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Towards a better understanding of conflict management in tropical fisheries: evidence from Ghana, Bangladesh and the Caribbean

Elizabeth Bennett[a,*], Arthur Neiland[a], Emilia Anang[b], Paul Bannerman[b], A. Atiq Rahman[c], Saleemul Huq[c], Shajahan Bhuiya[c], Mark Day[d], Michelle Fulford-Gardiner[d], Wesley Clerveaux[d]

[a] *Department of Economics, CEMARE, Conflict in Tropical Fisheries, University of Portsmouth, Locksway Road, Portsmouth, PO4 8JF, UK*
[b] *Marine Fisheries Research Division (MFRD), Ministry of Food and Agriculture, Ghana*
[c] *Bangladesh Centre for Advanced Studies (BCAS), Dhaka, Bangladesh*
[d] *Department for Environment and Coastal Resources (DECR), Turks and Caicos Islands*

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Abstract

This paper explores the nature of conflict and how institutional failure may be a primary cause of conflict over natural resources. Typologies for studying conflicts are reviewed and a typology specific to tropical fishery conflicts is proposed. Using data from three tropical fisheries, it shows how conflicts emerge and how they are managed.[1] The paper concludes that local level management of conflict can be successful, but, without proactive support from higher levels of government the underlying causes of conflict are unlikely to be removed in the long term. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Conflicts over the use and management of natural resources are widespread[2] yet the formation and impact of such conflicts are often poorly understood. In the case of fisheries, although there is much case-study information on conflicts from around the world, there have been few systematic investigations of conflict per se. The information deficit is particularly acute in tropical fisheries,[3] where, because of their important socio-economic role (e.g. employment, income, food supply) conflict may produce hardships for some of the poorest members of society. In order to provide a better understanding of conflict, and in particular its impact on sustainable livelihoods[4] in tropical fisheries, this paper will (a) produce a preliminary typology of conflicts in tropical fisheries; (b) assess the relative importance of different conflict types in three case-study fisheries and (c) explain why conflict might occur, its potential impacts and management.

Previous literature on fisheries conflicts can be divided between the 'post-modernists' and the 'theorists'. The post-modernist approach provides detailed information on a particular scenario, presented as a case-study [10–17]. Although these studies provide useful information on a specific location or issue, the results cannot necessarily be extrapolated with any ease or certainty to

*Corresponding author. Tel.: +44-23-92844091; fax: +44-23-92844037.

E-mail address: elizabethbennett@port.ac.uk (E. Bennett).

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[2] See [1–9] for case studies of forestry, water, land and farmer–herder and livestock conflicts.

[3] For the purposes of this paper 'tropical fisheries' refers to fisheries operating in tropical environments (between latitudes 23.5°N and 23.5°S) which are usually associated with non-industrialised or developing countries, and inshore and small-scale fisheries. Statements made here about tropical fisheries would therefore not necessarily apply to places such as Australia or the southern USA, or to industrial fisheries in tropical regions, such as tuna, for example.

[4] "A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base". (Sustainable Livelihoods Guidance Sheets (1.1), UK Department for International Development, www.livelihoods.org).

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a wider context (thereby limiting the utility for policy-makers).

The theoretical approach to the study of conflict advances new frameworks that can be used to describe and analyse natural resource conflicts. Since the inception of conflict theory during the immediate post-war period, these approaches have included sociological aspects, economic and econometric aspects, technological aspects and anthropological aspects [18–26]. In addition there is a large body of literature that sees the emergence of conflict in natural resources as the specific function of rising population and/or a decreasing resource base. Based on Malthus' original thesis,[5] more recent work on this theme has been conducted by Homer-Dixon [27,28]; Maxwell and Reuveny [29] and Myers [30]. Econometric analysis of secondary data has attempted to show that as the resource base declines, so conflicts emerge.

Although both the post-modernist and theoretical methods have their merits, there have been few studies of the institutional aspects of fisheries conflicts. Given the increasing recognition of the role of institutions generally, this appears to be an important omission. For example, little attention is paid to the way communities can and do co-operate over natural resource usage which might explain why conflicts do not emerge in some situations.

The research reported in this paper focuses on institutional aspects of conflict. Data were collected during 2000 from three study regions: Ghana, Bangladesh and the Turks and Caicos Islands (TCI) in the Caribbean. Each study region represents a different institutional, economic and social setting. Ghana has large, marine artisanal fisheries important for rural livelihoods; most of the artisanal catch is consumed within the country. Bangladesh is dominated by flood-plain fisheries that are governed by a complex patch-work of legislation and fishing rights and make an important contribution to domestic food supplies. Finally, TCI, a British dependent territory in the Caribbean consisting of sparsely populated small islands, heavily dependent upon off-shore finance, tourism and fishing.

The remainder of the paper is organised as follows. Section 2 examines the definition of conflict, associated conceptual frameworks and then reviews the typologies that have been previously produced in the literature to explain conflict and suggests appropriate modifications based on evidence collected in tropical fisheries from the current research. Section 3 describes the methodologies used for studying natural resource conflicts. Section 4 presents the results from three field studies conducted in Bangladesh, Ghana and TCI. Section 5 discusses these results with reference to the emergence and management of natural resource conflicts whilst the final section provides some conclusions and policy recommendations.

[5] Malthus predicted that human populations would eventually outgrow their ability to feed themselves. As they reached the limit of existence so major conflicts or diseases would emerge to 'cull' large sections of the population until the planet was once again in equilibrium.

2. Background to understanding conflict

2.1. Definitions

Broadly speaking, conflict emerges when 'the interests of two or more parties clash and at least one of the parties seeks to assert its interests at the expense of another party's interests' [31, p. 199]. Conflicts of this type do not necessarily have to be violent nor highly disruptive, in fact many conflicts that arise as a result of differing interests are low-level, non-violent phenomena [32].

Although conflict involves one group asserting its interests at the expense of another, conflict is not always negative. Positive conflict highlights incompatible goals or objectives, thus focussing attention on something that needs to change for the benefit of all concerned. Positive conflict has also been described as the means by which communities hold themselves together through establishing consensus within groups [33,34] and also proof that 'society is adapting to a new political, economic or physical environment' [32, p. 9]. Boulding [26] and Buckles and Rusnak [35] however, both note that only when political and economic elites are prepared to act with marginalised groups is change likely to occur: if the elites' priority is to maintain their position and the status quo, the positive role of conflict may not emerge.

2.2. Concepts and theory

Conflicts between groups emerge for a variety of reasons. Conflict can arise as a function of social structure (the sociological perspective), as a function of power relations (the political perspective) or as a result of rational decision-making by an individual seeking to maximise their personal utility given a pool of scarce resources (the economic perspective).

The issue that often sparks off a conflict is the 'perception' that the one group is gaining (or, in economic terms, maximising their utility) at the expense of another. The underlying reason why conflict emerges, however, is often more complex. It may transpire that opposing groups are working to a different set of objectives but the focus of the conflict settles on more visible differences (race, gender or religion for instance).

Warner [32, p. 11] identifies four issues that may explain the emergence of conflict: (a) demographic change (a sharp influx of new-comers perhaps driven by declining economic or ecological well-being in other sectors); (b) natural resources competition (increased dependence upon the natural resource can heighten competition for space and resources);[6] (c) developmental pressures (as government policy switches from livelihood protection to food production) and (d) structural injustices (changes in legislation that deny or severely restrict access to a resource by dependent groups in society).[7] We would argue, however, that in addition to these four reasons, institutional failure has to be considered explicitly.

2.3. Institutional failure

Understanding the institutional frameworks that shape conflicts and their management can help in understanding why conflicts emerge and can also help in forming management mechanisms to deal with them.

The definition of institutions is subject to many interpretations and considerable debate. For the purposes of this paper we will refer to two types of institution (following North's argument [36]): informal institutions such as markets, communities and social capital (i.e. a set of de facto rules or norms, that govern behaviour and shape society) and formal institutions such as the State, the judiciary, the political system (i.e. a set of de jure rules, enshrined in regulations and constitutions that govern behaviour and shape society).[8]

To understand why formal and informal institutions might fail, it is useful to look to the school of New Institutional Economics (NIE). NIE argues that institutions emerge to minimise transaction costs.[9] As transaction costs rise, so institutions adapt and change accordingly [41, p. 24] although this process is the subject of much debate [42].

If the institution is no longer able to effectively minimise transaction costs, however, it is weakened and is increasingly unable to function properly[10] [38, p. 337]. The cause and effect mechanism involved here is not linear: conflicts can raise transaction costs which in turn impact on the institutions' ability to function which in turn can lead to further conflict. The difficulty of establishing cause and effect complicates the conflict management process.

Strong and flexible institutions such as clear property rights, management systems rooted in community traditions, fair law enforcement and a competent State are needed for effective fisheries management. Arguably, the more nested the structure of formal and informal, local and state level institutions, the lower the transaction costs between the top and the bottom of the system and the more efficient the institutions in their management roles. In many developing countries this is not the case. Communication between the different layers of fisheries management are frustrated, the legitimacy of the ruling body to control or manage resources is often missing or contested and political factions and the action of rent-seeking elites influence the vertical relationship. It is in this context of imperfect or missing information that institutions often fail—largely because they were compromised to begin with. The failure of both informal and formal institutions to manage resources efficiently leads to conflict because there is an increased perception of inequality or injustice among the stakeholders.

2.4. Typologies for studying conflict

The development of a typology was an important starting point for studying conflict in developing country fisheries. Typologies aid in the codification of the real world. They enable the formation of hypotheses based on the unification of myriad facts under general categories. By listing the most salient features of the chosen phenomenon a typology can be built [43].

Charles [44] produced a typology of fisheries conflicts which helps explain the nature of conflicts in fisheries (see Table 1). He argues that in order to understand the types of conflicts that emerge, it is important to understand the paradigms that produce the roots of the conflicts: the conservation versus rationalisation versus social/community paradigms. In other words, the conflicts that emerge will reflect the chosen path or stated objective of the fishery stakeholders and managers. If there is considerable disagreement between conserving the fishery, meeting social objectives (food and employment) and rational management

[6] Many of these ideas are explored in the literature mentioned before [27,28].

[7] Successfully identifying the 'triggers' (ex-ante) that are likely to cause the escalation of natural resource conflicts in a specific situation is an area that warrants further research.

[8] Others see institutions as a set of regularised behaviour rather than rules per se [37, p. 26]. The term is also used indiscriminately in the literature to include 'organisations' such as government agencies [38, cf. 36, p. 23].

[9] Transaction costs represent the costs (time, money) associated with gaining information, making decisions, carrying out decisions and negotiating contracts [39]. In terms of fisheries, they can be divided into the ex-ante costs of collecting information and making collective decisions in the fishery and the ex-post costs associated with implementing collective decisions. Transaction costs in fisheries arise, mainly, from the fact that the fishery involves multiple stakeholders with differing objectives and long-term goals [40].

[10] A rise in transaction costs could be due to development pressures (political and economic), environmental scarcity (perceived or otherwise) and structural problems (political and economic). As a result of the rise, markets may collapse, property rights become unclear and States may be prone to civil unrest.

Table 1
Charles' typology of fisheries conflicts [44]

Jurisdiction	Management mechanisms	Internal allocation	External allocation
Conflicts over who owns and controls access to what; the optimal form of management and the role of government in the fishing system	Conflicts over how policy is carried out—often short-term conflicts over harvest levels, (over) enforcement and the consultative process	Conflicts resulting from how different fishery stakeholders interact	Conflicts resulting from how fishery groups and 'outside' activities interact

(economically efficient fishery) conflict is more likely. Charles [44, p. 393] states that fisheries that are 'relatively conflict free' are those where a high degree of consensus has been reached between all stakeholders and there is little argument over the objective of the fishery (to provide food, to provide for future generations or to operate efficiently for example). Charles does note, however, that such balance is unlikely to be achieved within an authoritarian regime, a point that becomes significant in Section 5. While this typology is concise, it was never intended to deal with some of the more intangible elements observed in many tropical fisheries. For this is it useful to look at the typology developed by Warner [32].

Warner [32, p. 11] proposes a typology of natural resource conflicts that encompasses many of the exogenous and intangible effects found in (tropical) fisheries. He distinguishes between (a) intra micro–micro conflicts (boundary disputes, elite capture of benefits, community differences), (b) inter micro–micro conflicts (lack of co-operation between communities, conflicts over wealth disparity and conflicts between long-term settlers and new arrivals) and (c) micro–macro conflicts (cultural disputes, relations between project sponsors and communities, environmental problems and contradictory resource needs). Warner's typology stretches the boundaries of conflict to include those elements that are not directly related to immediate stakeholders in the resource (such as project funders, elites) and other more intangible issues such as cultural difference and corruption.

We suggest that the typologies in Table 2 may usefully combine elements of the Charles and Warner typologies.

This typology is discussed further in Section 5.

3. Research methodology

3.1. Objectives

In each country, the aim was to investigate conflicts currently affecting artisanal fishing communities, how those conflicts are managed and the institutional structures shaping fishery and conflict management.

3.2. Data collection

Data were collected using a combination of semi-structured questionnaires, focus group discussions, and contextual and conflict map building [45]. Prior to data collection starting in each country, workshops were run to discuss local perceptions and interpretations of the word 'conflict'. All interviews were conducted in the local language by trained enumerators under the supervision of the project team. Coverage is show in Table 3. A process of 'triangulation' incorporated into the semi-structured questionnaires ensured a high level of confidence in the degree of conflict reported. For example, some communities stated at the beginning of the interview that there was no conflict at the village yet when they discussed issues of access, management and enforcement, past and on-going conflicts between groups came to the fore.

3.3. Ghana

The fieldwork in Ghana was carried out between March and May 2000. The survey covered 62 artisanal[11] fishing villages and focused on both the fishermen and the fish processors. Villages were chosen at random from a population stratified by Region (of which there were four). The resulting sample represents 33% of the villages listed in the latest Canoe Frame Survey (1995) conducted by the Department of Fisheries (Ghana).

3.4. Bangladesh

The fieldwork in Bangladesh was undertaken between July and August 2000. Given the large number of fishermen in the country (approximately 11 million in total) a case study approach was adopted. To reflect the wide range of access issues involved in Bangladeshi inland fisheries the study sites selected were a river fishery (open access), a permanent waterbody (owned by a leaseholder) and a seasonal water body fishery (open

[11] The Ghanaian definition of 'artisanal' is any vessel that does not use an in-board motor. Artisanal vessels range from dug-out one-man canoes through to planked canoes measuring up to 90 feet in length, powered by an out-board motor and requiring a crew of around 20 men (pers. comm Mr. Robert Thompson, MFRD Ghana, March 2000).

Table 2
Revised typology of fisheries conflicts

Type I Who controls the fishery	Type II How the fishery is controlled	Type III Relations between fishery users	Type IV Relations between fishers and other users of the aquatic environment	Type V Relationship between fishers and non-fishery issues
e.g. Access issues	e.g. Enforcement issues, quota allocation issues, co-management issues	e.g. Issues between different groups (linguistic, religious, ethnic). Issues between different scales of users (artisanal, semi-industrial)	e.g. Issues with tourism, conservation and industrial development	e.g. Issues over the environment, politics, economic change, elites, corruption

Table 3
Survey coverage by country

Country	Number of villages surveyed	Total number of participants in PRA sessions
Ghana	62	810
Bangladesh	10	142
TCI	3 (islands)	52

access/CPR). This method also helped avoid choosing sites that had exemplary conflict resolution procedures, or excessive conflict problems. Within each case study a minimum of three villages was selected to ensure that a diverse range of views were collected around the water body.

3.5. Turks and Caicos Islands

Fieldwork in TCI was conducted during November 2000. Of the 6 inhabited islands, 3 were chosen for the study: Providenciales which is the largest, most developed and is also the centre of the off-shore finance and tourism industries; Grand Turk which is the nation's capital where government employment is important, tourism and fishing taking lesser roles and South Caicos which is comparatively underdeveloped, has a very small tourist sector but is largely dependent upon fishing. A sample stratified by stakeholder group was constructed for each island, respondents were then chosen at random from each of the strata.

3.6. Data collation and analysis

Transcripts from the mapping exercises and semi-structured questionnaires from each country were analysed to produce a list of reported conflicts. The conflicts were grouped by similar characteristics (perceived cause of conflict, nature of the conflict, participants to the conflict). This process was repeated until the number of 'types' satisfactorily encompassed the entire range of issues raised (see Table 4).

4. Results

Table 4 presents the survey results within the typology framework proposed in Section 2.

The following provides more detail on the types of conflicts reported. An explanation of why these conflicts are occurring and how they are managed follows in Section 5.

Type I conflicts over who owns and regulates access to the fishery were present in Bangladesh and TCI, but not in Ghana. The strong informal institutional framework that operates at the village level in Ghana manages access to the fishery effectively—although the beaches are legally open access, custom dictates that no one may fish off a beach unless they have permission from the Chief Fishermen of that village. No such arrangement exists in either Bangladesh or TCI; most Bangladeshi villages have no real power over how access to resources is regulated and therefore many are denied access to open access water bodies by powerful political elites who have illegally 'captured' these benefits. Official government intervention also effects access and ownership. At the permanent water body (Tangail District), sluice gates to control and manipulate local water courses were built in the area in the 1990s under the Flood Action Plan.[12] Fishermen reported that these structures have restricted access to traditional fishing grounds. Although a 'Sluice Gate Committee' is supposed to represent the needs of all stakeholders, fishermen reported that their views were often discounted at meetings of the committee. Changes in national legislation have also resulted in the main water body, once fished by all the neighbouring fishermen under licenses, being transferred to the exclusive control of a leaseholder. The lease is awarded under a sealed-bid auction and, due to its prohibitive cost, is currently held by a group of wealthy business interests from the nearby town rather than the local fishermen (of whom only about half a dozen are hired to fish the water body).

[12] The FAP was a large multi-national donor project that set out to improve flood control in Bangladesh following the exceptional floods of 1988 [46].

Table 4
A typology of tropical fisheries conflicts

	Type I conflicts	Type II conflicts	Type III conflicts	Type IV conflicts	Type V conflicts
	Who controls the fishery	How the fishery is controlled	Relations between fishery users	Relations between fishers and other users of the aquatic environment	Relationship to non-fishery issues (e.g., economy, environment, corruption)
Ghana		Conflicts as a result of lack of enforcement	Conflicts between artisanal and other fleets; between catchers and buyers/ processors		Conflicts related to rising input prices; lack of capacity at the state level
Bangladesh	Conflicts over access to water bodies	Conflicts as a result of lack of enforcement	Conflicts between Hindu and Muslim fishermen		Conflict related to corruption in government
TCI	Conflicts over access of other groups to the fishery (non-belongers, part-timers)	Conflicts over size and allocation of conch quota	Conflicts between 'belongers' and 'non-belongers'	Conflicts between fishing and tourism	

Local fishermen reported that because they are excluded from the main water body their livelihood options have decreased; they are being forced to travel further afield to fish, bringing them into contact with bandits who extract protection money from them and other fishing communities who resent the presence of strangers on 'their' fishing grounds.

In TCI, although access to state level decision-making bodies (the Department of Environmental and Coastal Resources and the Ministry of Natural Resources) is comparatively high, fishermen did not feel that they had control over the fishery. This was reflected in their opposition to the increasing number of part-timers and 'non-belongers'[13] operating in the fishery and the way the quota systems in the fishery are managed. This will be examined further under Section 6.

Type II conflicts over how the fishery is managed and controlled are closely related to Type I conflicts. Reflecting the difference between fisheries management in the developed and developing world, evidence from our study shows that *lack* of enforcement was the primary conflict mentioned here whilst *over* enforcement was the issued cited by Charles under the same category [44, p. 382]. In Ghana lack of enforcement in the coastal zone was frequently mentioned by fishermen and acknowledged by fisheries officers. Clashes between semi-industrial or inshore vessels[14] and artisanal vessels were reported in many villages. State legislation bans semi-industrial and inshore vessels from fishing in waters less than 30 m deep (reserved for the artisanal fleet), yet attempts to patrol these waters or enforce the law are infrequent—mostly due to lack of funding and capacity to carry out such duties.

By contrast, in Bangladesh lack of enforcement can largely be explained by a lack of will to interact and engage with the fishery. It was reported in our study that civil servants are reluctant to take pro-active decisions for fear of demotion within their department whilst others only engage with the fishery as a means to increase their salary with bribes.[15] Although the fishermen at the river site (Brahmanbaria District) face few situations of restricted access (navigable rivers in Bangladesh are open access) illegal activities impact upon their livelihoods. Fishermen reported that failure by enforcement agents to adequately police the fishery means that the use of brush piles and kathadams (fish aggregation devices prohibited by law) is increasingly impacting upon fishing livelihoods as water flow and fish migration patterns change in the river. The temporary water body (Gopalganj District) experienced far fewer conflicts than the other sites examined in Bangladesh (due to the large size of the floodplain and wide range of livelihood options available to fishermen). However, the use of illegal gear (generally monofilament net) was reportedly on the increase—this was mentioned at the other sites also. Bandit attacks were also a problem at the temporary water body. Whilst banditry is common

[13] Belongers are local to the islands, non-belongers is a local term referring to all others.

[14] In-shore vessels are wooden and built in Ghana, semi-industrial vessels are steel and imported. They target similar species, although inshore vessels are generally smaller, travel less distance and spend less time at sea. Semi-industrial vessels are not to be confused with larger industrial vessels that target tuna and operate off-shore. There were no reported conflicts with these vessels.

[15] It is extremely difficult to gauge the level of corruption within a system [47], but anecdotal evidence (from fishermen and government employees) confirmed that the taking of bribes (in exchange for the return for confiscated illegal gear, for example) was widespread.

throughout Bangladesh, it was a particular problem at this site as many areas of the floodplain were comparatively isolated and neither Fisheries Officers nor the Police were considered to be adequate protection or help in dealing with these conflicts.

Lack of enforcement in TCI was only mentioned by fisheries officers who reported that it was often difficult to enforce regulations: perpetrators are often friends or family of the enforcement officers which can make cautioning or arrests difficult.

Charles also lists conflicts over harvest levels in Type II Conflicts. The only country that reported such conflicts was TCI.[16] South Caicos is the least developed island in the TCI study, almost completely reliant upon fishing for its economy and as a result reported conflicts related to the way the conch fishery is managed.[17] Nearly all the catch is processed in HACCP registered plants and exported. Conch is fished under quota assigned to the plants, not the fishermen. Whilst the fishermen did not have a conflict with the size of the quota, they argue that, as the island most dependent upon fishing, they should receive a proportionately larger share of the conch quota (it is currently divided equally between the 6 plants on South Caicos and Providenciales).

Type III conflicts between different fishery groups were present in all three countries. Conflicts reported in Ghana were either between the different sectors of the fishing fleet or between different actors in the market. In Bangladesh and TCI, however, they were centred firmly on other ethnic or religious groups.[18]

Conflicts between the artisanal fleet and the inshore and semi-industrial fleet in Ghana have been mentioned above. In addition to this conflict, Ghanaian villagers also reported clashes between fishermen of the same gear group (always from the same or close neighbouring communities) chasing the same shoal of fish. This was often referred to as the 'struggle for fish at sea'; net entanglements (deliberate or accidental) were an additional aspect of this conflict. There are a number of norms that govern behaviour at sea in Ghana—one of which is that the crew to spot a shoal of fish (usually small pelagics) first, is the crew that has the right to attempt to encircle that shoal with their net. However, disagreements over who saw the shoal first are frequent. Net entanglements that result when two canoes attempt to encircle the same shoal are the obvious consequence of this type of conflict. Fishermen reported that these types of conflicts have been rising in recent years, although there are no data to support this assertion. Analysis of the data collected does show, however, that those villages with fewer fishermen and canoes were less likely to report these conflicts than larger villages. This suggests that spatial issues may be fundamental to this type of conflict emerging, if not the prime cause of the conflict.

Conflicts between different actors in the fishing economy were frequently raised in Ghana: the most common being conflicts over price. The fishermen claim that the women traders[19] do not offer a fair price for the catch, the women claim that the fishermen are unrealistic about what the catch is worth. Although at first this appears to be market competition rather than conflict, the women traders reported that the fishermen often abscond to other villages to avoid credit repayments. At this point what was competition appears to become a conflict as the rules are broken.

Type III conflicts reported in Bangladesh and TCI always referred to other 'groups' (ethnic or religious) gaining at their expense. The nature of the open access rivers in Bangladesh allows new fishermen into the area, increasing competition for fish resources. The new entrants to the fishery are usually Muslims (referred to locally as 'new' fishermen)[20] and are often blamed for the rise in conflicts and the decline in fish stocks. A similar situation exists in TCI where conflicts involving the large number of Haitian, and to a lesser extent Dominican, fishermen were also reported on all of the islands. Economic difficulties in both Haiti and the Dominican Republic have led to a large influx of immigrants (both legal and illegal); many have moved into the fishery. Some, but by no means all, the 'belonger' fishermen resent the presence of non-belongers in the fishery, a situation compounded by a number of complex legal loopholes that have allowed this situation to arise. Again, there is little evidence to suggest that this rapid influx of migrants has been detrimental to the fishery, but the perception that they are to blame is strong, according to our survey.

Type IV conflicts with other users of the aquatic environment were only reported in TCI. Here,

[16] This is because quotas are not used in either Bangladesh or Ghana. Closed seasons are used in a number of fisheries in Ghana and Bangladesh, but were never raised as conflicts.

[17] The islands also rely heavily on Lobster that is managed by closed season. There were no conflicts reported over the closed season.

[18] This is an unusual finding. Unlike Bangladesh and TCI that are relatively homogenous ethnically and linguistically, there are up to five languages spoken by five different groups along the Ghanaian coast. Intuitively one would have expected the heterogeneity of Ghana to have lead to the sorts of conflicts that in fact emerged in Bangladesh and TCI.

[19] Women almost exclusively buy the catch, process it and then market it. They hold a powerful role within artisanal fishing communities and are the sole providers of credit in 35% of the surveyed villages (61% of the villages had no credit provision at all and just 3% had access to bank credit).

[20] Fishing is considered a lowly occupation of the minority Hindu population. As economic conditions in other sectors have worsened, so Muslim marginal farmers have taken up fishing. They are often referred to as 'new' fishermen even if there is a history of many years of their family earning a living from fishing.

demographic pressures from a rising number of tourist arrivals is impacting upon fishing interests—although it should be noted that these conflicts were reported less frequently than other ones already mentioned. With 17,000 inhabitants, Providenciales has the largest population of all the islands. It relies heavily upon the tourist industry for employment and income, fishing being much less important. As the tourist industry expands so too does the pressure on the coastal zone as divers, swimmers, water skiers and jet skiers vie for space. The waters are zoned and marine parks that do not coincide with fishing grounds are located around the island, however, dive operators seeking ever more unspoilt and quiet dive sites are reported to be encroaching on fishing grounds outside the parks, increasing conflicts with the fishermen.

Type V conflicts are perhaps the hardest to identify. The impact of economic and environmental change on a fishery has repercussions across many of the types listed above, yet in some cases conflicts are reported that merit a category of their own. Coastal erosion in eastern Ghana was cited by a third of the villages as a conflict and was having a severe impact upon villages' ability to maintain fishing activity. Natural erosion exacerbated by a number of large-scale infrastructural changes is pushing the shoreline towards villages causing a number of them to relocate in the past decade. In other places erosion has caused fishing days to be lost when the sea is rough because landing is no longer possible in anything but calm weather on the rapidly disappearing beach. Here we can conceptualise conflict between the villagers (with local objectives to continue living and fishing in certain areas) and government (whose objectives have failed to protect the coast) although this link was never made by the respondents.[21]

The state of the economy was also cited as a conflict in Ghana. Rapidly rising input prices are putting added pressure on fishing enterprises and exacerbates conflicts between catchers and processors over the price of fish. Again, this might be seen as a conflict between fishermen and the government. Type V conflicts were not mentioned in Bangladesh which, although heavily dependent upon aid, has not experienced rapid price changes at the market level.

In summary, all the countries in the study experience conflict in their fisheries although none of the fisheries displayed violent or acute conflict. All appeared to be dealing with a low-level of chronic conflict and conflicts related to how the fishery was managed were reported most frequently. Why these conflicts have arisen and how they are managed are now discussed in the following section.

[21] This may be simply that village communities are not yet 'politicised' enough to establish such a link.

5. Discussion of results

The results of our study in Bangladesh, Ghana and TCI show the importance of institutional failure (both formal and informal) as a factor in fisheries conflict.

Institutional failure in Bangladesh can be viewed at a number of levels. At the village level, although the community is comparatively robust, the institutions that shape the community have been failed by the support network above them (e.g. the Department of Fisheries, the police and the courts). A lack of will to actively promote fisheries management for sustainable livelihoods[22] and reported corruption have hampered the State's ability to enforce even the most basic of fishery regulations. This has also led to a progressive rise in transaction costs for the fishermen as increased violence and intimidation have led to rising monitoring or information costs.

Economic reforms introduced during the 1980s in Ghana have, on the one hand see transaction costs fall as institutional capacity at the state level (e.g. open political processes and market structures) has been promoted. The required 'slimming-down' of the state, however, has led to decentralisation which has increased transaction costs at the regional and local level: staff reductions in regional and district offices have weakened enforcement regimes. While informal institutions at the community level (such as the role of the Chief Fisherman and property rights) remain robust, they are coming under increasing pressure from the worsening economic climate and the reported rise in conflicts with inshore and semi-industrial vessels. The transaction costs represented by the time and money spent gathering information to take conflicts to a court or tribunal are rising as a result.

Ideally, the Fisheries Department staff at the regional level should be able to support village-level initiatives to manage conflicts and control the activities of rival fleets. However, the institutional capacity strengthening measures that are helping minimise transaction costs at the national level are a long-term initiative and it could be some time before positive effects filter down through the system.

It is much harder to identify institutional failure in TCI. The small size of the population on the islands has both positive and negative effects. The institutions that form the framework for local communities function well as a result of the small population:

[22] Current official policy as stated in the Government's Fifth Five Year Plan is the raising of production levels (to increase food source). On closer inspection, however, the current plan has no explicit linkage between production, income distribution and livelihood promotion.

social capital[23] is high, the transaction costs of negotiating, establishing and maintaining rules is low and compliance with the system is improved by social conformity (itself a function of high social capital). At the state level, however, the small population hampers institutional capacity and efficiency. Government ministers and state employees reported that close family connections often impose restrictions on what can and cannot be done in the fishery: private interests and political expedience are more immediate and have a bigger influence than would occur in nations with larger populations. Ideas put forward by interviewees to improve fisheries management on the islands, however, were that enforcement officers from other islands in the Caribbean should be used to help break down the 'negative' social capital effect. This has been tried in other places in the Caribbean with limited success.

5.1. Conflict management in tropical fisheries

Because institutions are the key to understanding conflicts, they are also the corner stone of any functioning conflict management process. As the following shows, the degree and success of conflict management is largely dictated by institutional capacity.

Of the three fisheries studied, Ghana is the only one with a recognisable set of institutions for dealing with conflict. A Chief and a Chief Fisherman govern each fishing village. Together with their representative Council of Elders they police the community and settle all disputes. Inter-village disputes are settled through negotiation with the respective Chiefs. For the past 6 years the Community Based Fisheries Management Programme (CBFM)[24] has been operating in parallel with this traditional institution with definite results. Villages in Central Region (where CBFM has been most fully implemented) reported a greater decrease in conflicts than any other region. Through a series of initiatives, the CBFM has, amongst other things, enabled fishing communities to manage and resolve inter-community conflicts much more easily by facilitating dispute resolution meetings at district offices. Whilst the CBFM has not replaced the traditional village based institution, it would appear to have strengthened it (although this issue merits further research).

Bangladesh has no such recognisable means of conflict management or resolution. Small conflicts among villagers may be settled amicably at meetings, but these are few compared to the much bigger issues of dealing with persistent bandit raids, access issues, corruption in the police force and lack of action by the fisheries officers. Many of these problems are directly linked to the economic conditions: bribery and corruption are widespread and accepted as a part of how society operates.[25] Although government departments are reportedly over-staffed, there are not enough trained fisheries officers with adequate equipment to patrol the fishery and maintain a level of law and order and departmental capacity is constrained by institutional problems at the State level. There is evidence of local level initiatives to manage conflict, often found in those areas with high levels of NGO activity. CBFM operate in certain parts of the country and do appear to have empowered the fishermen but, on the whole, attempts to challenge the system are frowned upon by the elite and avoided by the fishermen for fear of retribution and further problems. A number of 'official' organisations exist to represent the needs and interests of fishermen, but they were not mentioned in connection with conflict management mechanisms.

TCI has no institutional structure comparable to that found in Ghana, but a number of organisations and institutions contribute to conflict management and resolution. The Fisheries Advisory Committee (FAC) has a member from each of the main islands representing the processing industry and other people in society interested in fishing (there are currently no full-time fishermen on the FAC). The FAC acts as an advisory body to the government, and has been able to monitor and manage conflict in the past, although many fishermen reported that they did not find the process completely satisfactory. Social capital also promotes conflict management. As a consequence of the islands' small population (around 24,000 in total) it is not unusual for fishermen to be able to approach staff from the Department of Environmental and Coastal Resources or even the Ministry of Natural Resources socially. While this does not necessarily serve as the best way to manage conflicts, it appears to help in taking the immediate 'heat' out of situations before they get out of hand.

[23] Social capital is the amount of loyalty or the extent of networks accrued by an individual. High levels of social capital thus imply an improved ability to reduce personal transaction costs and exercise a degree of control over one's livelihood. See Putnam for more information [48].

[24] The CBFM is part of the Fisheries Sub-sector Capacity Building Project (FSCBP), a World Bank/IDA funded project run by the Government through the Fisheries Department. The FSCBP was started in October 1995 with a loan from the World Bank and formed part of wider 'structural adjustment' lending to Ghana. The key objective was to improve the long-term sustainability of Ghanaian fisheries through structural changes in management at Ministerial, Directorate and the local level. The issue of capacity building at both a local and national level was central to the programme and had in fact be a basic tenet of the Country Assistance Strategy (the document upon which all World Bank lending is now based) formulated in 1990 [49, p. 12].

[25] For a detailed discussion on corruption in natural resource management see Robbins [47].

6. Conclusion and policy recommendations

Conflict is present in all fisheries and the degree of impact will vary across countries. From the research reported in this paper, a key factor which determines whether conflict emerges (or not) is the ability of the formal and informal institutions to withstand and adapt to change. More specifically, it would appear that the emergence and severity of conflict is linked to the institution's ability to deal with rising transaction costs. Conflict is not a linear, step-wise process but often a circular one: management issues can lead to conflicts and conflict in turn can create management issues. It is the circularity of the dilemma that often complicates attempts to identify the source of conflict. Whether it is possible to manage or resolve conflicts in tropical fisheries will depend upon managers being able to (a) distinguish between positive or negative conflict; (b) determine the root cause of the conflict and tackle that issue first and (c) strengthen the capacity of local institutions to manage conflict, preferably in cooperation with government.

It is thus likely that a close alliance between government and local stakeholders (e.g. co-management) is a pre-requisite for successful conflict management in tropical fisheries. If institutions are 'nested' [25] so the information costs between layers of management can be minimised, helping prevent institutional failure. In so far as such an arrangement can strengthen the links between those that use the resource and those that manage or control the resource [50], co-management of some form may be the best long-term solution to conflict management. Where co-management is able to redistribute power and responsibility in the fishery, potential conflicts related to power relations and allocation of resources might be mitigated [51]. This has been shown to work to an extent in Bangladesh where the CBFM run by a coalition of Bangladeshi NGOs (funded by a number of external donors) has demonstrated a reduction in conflict at the local level in a limited number of areas [52]. While Ghana has an extant institutional base on which to build such a management arrangement, Bangladesh's institutional base is comparatively weak. Co-management has, for a number of different reasons, had limited success in the Caribbean [53, pp. 37–41] and so may not be the best solution for TCI. Here, building on positive social capital may be the best way forward.

From our research, we conclude that no matter how effective the institutional framework for local-level conflict management, without support from Government (policy makers and managers) and State institutions (law enforcement, stable markets and clear political processes) long-term effective and sustainable conflict management will not be possible. Tyler [54, pp. 264–268] suggests that a step in this direction requires public policy makers first need to recognise the impact that they have on the emergence of conflict (for example by weakening institutions, setting one group of users against another or setting up market-based management systems that run counter to traditional use patterns). Second, they need to improve information flows (an essential element of transaction costs) that are often a root cause of many conflicts.[26] Evidence from Ghana shows that when government and communities work in partnership, advances can be made in securing the livelihoods of artisanal fishermen. Bangladesh, unfortunately, demonstrates how local efforts at conflict management are severely hampered by a political system that prevents undue change at the bottom for fear that private economic interests will be damaged.

On a positive note, however, our study has shown that whilst conflict is widespread, it is not necessarily out of control. The traditional institutional structures that aid conflict management in Ghana appear to be able to adapt to change for the time-being; conflict in TCI is managed through the institutions grounded in the close-knit nature of the islands population, although how long this will be able to contain the problem remains to be seen.

Finally, further analysis of the research results is being conducted which will address some of the issues raised in this paper about the role of social capital, co-management and sustainable livelihoods in conflict management. An up-date on results can be found on the project web-site at http://www.pbs.port.ac.uk/econ/cemare/conflict.htm.

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[26] This point is also emphasised by Degen et al. [51].

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