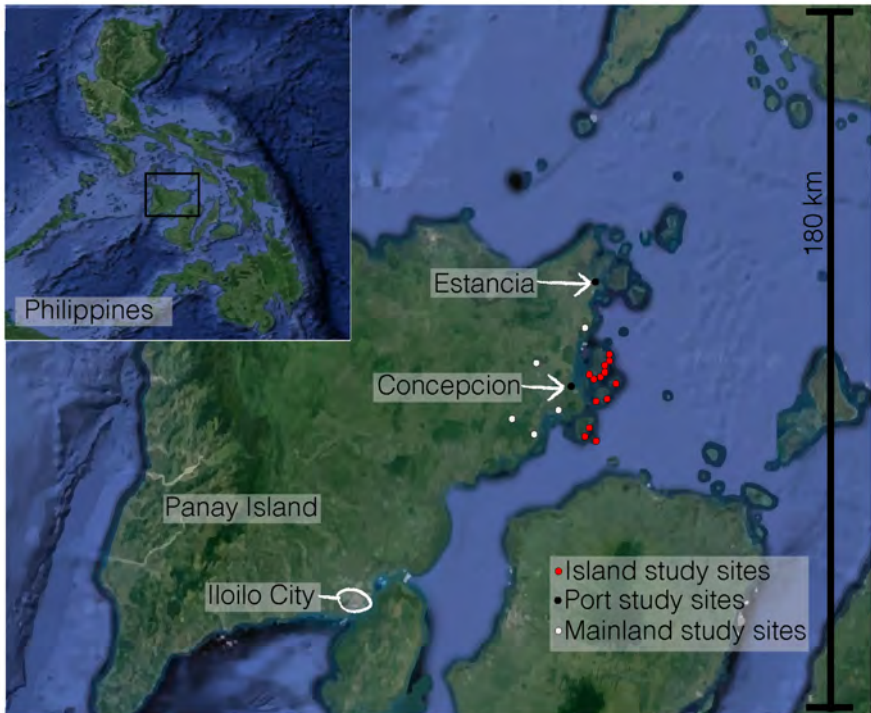


Figure 3: Map of Panay Island (larger picture) in respect to the rest of the Philippines (inset). Study sites are centred around the municipality of Concepcion in the north. They include markets, the central ports of Concepcion and Estancia, as well as offshore islands. Iloilo City is the capital and the location of the main governmental offices which were also visited.

Geography, demographics & socioeconomics

Iloilo is a province occupying the central and east of Panay Island in the Western Visayas Region VI- $1^{\circ}00'N$ $122^{\circ}40'E$ (see Figure 3 above for a map of Panay and the study sites). It consists of 42 municipalities, some of which encompass island *barangays* (smallest political unit in the Philippines) such as Estancia and Concepcion (the main area of focus in this study). The capital of the province is Iloilo City (population 447,992- 2015 (PSA 2015)). The Visayan Sea borders most of Iloilo's shoreline from its southern to northern tip, and covers about 10,000 km² of the central Philippines. It is relatively shallow with an average depth of 40m, and represents one of the top three fishing grounds in the Philippines (Ferrer 2016), thus playing an important role for the coastal *barangays* along its shores (Funtecha 1993).

The population of Iloilo are largely Catholic and the main ethnic group are the *Ilonggo* or *Hiligaynon* people whom speak *Hiligaynon*- a Malay-polynesian language native to Panay, Guimaras and Negros. The archipelagic nature of the Philippines in general has promoted a seafaring people who depend heavily on boats for transportation and livelihoods (Funtecha 2000).

The climate, like the rest of the Philippines, can be classed as maritime tropical. Seasons are punctuated largely by the monsoons, the dry *amihan* (northeast monsoon) and the wet and windy *habagat* (southwest monsoon). *Amihan* begins in September or October, and is characterised by easterly winds. The season ends by May or June, and can happen quickly over the course of a week or two, or more gradually where winds switch between *amihan* and *habagat* (westerly winds)

Iloilo City is a business and IT hub. However, in the main study area to the north, Concepcion municipality, the economy is centred on fisheries. A large part of the population in Concepcion lives offshore across 12 island *barangays* and is supported largely by fishing, and only marginally supported by subsistence farming or cash crops (e.g. rice, corn) due to poor terrain. As of 2012, Concepcion remained the poorest town in the Iloilo province, with a household poverty incidence rate of 37%. Estancia, a major fish port just outside of the Concepcion Municipality further north, recorded a poverty rate of 26% (PSA 2012 Municipal and City Level Poverty Estimate).

The Western Visayas as a region has benefited from its connection to the sea. In 2010, Western Visayas was ranked second for municipal (boats less than 3 GT) fisheries, third for commercial fisheries (boats over 3 GT) and sixth in aquaculture in the Philippines (NEDA 2011). The region contributed 11.3% to national fish production and 80% of national production occurred in the Visayan Sea (ibid).

Major historical developments¹⁴

The socio-economic state of Iloilo today is heavily shaped by occupation. Beginning in 1566 with the Spanish and continuing with the Americans (USA) in 1898 as a result of the treaty of Paris, and finally with the Japanese in 1942 until national independence in 1946.

Fishing has been a predominant livelihood for local populations since before the Spanish arrived (Funtecha 1993). During the Span-

¹⁴ References for this section: summarized from Funtecha 1993

ish colonial period, fishing methods and traditions of *Ilongos* remained relatively the same and provided a major livelihood source (Funtecha 1993). Commercial fishing began to grow in Iloilo, especially to the north, at the end of the Spanish era. New more productive gears were introduced, encouraging the development of fish broker businesses in towns like Estancia and Carles. A major port was built in Iloilo opening up Panay to the world economy by 1855. The Americans initiated programmes for fishery development in Iloilo and from the 1920s to 30s, fishing became more technological with motors, and operations became much bigger. The government (under US administration) began to develop processing and transportation facilities to assist the fishing industry. The Japanese were much more knowledgeable and industrious in fisheries, further developing operations in Iloilo during their occupation. For instance, through introducing Japanese fishing technology, such as trawlers. They also established the Iloilo Fishing Corporation, which was composed of both Filipino and Japanese brokers- also known as *Comisyonistas*. Post WW2 saw an increased demand for food as the population grew. From this point on, commercial fisheries grew. Various governmental decrees in the seventies aimed at accelerating the growth and integrated development of fisheries. National development plans at the turn of the 21st century aimed at the depeasantization of Filipino fisheries by increasing export and production (Williams 2001, Carnaje 2007, Ferolin and Dunaway 2013).

Current fishery dynamics

Today BFAR (Bureau of Fisheries and Aquatic Resources) is alarmed by decreasing fish catches and changing species composition in the Visayan Sea, as reported from various biological surveys (see Ferrer et al. 2016). BFAR has various plans underway to combat this i.e. empowering local sea patrol forces, establishing marine protected areas, regulating gears and closures (Nepomoceno 2018).

Contributing to this alarm is the prevalence of illegal fishing. The waters of northwest Iloilo are divided into commercial and municipal zones, and commercial vessels are restricted from entering nearer shore municipal waters, however do so frequently (Ferrer and Defiesta 2005, Ferrer 2016). This encroachment has been documented since at least the 1980's (Ardales and David 1985), and has created a conflict amongst the fleets, municipal fishers blame commercial fishers with efficient gears for declining stocks. Lack of law enforcement as a result of budget, logistics and operational problems (Ferrer and Defiesta 2005) contributes to overfishing and conflict, as well as the entry of more and more youths into the

industry as fishers (Ferrer et al. 2005). The condition of the Visayan Sea is deteriorating and there is the perception that local management regimes are failing to address this.

Seafood trade and markets

The Visayan Sea is one of the top exporters of seafood in the Philippines, and hence its fishers and traders are quite connected to the global market (Hernando 2005, NEDA 2011). Commercial fishing is dominated by SSF, and nearly all landings are marketed, only negligible amounts are rejected by trade and are instead used for household consumption (Hernando 2005). In many parts of Iloilo 100% of crab and squid landed by SSF is destined for the export market, usually marketed through export companies which have factories in Northern Iloilo (Hernando 2005). Typically, these high value products, as well as sea cucumbers, live groupers and lobsters, are exported abroad (Perez et al. 2012). The National Economic and Development Authority (Region 6, 2011) reports an overabundance of traders involved in fish sales. It has been noted that in the past five years fishers have become more locked into credit relations with traders, and are forced to dedicate more and more of their production budget to the export oriented landings, thus taking away from their own household budgets (Ferolin and Dunaway, 2013).

Unguja, Zanzibar, Tanzania



Figure 4: Map of Unguja Island, Zanzibar with sampling sites in relation to the mainland (left). No sampling was done on the mainland however value chains continued from Unguja through sales to Dar es Salaam and Bagamoyo.

Geography, demographics & socioeconomics

Zanzibar (6°1357'S, 39°3621'E) is an archipelago with a number of islands, the biggest being Unguja (1,464 km²) (see Figure 4 above for a map of Zanzibar and the study sites). These Islands are a semi-autonomous part of Tanzania- located about 40km off its coastline and within the Western Indian Ocean (WIO). Unguja, often referred to as Zanzibar, is divided into three main administrative regions with a

population of 896,721 people (2012). Stone Town, the capital of Zanzibar as well as a world heritage site is located on this Island.

The people of Zanzibar are largely *Swahili*. It is a very loose designation and is generally used to denote coastal peoples of mixed Arab-African origin, Muslim in religion, and speaking an Arabized form of north-east Bantu, *Kiswahili*. This unique African culture formed along the coastal strip of East Africa, from Kenya to Mozambique, as a result of the vast Indian Ocean trading system, which extended from the Middle East, India and China.

The islands have a tropical climate marked by the Indian monsoon and the changing rain and wind patterns it brings. Long rains *masika* fall between March and May, and are associated with the southwest monsoon *kusi*. Usually, there shorter rains *vuli* between October and December. The northeast monsoon *kaskazi* lasts from November to March, bringing weaker winds and higher air temperatures (Jiddawi and Öhman 2002). These monsoon winds were the basis for the Indian Ocean trading economy for millennia, facilitating transactions between Zanzibar and the rest of the Indian Ocean world (Mkumbukwa 2014, Sheriff and Ho 2014).

Today tourism is the biggest part of the Zanzibari economy contributing 47% of the GDP in 2014 (Nordic Development Fund 2014). About 28.7% of the population are employed by fisheries, while 98% of the animal protein in low income Zanzibaris' diet is seafood (Ngoka 2005). Most coastal people engage in more than one livelihood activity, largely crop farming, e.g. coconuts, and seaweed farming.

Major historical developments¹⁵

The history of Zanzibar reflects that of coastal East Africa, which encompasses the greater history of maritime trade within the Indian Ocean region. The Europeans arrived with the Portuguese at the turn of the fourteenth century. From 1700 Zanzibar came under Omani rule, becoming the capital of its sultanate in 1840. In 1890, the Sultanate became a British Protectorate, and in 1963 an independent Sultanate. This was short-lived, and in 1964, the Zanzibari revolution occurred. A couple of months later, through negotiation with mainland Tanganyika, the republic of Tanzania was formed- a union between Zanzibar and Tanganyika.

¹⁵ References for this section: Summarized from (Sheriff 1987, Mkumbukwa 2017)

Fisheries were and are important in Zanzibar not only as subsistence and livelihood sources but for socio-economic development since at least the mid-1800s (Mkumbukwa 2014). Under a British colonial government, the fishing industry received relatively little attention. Additionally, high seas were not typically exploited in Zanzibar, the lack of continental shelf and powerful vessels made it challenging to land enough fish and also hazardous (due to the rough/deeper seas). In the 1920s and 30s inshore fishing pressure, high demands and destructive gears all contributed to a decline in vessel numbers and fish landings. The 1950s saw the introduction of motorized vessels, however the artisanal fleet continued to dominate. After the Zanzibari revolution, import was discouraged and the new government established many fishing and market cooperatives. However, by 1967 they already had dissolved due to fraud and misuse of power. They were reintroduced in the 1970s via top-down approaches, and through them, fishers were forced to sell at fixed prices at government-established stalls. This led to fishers landing and/or moving over to the mainland. In the late 1980s all cooperatives came under control of the ruling political party through a merger. The politics of fishing and marketing in Zanzibar during these times lead to major fish shortages. Zanzibar entered the liberal economy in the 1980s, and its government began to promote tourism and private investment right away.

Current fishery dynamics

Since the 1980s fish catches have fluctuated, and the SSF systems of Unguja are currently reported as degraded, as fish biomass and biodiversity have continued to decrease. In addition, there is over-use of the coastal environment for resources, such as coral reefs and mangroves (Mkumbukwa 2014). The influx of migrant fishers, the lack of marine law enforcement, destructive fishing gear use and illegal offshore foreign fleets are all current components of the SSF (Colbert-Sangree 2012, DoE Department of the Environment 2009, Mkumbukwa 2017). In 2010 only 10-15% of vessels were motorized. The latest 2016 fishery survey saw a 17% increase in the number of vessels, with a 100% increase in the larger motorized *botis* (compared to 2012) (The Revolutionary Government of Zanzibar 2016).

Seafood trade and markets

Sea cucumbers, prawns, lobsters and seaweed currently reach the East Asian and European Markets from Zanzibar. However, Zanzibar does not yet have strong official connections to global seafood trade.

Exporting has not been a big option due to the lack of offshore stock assessment for potential fishery investors, as well as product quality coupled with declining inshore landings (Mkumbukwa 2014). The global markets are instead represented mainly by the tourist hotels on the Island (Jiddawi and Öhman 2002, Thyresson et al. 2011). This industry is continuously expanding and increasing its demand for high quality Zanzibari seafood produce (Gössling 2002, Thyresson et al. 2013). However, the fish market system overall is inadequate. The lack of storage and processing facilities results in major post-harvest losses and there are few seafood transport options or sufficiently available market information (Ngoka 2005). In recent years, more and more women have entered fish trading in Zanzibar (Fröcklin et al. 2013). Other livelihood options are missing and it is increasingly necessary for all adults to contribute to the household income (ibid).

Key findings- results & discussion

1. Incorporating non-sales transactions into the VC provides a better description of the market's safety net functions, especially for more marginal or peripheral actors.

My work in Zanzibar highlights a layer of market relations in the SSF VCs that are not generally captured by traditional VC or economic analysis (Fabinyi et al. 2018). These relations centre on assistance and reciprocity and include exchange or provision of cash-gifts, food, seafood products, services and loans within VC nodes, between them and beyond the VC. Tracing these interactions showed a wider influence of the Zanzibar VC, highlighting its horizontal elements - local social relations. It also brought to light previously unidentified actors, beyond fishers and trading-agents, that play a role in the market place. These actors, referred to in Paper I as auxiliary actors, are important to capture. A poor understanding of their influence on and from marine resource related benefits, risks undervaluing the contribution and importance of the environment to local livelihoods (Fröcklin 2014). This can skew efforts for conservation and poverty alleviation with negative effects for overlooked groups in society (Daw et al. 2016). Certain actor types (e.g. rural actors, especially fishermen using larger vessels) were more engrained in the Zanzibari informal assistance network. While others, like female urban traders, remain on the margins of these exchanges, leaving them potentially more vulnerable to short-term fluctuations in the fisheries and markets.

Paper II shows that the safety-net function of assistance networks operated differently across cases (see Table 3 for a synthetic overview of the case comparison outcomes). For example, exchanges between fishers and traders in Concepcion were limited to economic transactions and asymmetrical financial support from traders to fishers. In Zanzibar, fisher-trader relations were often reciprocal and spanned a wider array of exchanges, such as food and favours. Concepcion also differed from Zanzibar in that repayment of loans or other types of assistance (Concepcion fishers also exchange non-financial help) is typically required both within and between nodes.

In contrast, gift-giving exchanges tended to more often mark trade interactions among Zanzibari actors. This gifting seems to reinforce social standing within the market environment. Such findings have commonalities with work by economic anthropologists and sociologists where actors in an economic environment are not only concerned with maximizing their production and income but also social standing, reputation, norms and rules of the context (Granovetter 1985, Ortiz 2005, Smelser and Swedberg 2005). Market related gift giving plays an important role across Tanzania's agricultural markets (Eaton et al. 2007), and in the broader Swahili society (Yahya-Othman 2009). Most societies at the local scale have evolved social processes, including customs and reciprocities, that are interlinked with economic exchanges (Smelser and Swedberg 2005). Such processes can promote human wellbeing in addition to ecosystem services (Butler & Oluoch-Kosura 2006), and thus are important to present in VC contexts.

These results highlight the horizontal dimensions and safety-net functions of the VC, and how they are not easily separated from financial transactions or local social norms (Fabinyi 2013, Fabinyi et al. 2018). These are generally not analysed in relation to VC positions. Paper I and II therefore contribute to a more realistic conceptualization of SSF markets. They present the importance of non-financial value creation in the VC for a better understanding of benefit flows in this context. I contribute to more recent work in commodity-chains and SSF that incorporate the importance of these social relations in market organization and operation (Fabinyi 2013). Specifically, I take a next step by mapping these relation-types as assistance and reciprocity in combination with the VC. These types of nuances are important as governance interventions with a poor understanding of the informal less visible market interactions risk undermining vulnerable actors' options for short-term livelihood security.

2. The nature of patronage differs across cases but in both places social norms create inflexibility that extends through the value chain.

Like previous work Paper I and II show the mutually beneficial nature of patronage for fishers and traders, in my case characterized by the distinct Swahili and Ilongo settings [c.f. (Stirrat 1974, Lawson 1977, Platteau and Abraham 1987, Platteau 1989, Pelras 2000, Máñez and Ferse 2010, Ruddle 2011, Ferrol-Schulte et al. 2014, Nurdin and Grydehøj 2014, Wamukota 2015, Miñarro et al. 2016, Bailey et al. 2016)]. Table 3 below summarizes the main differences between the

patron-client relations in both places. Patronage in Zanzibar appears to be of a more symbiotic nature than in Concepcion. Zanzibari patronage is marked much more by reciprocity, which patrons (nearly all male) and fishermen use for maintaining food and livelihood security. Traders often receive loans and fish from fishers [c.f. Keat 1976 in (Lawson 1977)]. The majority of these traders, whom, relative to Concepcion, are small-scale, capital-poor and lack infrastructure (e.g. ice, storage, transport, etc.), use such relations for providing the economic margins on which they can operate.

The contractual arrangements and PC in both cases are marked by influence from the wider community environment through social standing, expressed as the unwillingness to 'lose face' by ending an arrangement [c.f. (Platteau and Abraham 1987, Johnson 2010)]. In Zanzibar, traders must fulfil contracts with consumers outside of trade, thus extending the influence of local norms like sales arrangements downstream beyond the fisher-trader link. In both countries actors (both fishers and traders) felt they could not end their downstream arrangements. Ultimately these results highlight that prearranged transactions can create inflexible structures when coupled with the broader social processes and can extend through the VC. This is interesting because it emphasizes patronage as a feature of the entire (local) trade network – not just of a single VC link. Social and business pressures, as well as debt relations, are intertwined throughout the trading networks, possibly affecting the ability for the entire SSF to change and adapt.

Table 3: Outcomes of comparison of value chains in Zanzibar and the Philippines according to the informal exchange networks, the market structure and conduct, benefit capture and patronage. Different outcomes of the comparison are marked in light grey and the similarities in dark grey in the boxes underneath.

| Paper II: Comparative outcomes | Philippines | Zanzibar |
|---|--|--|
| <i>Assistance network & reciprocity</i> | <ol style="list-style-type: none"> 1. More limited informal exchange network- quantity & actor types 2. No secondary players identified 3. Between node assistance limited to traders providing fishers loans 4. Counter obligation required | <ol style="list-style-type: none"> 1. Wider informal exchange network supporting > actors & actor types 2. Secondary/auxiliary actor included 3. Between node assistance common and extending beyond finance to include products, food, favours, credit 4. More gift-like |
| | Frequently within node | Frequently within node |
| <i>Market structures & conduct</i> | <ol style="list-style-type: none"> 1. Higher market concentration -Fewer trading actors 2. >95% of sales contractual - Contracts with patron-traders 3. Few spot-transactions 4. Family oriented fishing and trading units including husbands & wives | <ol style="list-style-type: none"> 1. Lower market concentration -Large number of trading actors 2. ±50% of sales contractual - Contracts with patron-traders, consumers, hotels/restaurants 3. Spot-transactions/auctions common 4. Fishing and trading not done as a family unit, wives & husbands work separately in the VC |
| <i>Income & benefit capture</i> | <ol style="list-style-type: none"> 1. Higher income inequality at systems level 2. Less actors receive benefits outside of sales transactions 3. Gender roles allow women to participate more equally but lead to lower fishing-incomes for women | <ol style="list-style-type: none"> 1. Lower income inequality at systems level 2. More actors capture both financial and non-financial benefits from an extensive informal trade network 3. Gender roles limit women's participation but doesn't have a strong impact on income due to the many small-scale male traders in VC |
| | Fishers capture relatively small proportion of local wealth (Gini=0.57) | Fishers capture relatively small proportion of local wealth (Gini=0.54) |
| <i>Patronage & contractual arrangements</i> | <ol style="list-style-type: none"> 1. Financially oriented 2. Women and men act both as patrons & clients 3. Institutionalized patronage system extending beyond fisheries | <ol style="list-style-type: none"> 1. Market by reciprocity & gifting 2. Mainly men as patrons & as clients, few women involved 3. No clearly defined patronage system |
| | Social standing influences contracts | Social standing influences contracts |

3. Chain structures and levels of contractualization within the two cases differ vastly, giving rise to distinct income inequalities and distributions. Yet fishers capture a similarly low proportion of local wealth regardless.

In the Philippine system, where Concepcion is representative of other Visayan seaports, contractual arrangements dominate nearly all market interactions. Trading agents - brokers and buyers - are relatively few in number. This arrangement exhibits the highest inequality at the country level (according to the Gini coefficients and Lorenz curves), also amongst trading actors, signalling the capture of wealth by a few.

The market in Zanzibar is structured quite differently. Like other East African agricultural markets they are characterized by smaller product quantities, larger numbers of buyers or traders, frequent spot-market exchanges (auctions or random sales) and limited coordination (Eaton et al. 2007). Zanzibar traders with contractual arrangements, whom are primarily men, reap higher daily incomes than their freelancing peers who sell ad-hoc. It could be that their prearranged customers (hotels and local consumers) demand much higher volumes than ad-hoc sales, which requires a higher level of coordination and performance. The pattern differs among fishers where there is little difference in incomes between those with and without patrons. Fishers in both cases show similar within group inequality, regardless of different markets or transaction types. These types of results are expected as they show producers, regardless of connections to international export or better market infrastructure, capture a similarly small proportion of wealth from their system.

Though not strongly connected to international export, Zanzibar is linked to global trade dynamics through international tourism. Traders that have managed to tap into this market, earn more than their peers or fishers, who have not. Thus, a certain few traders can capture wealth with high value market opportunities, but the majority of VC groups are excluded as a result of high barriers to entry, both economic, such as financial capital, and cultural, such as gender roles.

4. Gender impacts daily income and participation in both places according to VC position.

One cultural-related barrier to market participation and/or benefit acquisition in both sites is gender. The roles of men and women in the market are deeply entrenched in local gender identities linked to the broader socio-cultural context (FAO 2017). In SSF-related studies

in general, women are often presented as secondary, marginal, and more vulnerable players (Tindall and Holvoet 2008, Westerman and Benbow 2013, Brugere and Bodil 2014, Fröcklin 2014). Results show that in both cases, being a woman impacts benefit capture depending on VC position and activity. For example, I found that women participate in all nodes in Concepcion, though as fishers they earn less than men. In Zanzibar, women operate separately to men in distinctly female nodes, but this does not statistically impact income as there are many male traders who also deal in low-value fish trade as they do. Zanzibari female traders in general rarely either connect to the higher value tourist industry for cultural (Demovic 2016) and capital reasons, nor have patrons. However, both are mechanisms for better income according to my results. When they operate in a similar fashion to larger male traders (transporting, icing, etc.) they capture higher daily net incomes than many traders in the sample.

Formal governance in Zanzibar and the Philippines, like SSF related research in the past, view women as minor participants in SSF VCs (Siason 2000, Fröcklin 2014, Kleiber 2014, Williams 2016, Pastor 2016, Pavo 2016) yet women do not necessarily conform to the stereotypical notions that external actors, such as officials or researchers, often impose on them. For example, Concepcion women fish on commercial vessels and run large broker businesses. Zanzibari women can earn higher incomes than many men when dealing with transport options and trade-facilities. Although gender is a strong organizational category in many low income agricultural VCs (Bolwig et al. 2010, Riisgaard et al. 2010, FAO 2017b), deviations exist from the dominant narrative. Evidence for this occurs across west African SSF, for example see Browne (2002) or Udonga et al. (2010). There is evidence in both Zanzibar and the Philippines that women are gaining ground, e.g., in positions and numbers, in the SSF market environment. However, the question remains if these examples are simply cracks in the dominant narrative or future trends in VC participation for women. Gender alone does not drive differential benefit capture. Instead it intersects with different VC dynamics as well as other social factors and need not be singled out if researchers are to better understand actor's long-term VC positions (Wosu 2017).

In summary, these findings contribute to the fisheries-trade-poverty debate in highlighting how characteristics of different actor groups in the VC impacts their potential to earn income and connect to higher-value global trade options (Wamukota 2015)

5. Short-term fishing-related decisions are likely shaped by gender roles but not necessarily strongly influenced by economic incentives such as price.

Paper I and II shed light on how individual characteristics drive benefit capture, which in turn may motivate or influence decision making in the market. Paper III takes a step further towards understanding such resource-use decisions, by using PC and export markets as two structural features to test market decision-making with an experimental approach. A price rise, used as a proxy for a global market connection, did not predict fishers' operational loan taking and consequent fishing effort in the experiment. This rhymes with other studies demonstrating a limited response of fishers' to market incentives (Béné and Tewfik 2001, Salas et al. 2004, Abernethy et al. 2007). In my case gender appeared as the only predictive variable of fishers' experimental behaviour- which did not relate to gendered risk preferences. Men went bigger than women throughout the experiment regardless of economic or market incentives- both in their interpretations of catch rates as well as their loan choices. Such results reflect the fact that fisher's market responses often appear to be complicated by individual and collective constraints like masculinity roles, peer pressure, fishing skills, and by the general socio-cultural context of the fishery (Dumont 1992, Russell 1997, Béné and Tewfik 2001, Fabinyi 2007). Paper III adds to this body of work.

While patrons have been cited as influencing increases in SSF production in the literature (e.g. Máñez and Ferse 2010, Crona et al. 2010, Johnson 2010, Ferse et al. 2014) I did not uncover significant empirical evidence for it in an experimental field setting, using price as a mechanism. However complimentary data collection highlights two influences of patronage through financing. Firstly, over half the fishers sampled would change their spatial fishing effort if offered a bigger loan from their patrons by traveling further. Secondly, debt is closely coupled to fishing activities as fishers cannot follow better market prices or conditions without paying off their loans Thus patronage drives exploitation in this way. This type of theoretical and empirical knowledge on the connections between seafood trade and SSF dynamics can promote an understanding of how insatiable global seafood markets may push SSF past ecological thresholds (Kooiman et al. 2005, Berkes et al. 2006).

6. Patronage, when coupled with weak resource governance, external shocks and strong market demands, could contribute to eroding social-ecological resilience.

Typhoon Yolanda in November 2013, and the resulting aid interventions, lead to a number of internal changes within the fisheries of Concepcion, including a rise in the number of vessels (Hanley et al. 2014, Chamberlain 2015, Ong et al. 2015), a decrease in average vessel size, and increasing debt burdens of both fishers and trading agents, who took loans to re-start operations. This left fishers particularly more entrenched in the PC system than before. PC were quick and flexible to respond to the natural disaster aftermath, providing finance to rebuild vessels or to fuel newly donated vessels. These dynamics as well as the additional internal changes filtered by the PC system (i.e. income and catch fluctuations), are likely to have longer-term social and ecological impacts for Concepcion. Notably, when coupled with lack of law enforcement and local management capacities, as well as the prevalent economic vulnerability throughout households. For example, the PC system only enhances their adaptability to specific known shocks, e.g. income fluctuations, while the underlying causes of their economic vulnerability are not addressed, and this can decrease the overall system's ability to deal with unknown shocks in the future (Walker et al. 2004, Nelson and Finan 2009).

Post-Yolanda Concepcion fisheries appear to be on a trajectory in which the SES is increasingly less able to support human and ecological wellbeing. Yolanda left badly damaged marine ecosystems in its wake (Granath 2014, Kent 2014, Campos et al. 2015). Meanwhile, inshore fishing effort has increased, which goes unregistered by many fishers who felt the situation was the same as pre-Yolanda. Additionally, the Concepcion fishery has been weakly governed and experiencing declining stocks for a long time (Ferrer and Defiesta 2005, Ferrer 2016). The declining conditions, diversity and biomass of organisms translates into big risks for dependent fishers and patrons. Further, when SSF incorporate bigger market demands, e.g. regional, national or global, short-term economic incentives offered through fast responding PC have led to more intensive (and sometimes destructive) exploitation (Johnson 2010, Ferse et al. 2014, Nurdin and Grydehøj 2014, Miñarro et al. 2016). Debt is now more tightly coupled to fishing and ecosystem dynamics as both fishers and traders still have large post-Yolanda debts with their patrons. Coupled with the lack of alternative livelihoods in the area (Ferrer and Defiesta 2005) this change may only increase the dependency

of local households on fishing. As a result of the PC system's response to shock, actors' indebtedness and reliance on informal institutions have expanded and changed the longer-term trajectory of the Concepcion system.

Final insights & reflections

This thesis set out to contribute to three identified gaps in SSF governance.

In relation to Gap 1 – improved understanding of SSF market structures and dynamics – I provided a more systemic view of SSF markets, reaching beyond mere sales transactions to also include actors not conventionally considered. My results offer important articulation on the connections between different market structures, conduct and informal exchanges. Specifically, what these articulations mean for human wellbeing in two different settings.

In relation to Gap 2 – better understanding SSF-derived benefits – this thesis has documented the importance of local social norms, such as gender roles and social standing, in impacting how actors earn a daily wage and take part in SSF trade. Benefit distributions of global seafood trade are mapped at production sites illuminating high barriers to entry and associated inequality.

Finally, Gap 3 was highlighted as a lack of understanding of the links between trade, the incentives it creates for SSF actors and the effect of this on the environment. While encountering some limitations, this thesis sheds light on the role of patrons in influencing exploitation through finance and indebtedness, rather than factors like market prices. These mechanisms can enable global markets to influence fishing activities in the long-term. In the short-term I highlight the influence of gender-roles in financial fishing decisions.

In summary, this thesis can contribute to SSF governance strategies attempting to include the market as a means to improve human and ecological wellbeing in fishery systems, while embracing the complexity this inclusion brings. To conclude I will synthesize some reflections on this research.

Reflections

The VC approach- more than a simple chain

Adopting the VC decentred fishers in my analysis - the usual focus of fisheries governance. This allowed me to address the complex connections between trade, fishing and dimensions like local norms. I placed significance on integrating multiple types of values and dimensions into my approach, which is something lacking in rapidly expanding social research on seafood commodity chains (Fabinyi et al. 2018). The dimensions I address in the VC such as gender and other social relations, are important in influencing capacities for upgrading or improving abilities to govern (Adhuri et al. 2016). These dimensions need consideration if trade processes are to be made more equitable and sustainable. The VC approach provided a structure for comparative analysis while remaining open to contextual nuances. Further cross-case comparisons of SSF VCs remains an important aim if academia is to provide more conclusive relatable lessons for how SSF fare within the context of today's global drivers (and their distinct effects) (Béné et al. 2016).

Patron's behaviour- an area for future research

All four papers show the importance of patron-client relationships as key market processes linking social, ecological and economic dynamics (Crona et al. 2010). Specifically; I demonstrate the importance of female "middlemen" and patrons; our understanding of patronage in SSF has been dominated by a focus on male actors.

A key feature of patronage that emerged is the intertwining of debt and repayment with individual relationships, cultural norms, social pressures and fishing activities. According to scale and perspective this feature can be either negative or positive. If we can move beyond the debate over patrons as exploitative or beneficial, as they can be both or either depending on circumstances and objectives, then discourse on the patron-client puzzle can be more systemic and long-term. A key piece of this puzzle seems to be the financing behaviour of the patrons themselves. Fishers' decisions are shaped in part by the space that patrons create through their financing of vessels, gear and operations. How exactly patrons respond to fishery governance measures and new markets is key to understanding how they finance fisher's interaction with the seascape. This intermediate step seems to be missing in research, policy and practice. One way to address this in the future could be to carry out behavioural economic experiments with the patrons themselves.

Unpacking complex narratives- understanding gender

As a result of my interdisciplinary SES approach more complex narratives arose than those often presented in SSF research, or that I am adept to work with. The way gender emerged throughout the thesis is noteworthy, seeing as I did not apply a gender lens or present it as a specific focus. Nevertheless, it was crosscutting and intersected with VC position and economic status to shape people's roles in responding to global markets, coordinating their sales and earning a daily income. It was unexpected that gender was the *only* variable predicting behaviour in the experiment, which was designed to understand fisher's responses to price. In this context, gender roles may be one of the key variables linking market responses, or lack of, with fishing behaviour. What the dynamics of gender roles in natural resource extraction means for systems increasingly connected to insatiable global trade is perhaps a pertinent question for fishery governance and research. The lived complexities between gender, environmental relations and globalization are already being addressed by work such as Cruz-Torres and McElwee (2012). There is a need for SSF research to enrich and complicate ecological concepts of sustainability with these socio-cultural dimensions if governance is to understand and influence human behaviour in the biosphere.

Other future directions

Fieldwork identified major trade corridors of small processed fish (*dagaa*) between Zanzibar and the Democratic Republic of the Congo. Dynamics of regional or non-western based international trade like this e.g. within the African continent, are currently a major knowledge gap in academia and governance (Béné et al. 2010, 2016, Wamukota 2015). But this type of trade can be more important for human consumption and employment than export to the global market (Béné et al. 2010, Hara 2015). An interesting and useful piece of research could be comparing the different trade models and their impact on both social and ecological wellbeing.

As I was limited, both by time, data and methods, in actually addressing the ecological dynamics in the VC, another direction could be to move the project focus to the ecosystem. An interesting question would be how changing ecosystems, stocks or assemblages, influence market structures and interactions? There is plenty of evidence of such ecological alterations with regards climate change (e.g. Ford et al. 2018). In particular, I would be interested in the role of patronage in the adaptation of VCs to new ecosystem regimes- is it a catalyst allowing a flexible transition and reorganization of the market or is it a rigid link in the chain?

Thanks

Oi Oiiiiiiiiii- back at you Patrick West!!!!

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my mind and I am so lucky to have been able to work with you. I would be ridiculously happy to work with you again. There you are a total dream to work with and it has been so fun and relaxing and inspiring to work on these dam experiments with you. So sorry we didn't get a price response but my response was: you are an awesomely super supportive supervisor and please think of me for your next fishery-related experimental surprise.

Hakkarainen- dada- you're too smart dada, seduce me like what the hell, what the hell. Sorry sorry sorry, please please sir, please sir. Them book-learning bi&*hes!!! Too much to say to you, but you clearly know what a ledge-bag you have been the last 4.5 years. Twas one of the best days of life when I walked into Capoeira and met you. Meet you at the end of the bridge in Mbweni one day again? Sigi you're also a book learning bi&*h and I super appreciate your part in my fishy journey, especially this last year. Our fishy bond will never break.

Vitas- where the hell do I begin? Well this is a public book so I'm not gonna go blabbing. Thanks for moving to Sweden with me first off. Thanks for being so f-ing cute and hot. Thanks for being the anchor of my life. I don't give a s*&t where or what I live in as long as we are together and having the craic as we do. Thanks for the endless shnuggles, you are a source of energy and happiness. Thanks for going blank in the face when I start talking about my PhD because it keeps me fresh and in the real-er world. It also makes me aware of what really matters. Amo-te muito o meu shnuggly bunny.

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X

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