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Managing sino-ghanaian fishery conflict: a political ecology

approach

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Abstract

A global recurring challenge for marine managers and policy makers is the effective management of fisheries conflicts. This study demonstrates the usefulness of a political ecology approach in understanding the complexity of conflict in increasingly internationalized national fisheries. By doing so it aims to provide an alternative approach to the environmental security perspectives, predicated on scarcity narratives, that often underpin policy on fishery conflicts. Using a localised example of industrial Chinese and local artisanal fishermen conflict in Ghana, this paper reveals a complex account of contesting 'access' to resources, in material and nonmaterial terms, that moves beyond an 'absolute scarcity' driven narrative. The conflict is shown to be one, in part, focussed around spatially fixed areas as well as moral claims of correct ways of

fishing that reflect social tensions within the local fishing community. Both aspects show long term motivations to keep resource access, rather than being concerned with in the moment struggles over scarce resources. This work also highlights the existence of cooperation between groups of artisanal fishermen involved in transshipment with Chinese fishermen, revealing the complex nexus of winners and losers produced by environmental, social and political factors. In sum, policy must acknowledge that conflict is rarely produced purely by scarcity, and that broader social and political factors often combine in a variety of forms to produce localised conflict. If these complexities are ignored, fisheries policy runs the risk of unintentionally exacerbating conflicts and disadvantaging those who it aims to help.

Keywords: Political ecology; Resource access; Conflict; Fisheries; Chinese DWF; Ghana;

Introduction

Globally, marine managers and policy makers face the challenge of effectively managing conflicts between fishers within and across fishing sectors (Bennett et al. 2001). This study explores the potential role of political ecology (PE) in helping to understand the complex interactions in increasingly internationalized national fisheries, focusing on the conflict produced between industrial and artisanal fisheries. Political ecology (PE) has been popularly described as “combine[ing] together the concerns of ecology and a broadly defined political economy” (Blaikie & Brookfield 1987:17). Within this diverse field, one persistent area of focus has been on ‘resource conflict’ (Basset 1988; Neumann 1988; Beitzl 2012; Robbins 2012; Pichler & Brad 2016), critiquing neo-Malthusian explanations built on over-population induced ‘resource scarcity’ narratives (Le Billon 2015). This work deviates from such narratives that continue to persist, in two main forms, within the literature on resource conflict, particularly within fisheries. The first form relates to environmental security perspectives that put resource scarcity, produced physically and socially, as the leading cause of conflict (Homer-dixon 1994; Homer-Dixon 2010). In this way, the origin of conflict lies in the reduction of resources, or increase in demand, that propels competition and in turn leads to strife between peoples who have been forced to move or change their behaviour accordingly (Turner 2004). The second more elaborate form relates to common property approaches (Ostrom 1990) that identify socially-produced resource scarcity, resulting from the failure of institutions to constrain individuals who compete in the overuse of resources, as the principal source of conflict. Similarly, both see the roots of conflict in purely supply and demand terms. In contrast, political ecology views peoples general

'access' to resources as a historically produced and contested object, informed by material (social and environmental) and nonmaterial (meanings) changes. The term 'access' is defined here as having the *ability* to obtain benefits from things (Ribot & Peluso 2003), consisting of a bundle of powers which allow resource access to be obtained, controlled and maintained by certain actors (Campling et al. 2012). The PE analysis, then, concerns itself with the broader processes of change, rather than the in-the-moment responses to resource scarcity which both other perspectives are premised on.

The primary aim of this research, then, is to show how conflicts within fisheries can be oversimplified by resource scarcity narratives and, by consequence, to demonstrate how PE is well positioned to reveal the deeper complexities that are crucial for successful policy on such issues. By focussing specifically on the local case of industrial Chinese distant water (DW) fishing companies and their interactions with artisanal fishers, it reveals the intricacies that can inhabit fishery conflicts more widely, even in areas experiencing ecological pressure like Ghana. Prior to a brief contextual summary of the Ghanaian fishery, the paper establishes a theoretical framework that builds on the 'material and nonmaterial' approach to resource access used by Turner (2004), by examining aspects of cooperation that exist alongside conflict. In doing so, this study not only makes an important theoretical contribution to the analysis of fisheries conflict that will, as it is argued here, prove critical for policy makers, but it also sheds light on the relatively unknown interactions of Chinese DWF within host countries.

1.1 – Theoretical framework

Environmental security narratives have come to play a dominant role in the analysis of fisheries conflicts in academic literature and the mainstream media (Pomeroy et al. 2007; Muawanah et al. 2012; McClanahan et al. 2013; Greenpeace 2015). The copious literature on globally declining fish stocks has provided a widely adopted backdrop for causal statements of conflict that are often phrased in a such a way as; 'with increasing amounts of boats looking for decreasing amounts of fish, fish stocks are becoming scarce and conflicts amongst local and international fleets are increasing' (Van Bogaert 2000). This is hardly surprising considering historical examples of "fish wars", here one can think back to the 'cod wars' in Newfoundland. Specifically, China's distant water fishing activities, particularly in West Africa, have been linked with causing environmental degradation and resource scarcity that could directly promote conflict in coastal communities (Carolin 2015). Whilst there is an acknowledgement of other causes acting in tandem with scarcity in the current academic literature on environmental security and conflict (Ayana et al. 2016; Pomeroy et al. 2016), work on these less straightforward aspects has been missing and is often only mentioned in passing. It is not the intention of this author to dismiss accounts of scarce resource related conflict, but rather to show the existence of other, often more complex and multi-dimensional causes alongside.

The framework used here begins by dealing with the political economy of both fishing groups as well as outlining the ecology of the fishery. After this it takes a line of inquiry similar to that outlined by Turner (2004) in addressing a series of questions; Firstly, is the conflict in this study driven by resource scarcity or, rather, the availability of resources? This point has profound implications for fisheries policy and links in with the the specific ecology of the fishery (discussed in detail further on). If absolute scarcity drives conflict, as proposed

in the environment security literature, then different policy will be required as opposed to conflict driven by relative scarcities. Secondly, if conflict is in part due to struggles over 'access', to what extent do they represent an attempt at maintaining access through moral claims, historical precedent and community norms, rather than 'in-the-moment scrambles'? Lastly, to what degree does the interdependence on successful fish stocks produce a measure of cooperation? If it does, between who does this cooperation exist and to what consequence? This framework, by systematically looking into the material and moral dimensions of this conflict, as well as the coexistence of conflict and cooperation, allows for a much more nuanced account of this local conflict that will seek to highlight the broader themes within.

1.2 – Ecology of the Ghanaian fishery

Located inside the Gulf of Guinea, Ghana's fisheries are primarily influenced by two major oceanic currents, the Guinea current and the South Equatorial Current that, through seasonal upwellings, enrich the coastal waters and enhance productivity (Longhurst & Pauly 1987). Beyond the seasonal scale, environmental variability also occurs at the inter-annual and decadal scale, influenced by the El-Nino Southern Oscillation. Through the period from 1970-1990, environmental variability coincided with variability in fish landings, with declines and increases of fish populations (Perry & Sumaila 2007). It is further noted that some small pelagic fish populations fluctuate so variably from year to year that it is impossible to predict abundances (FAO 2004). Such variability is projected to increase with the onset of climate change effects, leading also to shifts in the distribution (Belhabib et al. 2016).

Regarding resources, the small pelagic fisheries, consisting of species such as Clupeidae,

Carangidae, and Scombridae, are among the most important for commercial fishery supporting the artisanal and industrial sector in Ghana (Perry & Sumaila 2007). Large pelagic resources, including tuna, are also fished out beyond the continental shelf as well as demersal resources that are fished by the trawlers.

Yet, on top of the previously mentioned environmental variability, studies have shown the deleterious effects of fishing pressure that are causing declining stocks (Atta-mills et al. 2004; Nunoo et al. 2014). Studies have shown how the demersal fishery is being fished at its very limit (Mensah et al. 2006) whilst the small pelagic resources, particularly *Sardinella* down to 17,000T from 120,000T a dozens years before, are in rapid decline due in part to overfishing (Asare et al. 2015).

1.3 – A brief history of fishing in Ghanaian fisheries

The colonial period was a defining time for the management of marine resources in Ghana and, whilst perhaps not as influential as it was in other resource sectors (e.g. mining (Alimonda 2015)), it still provided a strong influence on the shape of fisheries management and conflict today. Unlike the move to privatisation that took place in Ghanaian land management, British colonial authorities governed marine affairs in a “freedom of the seas” manner, advocating unrestricted, open-access and rejecting the private and communal marine tenure that had existed before (Walker 2002). This became significant when, by 1851, local authority structures became increasingly rejected in favour of colonial judicial courts who governed under a ‘maximal exploitation’ model. Both of these changes transformed the way in which resource access and conflict was managed, particularly as

fishing gear became more 'advanced'. This was exemplified by the introduction of the 'Ali' net at the turn of the 19th century (Lawson 1968) (and still used by many artisanal fishermen now (Akpalu 2013)). Its application generated conflict that took a form similar to that between industrial DWF and artisanal fishers in this study. The 'Ali' net, described as being able to capture almost anything due to its small mesh size, became widely used within fishing communities causing divisions between groups who used it, and those who opposed it linking it to decreasing fish populations. These disputes spread further to territorial claims over waters, when certain groups tried to outlaw 'Ali' net fishing in their claimed waters. However, when these conflicts were taken to the courts, the colonial judiciaries repeatedly ruled against, saying 'boundaries could not be fixed at sea which was common property' and that 'the best fishing net is the net which catches the most fish' (Walker 2002). Taking advantage of this notion, the way was paved for substantial attempts at modernising the fishing industry in the 1950s, in a bid to capitalise on inexhaustible stocks. A large state led plan for an industrial fishery was created in 1966, which led to the purchasing of trawlers, cold storage facilities being constructed and the formation of the State Fishing Corporation (SFC) (Overå 2011). However, a lack of finance and resources, as well as political instability and the independence of neighbouring countries (Atta-mills et al. 2004), led to its ultimate collapse and sell out in 1988 . As such, this collapse provided the foundation for foreign investment in joint-venture arrangements in a bid to revive it (Overå 2011).

1.4 Brief introduction of Chinese DWF

From 1985 China began a concerted turn towards DWF activities to help meet its growing demand for fish (Pauly et al. 2014). This seemingly ubiquitous expansion has been

accompanied by a host of criticism directed at China's general resource diplomacy with developing countries, aligning it with a 'neo-colonialist' approach (Power et al. 2012). This criticism is particularly pertinent to China's extraction of fisheries resources along the coast of West Africa to which it has established formal access agreements, or joint venture arrangements, with numerous states (Mallory 2013). In Ghana, Chinese DWF activities began, and continue to operate predominantly in bottom-trawling operations within the industrial sector (Xue G. 2006; Belhabib et al. 2014). As such, multiple Chinese DWF companies in joint-arrangement trawling partnerships dominate the industrial sector in Ghana. However, the Chinese DWF industry has evolved considerably since its inception, moving from an entirely state-owned enterprise to being almost 70% privately owned (Carolin 2015). As a result, the state has lost a degree of control over its overseas operations (Mallory 2013). As well, the increasingly heavily subsidised nature of China's DWF has led to a highly competitive environment amongst Chinese DWF fleets (Xue 2006).

2. Methods

2.1 Study Area

The primary data collection was multi-sited, with qualitative research components collected in China and Ghana. In Ghana, research focussed on undertaking interviews in the central and greater Accra region. Chinese DWF has long been established in Ghana, taking the form of infrastructure as well as active vessels, and as previously mentioned is undertaken in partnership with Ghanaian fishermen. This meant that interactions were likely to be more substantial and, from a practical perspective, it also allowed Chinese DW fishermen to be

accessed more easily. Additional interviews were also collected in China/Taiwan. This was in acknowledgment that although the area of study was bounded within the fishery of Ghana, the 'local' site is not isolated and, particularly in this case, is connected to 'transnational' processes that extend back to China. The interviewees in Keelung were all captains of vessels and were chosen if they were directly, or indirectly, involved in distant water fishing. The basis for these interviews was to reveal the situation with which these captains leave China and go to fish in Africa.

Within Ghana all of the fishermen were interviewed in fishing communities in Accra, Tema and Elmina whilst interviews with external figures were conducted in Accra. The fishing sectors in Ghana, similar to those in the Taiwan Strait, are comprised of medium to large industrial and semi-industrial fishing vessels targeting large and valuable fish at the extent of, and beyond, the EEZ. These vessels operate out of the large harbour at Tema, as well as the smaller port at Sekondi-Takoradi using trawling and long-line fishing methods. In addition to the industrial sector, artisanal fishing communities operate along much of the coastline in between the larger ports. These communities often fish in the waters just off the coastline in the designated canoe fishing area.

2.2 Data collection and analysis

This analysis draws primarily on qualitative data gathered in the field. This includes semi-structured interviews ($n=23$) and an informal group discussion ($n=1$) with a range of respondents, from fishermen to fisheries officials, as well as dialogue with associated academics in both field sites. The flexibility provided by this form of interview led to its

preference over questionnaires. The interview was focussed around exploring the three dimensions of conflict outlined in the introduction. Multiple lines of enquiry were set up through initial contacts in the local and industrial fishing harbours, at both locations, which were built on using the 'snowball technique' that asked participants to suggest other people who would offer valuable perspectives (Bryman 2004). This analysis also involved direct observations of fishing activities and relationships. During the time in the field in Ghana, frequent trips were made back to interview areas to observe the activities themselves.

Semi-structured interviews were split into four areas of topical discussion containing broad questions that were expected to open up debate within each. The interviews lasted from seven minutes to an hour and a half. When the information became not useful, the interview was moved on to the next topic of discussion, although this often happened naturally as the interview progressed. The first two sections focussed on descriptive details pertaining to fishing methods, locations and logistics. The latter two parts were centred around less tangible themes, instead directing conversation towards ethical standpoints as well as values and attitudes towards certain conflict aspects of the fisheries. This often prompted some hesitation amongst many of the respondents and, as a result, the topical question was regularly rephrased in order to make it more comprehensible. All interviews and group discussions were recorded, with permission, and then transcribed verbatim to allow for coding (Strauss & Corbin 1998). A thematic analysis, frequently applied in interview analysis (Bixler 2013; Moshy et al. 2015), was undertaken by coding and recoding in order to identify and draw unifying themes in the interview responses (Strauss & Corbin 1998). The interviews were then reanalysed and parts of the responses assigned to the corresponding theme.

Few Chinese DWF captains in Ghana were interviewed due to logistical restraints, namely getting access to the berths at port. This was largely compensated by the higher number of interviews with Ghanaian crew on such vessels who were more easily accessible outside of the ports as well as Chinese distant water trawler captains in China. A translator was used for many of the Ghanaian interviews and where possible word-for-word translations were carried out.

3. Results and Discussion: framing and explicating the role of Chinese DWF in Ghana

In this section the political economy of the industrial and artisanal fishing sector is briefly analysed before an application of the framework previously outlined. This yields three main areas of focus: conflict in material terms, conflict in nonmaterial terms and cooperation alongside conflict.

3.1. The political economy of Chinese DWF and artisanal fisheries

The ways Chinese DWF have operated in Ghana has changed since their original appearance, estimated by many of the interviewees to be 25-30 years ago. The transformation of an entirely state-owned fleet to one dominated by private companies, now 70% (Carolin 2015), has led to a fragmented and inwardly competitive community “*the*

Chinese don't even speak to each other, if you are A company and B company they won't be talking to each other, because they are in very very tight competition, they don't want to help each other" (Fisheries researcher, Tema, #1). Between 2010-2014 alone 53 new companies were set up (Kang 2016). The companies themselves are heavily reliant on government fuel subsidies, estimated at around 80% of the non-operating income, that make the operation financially viable (Kang 2016). The economic situation of the companies was described by one Chinese trawler captain *"Most of the Chinese companies working in Africa are supported by the government in China so what happens is, if they don't make good money the manager is fired, its straightforward. Other international fishing companies have more freedom"* (Chinese industrial captain, Taiwan, #3). Whilst within the industrial fishing community in Keelung, Taiwan, it was evident that declining fish stocks at home, and the appeal of large subsidies, were main topics of conversation between captains discussing overseas operations. Fujian, the province across the Taiwan strait from where interviews were conducted, and where many of the industrial captains had come from, was one of the provinces leading the expansion, aiming to almost double its DWF vessels to 900 from about 500 between 2010-2014 (Kang 2016).

Within Ghana itself, Ghanaian law dictates that a minimum 51% majority share of the DWF operation must be Ghanaian owned, the licence must be registered with a Ghanaian partner, all crew must be at minimum 75% Ghanaian and foreign vessels must pay tax and access fees to the government every quarter (Researcher in national fisheries NGO, Accra, #1). First off, the majority share is usually held by one main Ghanaian license holder who deals with the finances (including Saiko contracts) and laws surrounding the operation of the boat within the fishery. Upon entering a compound belonging to one of the DWF

companies it was evident that the Ghanaian licence holder, even having his own office, was substantially better off than his other Ghanaian colleagues. Despite this, control lies predominantly with the Chinese fishermen as illustrated by one interviewee *“The Chinese supply the vessel, the license is our (Ghanaians) stake, usually 51%, but actually its all being controlled by Chinese”* (Ghanaian licence holder, Tema #1). The remaining crew, which often numbers 20+ Ghanaians control the lower positions on the boat, and are required to follow the commands of the Chinese captains, *“The [Ghanaian] crew don’t discuss the operation. The Chinese mostly talk to the Ghanaian first mate who passes on the information”* (Licence holder – Industrial, Tema, #2). Further up, it was often alleged that many officials within the government have some stake within these DWF businesses, and are often in receipt of large amounts of returns from these boats *“You see the government every quarter is taking around 4000-5000cedi (\$1000-2000) so if there are even 77 vessels each paying the fee, then it is all going to the ministry of Ghana fisheries, so you can imagine how much money the government is making off of the Chinese”* (Ghanaian licence holder, Tema, #1).

The catch of these boats, primarily from the demersal fishery, is often split, with 70% sold in country to local markets and 30%, largely consisting of Cephalopods, sold as export. These exports function in various ways. In the field, it was observed that much of the export goes through one of the local fish processors belonging to Chinese National Fishing Cooperation (CNFC). Not only do the larger industrial vessels sell their high-value catch here, but local catches of high-value fish are also brought here. The chain of export was described by one of the fish processors heading operations in Elmina *“We buy the catch here. Depending on what season, [the catch] can be multiple species. From here it is sent to our main distributing factory in Las Palmas where it goes on to Asia, but also some is sent to Europe”* (Fish

Processor - Industrial, Elmina, #2). Besides this 30%, the remainder of the catch is largely sold to the same local markets as the artisanal fish catch.

The artisanal fishermen have, by law, the exclusive right to fish in the waters at a depth up to 30m (Kwadjosse 2009). Fishermen within these communities are made up largely of purse seine and Ali net fishermen, using medium sized canoes (4-7 crew) and larger canoes (18-24 crew). Fishing is seasonal, and is largely dependent on the nutrients brought up through upwelling on the continental shelf. As a result, the fishermen use a range of fishing methods to exploit various ecological niches in order to maximise the year round fish supply, catching multiple species of fish *“Every season is a different type of fish, one season we may fish for one species, and the next season we go after other different kinds of fish”* (Artisanal fisher, Jamestown, #2). Typical fish landings consist mainly of pelagic species (Anchovy, Horse & Chub Mackerel) as well as a small number of demersal species (Akpalu 2013).

The artisanal community is not homogenous, with another set of fishers/collectors who engage in the process of transshipment, known locally as Saiko. Saiko fishing is the exchange of frozen slabs of small, often juvenile trash fish caught as bycatch from the trawlers, and given to the artisanal fishermen in exchange for money (Nunoo et al. 2009). This process is known to occur along the entire coast although most predominantly at Axim, Apam and Elmina (Mpoana 2015). Almost all interviewees involved in Saiko recounted a similar narrative in the formation of Saiko fishing, here paraphrased as: ‘Originally they weren’t taking money, the Chinese trawlers were just throwing away lower classes of fish...but those canoe people who supplied them with food and vegetables were given the fish as a token thank you. Eventually those canoe people were making large amounts of money from selling

the fish given to them so the Chinese people thought they should sell it to them and make some money out of it too'. (Chief fisherman, Elmina, #1) This form of fishing has now become an established business, particularly in Elmina (Mpoana 2015)

3.2. Conflict within the fishery– beyond 'resource scarcity'

Research into conflicts between fishermen has come to be dominated by environmental security narratives that position 'in-the-moment' scarcities as the principal driver. It is not to say that such environmental problems are not happening or have no influence on conflict, but rather that such events do not naturally produce conflict and are instead *politicized* (Le Billon 2015). Indeed, it is acknowledged that resource scarcity can often play a major role in conflict, yet in environments of such great variability like fisheries, there often exists a variety of more complex factors (Bavinck et al. 2014). In addressing this conflict, this work uses the framework described in section 1.3. It first looks at the material dimensions of the resource conflict, revealing how they are often more complex than portrayed by environmental security narratives. It then goes on to reveal the nonmaterial nature also present in some conflicts before illustrating cooperative aspects that exist alongside the conflict.

3.2.1 Conflict within the fishery in material terms

As outlined earlier in the framework, this conflict has a clear material dimension, yet the degree to which it occurs over absolute scarcities as opposed to relative ones is the focus of this section. The extreme environmental variability of fish resources results in spatial and

temporal variances that mean competition often may never take place in the same areas across seasons. Instead, conflict often occurs in strategic places aimed at maintaining long term access as opposed to 'in-the-moment' struggles over specific resources. In this case, the conflict was summarised by one interviewee *"The trawlers shouldn't fish shallower than 30meters. This area is reserved for the canoe, the local fishermen. But at the same time that place is where you can get the octopus that the Chinese people use as export, because if you get the octopus you can make money. That's where the conflict comes. The local Ghanaian fishermen think the Chinese are invading their territory and the Chinese think they are being deprived of getting the octopus as export"* (Ghanaian licence holder, Tema, #2). However, looking deeper into the conflict, the idea of territory is identified as relating to specific, spatially-fixed areas within the canoe fishing area. It was revealed through interviews and observations that the DWF, in encroaching into the canoe area, are primarily in search for Cephalopods. As they are often found on the seabed, hiding in rock or coral formations, the trawlers frequently fish around these key habitats in order to acquire them. However, these same rocky habitats are also used as congregating areas for pelagic fish, which the artisanal fishermen use as key fishing areas, explained by one interviewee *"We have some rocks in the ocean that the fish aggregate around here, where they come to eat and we can normally find them. But because of the Chinese trawling method for octopus they have taken all of these rocks away, so the fish can not come so close and we have to travel deeper into the ocean"* (Artisanal fisherman, Elmina, #3). Whilst the DW fleets have existed in close proximity to the canoe fishery before, the incursions into specific areas of high-productivity have led the fishermen to become increasingly angered.

Therefore, an absolute-scarcity driven conflict explanation, associated with environment security narratives, does not reveal its full complexity and cannot be viewed without considering the wider political economy. One begins to ask questions: What is driving the conflict now? Why haven't previous environmentally driven decreases in fish populations produced similar scenarios of conflict between the fishermen? As previously highlighted, the enhanced competition and saturation of DW fleets is leading many of the companies to turn to increasing their high-value catch of Cephalopods for export. These rocky outcrops have become key areas of spatially fixed-conflict when they do so. It was made clear from interviewees that their coexistence had not led to such a pronounced cause of conflict in the past, even when they had ventured into canoe waters *"Before they were less and they were working far away on the ocean, not bothering us, but now they have becoming closer to us, disrupting our fishing. They have fished in and around our area before but these fishing activities near our best fishing areas are too much. They destroy the area, our nets and boats"* (Artisanal fisher captain, Elmina, #1). Whilst strong reactions have come from incursions into these spatially fixed areas, responses to broader incursions in the less productive areas, elicited by the artisanal fishermen, appear to be influenced as well by other nonmaterial factors and reflect wider strategies. This feature was demonstrated by Turner (2004) who showed how farmer-herder conflict over specific unproductive pastures in the Sahel actually reflected wider social strife within the communities.

3.2.2 Conflict within the fishery in non-material terms

Here, then, is another more pronounced aspect to the conflict that addresses the second part of the framework, i.e. conflict over the nonmaterial. This relates to the ways in which

conflicts over 'access' emerge within groups, each using moral claims and historical precedent to make their case. This form of conflict was observed between two groups in the traditional fishing community. As mentioned earlier, a form of artisanal fishing, termed locally as 'Saiko' fishing has become established as a result of the presence of industrial vessels. As such, conflict has been generated not only between industrial and artisanal fishers, but also between the Saiko fishermen and the traditional fishermen within the artisanal community. The Saiko men are criticised by the traditional fishermen for not fishing under the traditional management structure and instead are seen as contributing to the fishing difficulties of traditional fishermen, as an interviewee explains *"The community does not make any benefits from the Saiko business. Each individual boat owner is supposed to pay something to the fishing village but actually the Saiko fishers they don't pay any much money to the village for development. Their behaviour is such that when you try and tell them to pay, they say you are trying to ruin their business. And actually, the business is making the regional fishing very difficult"* (Chief fisherman, Elmina, #1). From observation, it was clear that the divide in Elmina extends through the fishing community, with the landing ports for Saiko caught fish and traditionally caught fish separated by some distance, with some within the community even regarding the fish caught by the Saiko fishing as less valuable.

Yet interviews with Saiko fishers revealed an opposing view, believing their fishing was more sustainable than some of the traditional fishing *"We Saiko fishermen use good methods, other fishermen nowadays are going with chemicals and with dynamite, but us and the Chinese only use nets"* (Saiko fisherman, Elmina, #1). This aspect of contention more closely resonates with the description of the 'politicisation' of environmental conflicts given by

Robbins (2012) “When local groups...secure control of collective resources at those expense of others by leveraging management interventions by development authorities, state agents, or private firms” further adding that systems of access are “historically contingent”. In this case, the Saiko fishers are able to acquire large amounts of resources via the Chinese trawlers who, when fishing inshore, are catching a portion of the catch that would have otherwise been caught by the traditional fishermen. This type of conflict is embedded in the local history of the artisanal fisheries and, in essence, is no different to the introduction of the ‘Ali’ net at the turn of the 19th century (Lawson 1968). Fishing communities were often drawn into disputes when certain groups claimed the net was reducing and affecting their own catch and fishing (Walker 2002). In this way, again, the conflict moves beyond a ‘here and now’ scramble for resources, instead reflecting long term attempts at maintaining access to resources. This aspect also shows how social tensions are incorporated into material resource struggles. In this case, the newly acquired wealth of the Saiko fishers and the lack of investment back in to the community, comes to be expressed in terms of fights over fish resources. Indeed, it could be argued that the change in power relationships, namely the loss of power from the traditional fishing institutions, was the social factor propelling the conflict over the resources. Regardless, policy based on in-the-moment resource struggles would miss the crucial complexity of the situation and its origins in conflicts outside of resources.

3.2. Cooperation and conflict

The flip side of socially produced conflict, is the occurrence of cooperation between various other groups. Whilst ecological pressures within fisheries have the potential to cause

conflict, so to can they produce cooperation. Neither is absolute in its desirability, with conflict also being associated with positive consequences and cooperation with negative ones (Bavinck et al. 2014). Rather, what is created is a complex nexus of winners and losers. This section is associated with unravelling the nexus produced by Chinese DWF and artisanal fishermen, identifying areas of cooperation and their policy implications. The Saiko business is an obvious aspect of cooperation that demands further analysis. This business is particularly curious when considering that these two groups of fishermen, traditionally at odds over the same resources, have evolved a cooperative relationship at the expense of groups of other artisanal fishermen. Groups of local fishermen are able to regain some degree of power by bypassing the government and directly dealing with the Chinese. This rejection of formal systems of governance by some artisanal fishermen, preferring informal negotiations with industrial fishermen, has been identified elsewhere (DuBois & Zografos 2012) and is often a result of alleged corruption. Although they remain weaker actors, the trade of trash fish enables them to increase their power and socio-economic standing (Nunoo et al. 2009) by trading with Chinese DWF companies who to a certain degree rely on this trade to out-compete the other companies *“The [trash] fish pays for our food and maintenance supplies. These costs are important to cover in recent times as it [profit] is harder to make now because there are more boats than ever”* (Licence holder, Tema, #2). Similar cases of cooperation generated between private companies and local resource users are not limited to this study (Brown & Ekoko 2001). In particular, the cooperation in the trade of trash fish has also been identified in Nigeria surrounding the prawn-fishing industry (Mpoana 2015).

Despite the illegality of Saiko, the business is allowed to occur often as the result of officials

turning a blind eye *“We protest but we know that no change will happen. The officials close their eyes to the business. They have interests with the Chinese”* (Fisherman, Elmina, #3). It is clear that the trade of bycatch, produced by destructive fishing methods within the canoe fishery, is not sustainable, is illegal and is a point of conflict itself, producing losers particularly amongst the local fishing communities. Yet, the history of Saiko fishing goes back far beyond the artisanal-industrial conflict within the canoe fishery area, and so cannot be dismissed as an irrelevant product of scarcity and poor fishing practices. It was clear amongst some respondents that the position of Chinese fishing vessels, and their business in Saiko, was beneficial. Mensah & Antwi (2002) report that among the main concerns of artisanal fishermen are low seasonal catch and seasonal underemployment. In this respect, the Saiko business was viewed as a vital change in production to prevent these factors worsening, illustrated by one Saiko fisher *“I would like to go back to traditional fishing, but right now the fish is not good enough. Saiko provides fish during the off-season and I can make better money”* (Saiko fisherman, Elmina, #3). In an environment of such variability and pressure, this case provides a compelling example of cooperation where environmental security narratives would traditionally see only conflict. In showing how environmental factors mix with political and social determinants to produce cooperation, these findings align with the emerging literature on the co-existence of conflict with cooperation (Bavinck et al. 2014).

4.0 Conclusion

Scarcity informed narratives that portray in-the-moment conflicts are frequently used

within the context of fisheries (Muawanah et al. 2012; McClanahan et al. 2013); however, such an explanation can overlook more complex causes as evidenced in this study. Whilst areas may be experiencing ecological pressure, scarcity is not a clear-cut and controlling phenomenon, as the conflicts themselves are multi-faceted and vary spatially and temporally amongst different groups. This work reveals the shortcomings of environmental security narratives, that still persist in fisheries literature, by using a PE framework to highlight three key aspects to the conflict; conflict in material terms, conflict in nonmaterial terms and cooperation alongside conflict.

Addressing the conflict in material terms, the progressive incursions of industrial fishers into the area set aside for the canoe fishers was found to be a point of conflict between the two groups. Yet, through observations and interviewee responses, it became clear that the conflict revolved around key, spatially fixed areas of high-productivity within the canoe fishery. In this case, this involved the rocky habitats that are inhabited by Cephalopods, but that also function as fish spawning sites. In this respect, the conflict resembled longer term attempts to maintain 'access' to fish resources rather than 'here and now' struggles over scarce resources. An analysis of the political economy of the DWF also revealed how competitive economic conditions had led some of the DW fishermen to attempt to change their fish catch, in favour of exports of squid, octopus etc, which was prompting their incursions into these areas within the canoe fishery. The second aspect of the framework also revealed a further nonmaterial dimension to the conflict between Saiko fishers, in partnership with Chinese DWF, and traditional artisanal fishermen. In this instance, moral claims on 'right' ways to fish were used by both groups to justify their activities. Resources were thus used as means to convey the social tension within the local fishing community,

between those who were, and were not, contributing financially. Further still, it was shown through historical accounts, how this type of conflict was historically contingent and embedded within the fishery. Both aspects represent a conflict between industrial and artisanal fishers that is centred over 'access' to marine resources that transcends the 'here and now', reflecting longer term goals and strategies. This is crucial for policy, particularly within environmentally variable areas, as the implications for policy directed at absolute 'in-the-moment' scarcities will differ substantially from those directed at spatial and temporal scarcities between certain groups.

This study also highlighted the curious incident of cooperation, alongside the conflict, from the interactions of Chinese DWF and artisanal fishermen in Saiko. In doing so, it revealed the complexity of industrial and artisanal fisher interactions in areas of ecological pressure, being produced through a series of environmental (variability of resources), social (power competition between groups) and political (alleged corruption) factors. The occurrence of cooperation was not indisputably positive or negative yet it is clear, at present, that it is unsustainable, producing winners as well as losers within the local fishing community.

However, the Saiko business was identified as existing prior to the regular incursions of DW fleets into the canoe fishery, and as such provides an important interrelation for further analysis considering its role in supplying fish off-season.

Through this localised example in Ghana, the study reveals the potential insufficient nature of perspectives underpinned by 'scarcity' narratives in driving conflicts between industrial and artisanal fishers and the policies built on it. Instead, a PE analysis reveals a greater level of complexity to accounts of conflict, and the importance of their historical and political context. Against a backdrop of substantial environmental variability, the conflict was shown

to be more involved with relative scarcities and longer term goals of maintaining access rather than in-the-moment struggles over absolute scarce resources. Furthermore, it exemplifies the complex ways in which Chinese DWF interact in foreign fisheries, and the myriad of outcomes associated with their interactions amongst local fishing communities. In this respect, this research has joined the work of Menon et al. (2015) in highlighting the transboundary nature of fishing crises. A failure to acknowledge and incorporate the complex interactions of these crises into policy may very well result in the disadvantaging of poorer fishers. Policy, then, that looks to address absolute scarcities will be significantly misdirected and could work against the people who it aims to help, or at the very least could simply redistribute the conflict to other areas. This study demonstrates a need for further detailed PE analysis in fishery conflicts that do not oversimplify the social and political aspects of actors.

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