

Institutions, economics and conflicts: fisheries management under pressure

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Introduction

Poorly defined property rights, increasing effort and decreasing catches are resulting in conflict in fisheries throughout the world. While these effects are common and well documented in highly regulated fisheries in the European Union (conflicts over allocation of quota for example) and North America (for example conflicts over access to salmon stocks between the USA and Canada); the effects upon fisheries in developing countries, while under-researched are invariably more dramatic and can have long-term implications for the promotion of sustainable livelihoods.

While there is as yet little evidence of a sharp increase in natural resource conflicts (Hussein, 1999) it is apparent, however, that the consequences of conflict in the management of natural resources are becoming more detrimental to long-term sustainable exploitation and are effecting an increasingly large number of people (Olomola, 1998; Homer-Dixon, 1994; Streiffeler, nd; Myers, 1987). Although there is an extensive literature on natural resource conflicts, little work has been done on a) analysing the causes of conflict beyond the case-study arena or b) applying economic tools to the study of conflict. In an attempt to redress the balance, this paper sets out some initial findings from an on-going study into the management of conflict in tropical fisheries¹. Drawing on New Institutional Economics and common property resource management theory, it analyses how and why fisheries institutions² adapt to changing circumstances and the role of conflict in the process. Using evidence from

¹ The Management of Conflict in Tropical Fisheries is a three year project funded under the British Department for International Development (DfID) Fisheries Management Science Programme (FMSP). The project, running from February 1999-February 2001 is being conducted by CEMARE in the University of Portsmouth. In depth field work in the three study countries Ghana, Bangladesh and the Turks and Caicos Islands is due to begin in April 2000 (after this paper is submitted) thus further analysis will be available in a revised paper prepared for IASCP in May 2000.

² There is a large body of literature that attempts to define and categorise institutions. In this paper institutions will be used to refer to any body of persons (legally established or otherwise) that organise a particular activity at any level of society thus incorporating local fishermen's associations, markets and governmental departments. For an excellent review of the myriad definitions of institutions, see Johnson (1998).

Ghana it examines the emergence of fisheries management institutions under differing access regimes and analyses the factors which appear to have influenced institutional change.

The paper argues that conflict can be the result of rising transaction costs and the inability of natural resource institutions to manage these changes. It also argues that conflict can be both a positive and negative force and should not necessarily be eliminated altogether.

The paper is divided into four sections. First, it locates fishing as an economic activity within developing countries and looks at the interactions between local, national and international policy objectives and how these can impact upon the development and exploitation of the resource. In the second section, conflicts are described and why they emerge in natural resources management is discussed. Focusing on the role of institutions it looks at how changes in institutions might affect the management of common property resources. Section three draws on initial findings from field research conducted in Ghana between March and May 2000. In the final section, the paper presents a number of conclusions as to the process of conflict formation and the possibilities for managing it.

The role of fisheries in developing economies

Fisheries play an important role in the local and national economies of many developing countries where they provide food, income and employment for large sections of the population. However, the framework within which they operate is often complex and vulnerable to failure. The absence of clearly defined property rights, the trade-offs between national and local needs and the impact of rising pressures on the economy can, however, all contribute to the failure of fisheries to positively contribute to the development process.

The national perspective: Following the second world war the rapid expansion of fishing capacity in many developing countries was promoted through the so-called

Blue Revolution³. New fishing technologies and fishing methods coupled with a desire to improve nutrition and generate foreign exchange led many countries to build on fishing activity already present. Some of this development was as part of national development programmes, in other cases, international loans and funding programmes helped promote the development of national fishing industries. As a direct result of this drive to build up national fishing capacity, the participation of developing countries in global fishing activity rose dramatically between 1955 and the 1980s. The rewards to be gained from participating in the global fishing market were potentially large, and many benefited, albeit in the short-term, from their forays into fishing. Increased export-revenues and the multiplier effects associated with expanding industries all helped boost the development of many developing coastal states.

The long-term consequences of such developments, have, however, had a dramatic effect. Rising incomes and increased borrowing of cheap petro-dollars contributed to chronic debt problems as the global economy staggered to a halt in the early 1980s; an attitude of positive speculation on fish-stocks, lack of proper assessment and regulation led to the over-exploitation of a number of important stocks (Schurman, 1996; Thorpe et al 2000). As a consequence of the international debt burden and the strictures placed on the economy by the Structural Adjustment Programmes, trade-offs between local and national needs put further pressure on resources. The downsizing of the state and the increased role of the market as the resource allocation mechanism saw many developing countries expand their export fisheries to generate revenue whilst at the same time the power to regulate such activity was hampered by the limited capacity of Fisheries Departments to undertake interventions. The push for export revenue and the renting of grounds to Distant Water Fleets has resulted in spatial conflicts between industrial and artisanal fleets (Johnson, 1996), state support for local fisheries has been constricted and external economic pressures now drive national policy formation (see for example the work by Stonich, Bort and Ovares, (1997) and Neiland, Soley and Baron (1997) on the expansion of shrimp farming)

³ This term was first used by Bailey (1985) to describe the aquatic equivalent of the Green Revolution. Blue Revolution refers to the advent of new fisheries technology that helped boost the fishing capacity of developing countries.

From a local perspective: In agricultural-based economies, natural resources form the social safety-net that supports large parts of the population. Access to common property natural resources such as timber, fuelwood, grazing land, fisheries, forest products and irrigation water are fundamental to the livelihoods of many of the world's poor. These natural resources are often held as common property and the survival of rural populations has traditionally relied upon a complex set of institutional arrangements that govern use of and access to these resources. The formation of institutional access and use arrangements is well-documented (eg. Ostrom, 1994; Alegret, 1996; Feeny, 1988). Whilst many communities have succeeded in maintaining their common property resources through collective action, in some cases pressures internal and external to the community have caused arrangements to collapse (Berkes, 1986; Mensah-Abrampa, 1988; Adam, 1994). The outcome of a resource becoming open-access is likely to be over-exploitation and the dissipation of resource rents (see Cunningham et al, 1995 for example). In terms of development, then, as the ability of a community of users to exercise rights⁴ over their resource is eroded so the role of the resource as a safety-net is undermined

The pressures that lead to the erosion and collapse of common property resources are diverse. They can result from a rapid rise in population (either through natural growth or an influx of migrants); changes to the ecological status quo (through droughts or flooding, for example); national policy changes that affect rural employment rates; technological change that results in higher harvesting potential and social change that can alter income differentials, systems of property rights and market systems.

An important outcome of the breakdown of common property arrangements is the emergence of conflict between stakeholders. However the precise mechanism is not fully understood. This will be explored in the following section.

An anatomy of conflict

A review of the conflict literature reveals numerous theoretical approaches to describing and explaining conflict. Conflict is a function of social structure

⁴ See Schlager and Ostrom (1992) for a description of the different rights associated with common property resources.

(sociology), of power or class relations (political science) and of individual utility maximisation (economics). It is both positive and negative, constructive and destructive (Powelson, 1972), violent, coercive and non-violent (Wallace, 1993). This diversity of approaches reflects the wide range of disciplines that have addressed the subject. There are many possible definitions of conflict, the following synthesis of definitions is used in this paper:

- Conflict is a situation of non-cooperation that involves groups of people with differing goals and objectives and yet
- Conflict is dynamic and can be a positive catalyst for change

Although the term ‘conflict’ often has negative values attached to it, this is not necessarily the case (see for example Warner and Jones, 1998). Conflict can be described as negative when the outcomes are a zero-sum game (no-one benefits) rather than a positive sum-game (everyone benefits) (Powelson, 1972) or where there is a deadweight loss of social resources as a result of the ‘guns vs butter’ argument⁵ (Neary, 1997:493).

However, it is also important to bear in mind that conflict can be positive and attempts should never be made to eradicate it completely or to prevent it emerging. Conflict encourages goods to be produced more cheaply, government to become more efficient, flaws in the set-up of institutions to be ironed out and allows society to function efficiently by resolving small conflicts often (Powelson, 1972). At this point, the question of the difference between conflict and competition arises. Competition implies the existence of rules, conflict arises when those rules are, for whatever reason, disbanded or ignored.

In order to help clarify whether conflict is positive or negative it is often helpful to look at what the conflict is over and how fundamental that disagreement is to the social *status quo*. Aubert (1963), Boulding (1966) and Powelson (1972) all differentiate between conflicts that are ‘within consensus’ and those that are ‘over consensus’. In the former case the parties to the conflict agree about the *value* of

⁵ This refers to the decision to allocate more of the national budget to arms rather than to food, education, health etc.

what they seek but not the means of *achieving* it. In the latter case the parties to the conflict are unable to agree on the value of what they seek nor on how to achieve it. The potential impact of conflict is thus dictated by the degree of consensual framework within which they are contested and the degree of conflict over basic consensus (Coser, 1972:73).

An economic explanation for conflict

Economic theory provides two reasons why conflicts emerge over natural resources: a) the allocation of scarce resources requires trade-offs which become increasingly difficult as the demand for and supply of resources changes and b) short-term personal gain wins out over long-term social needs or benefits.

a) The resource allocation issue: Natural resource conflicts occur when the resource in question has become so scarce or degraded as to raise issues of allocation amongst the community of users. Under perfect environmental conditions, as the ratio of users to resource grows so expansion takes place: extra land is brought into cultivation, new areas of forest are exploited, different species are fished or fishery activity moves along the coast or further out to sea. Powelson (1972:33) argues that so long as the answer to 'who gets how much' is resolved by producing more, conflicts over allocation are positive because they encourage growth.⁶ When the ecological boundaries of the resource have been reached, further expansion is no longer possible (without adverse consequences) and the division of the metaphorical cake has to change because the option of increasing the size of the cake is no longer possible⁷. At this point, resource allocation mechanisms come under increased pressure to satisfy all users. The equity of resource allocation tends to diminish as the ability to expand production decreases. As government departments attempt to placate all the stakeholders, so resource allocation decisions have to change and conflict ensues as certain stakeholders gain precedence over others. This is of course nothing new. The trade-offs between equity and efficiency occur in all markets and are faced by all governments. In the developing world however, where democracy may be

⁶ Valid though this argument may at first appear, it fails to take into account the economic and social cost of increased production and economic growth.

weak and where powerful interest groups are able to co-opt and unduly influence the decision making process, managing the trade-offs is difficult.

b) Short-term gain vs social needs: There is a large body of literature that uses game theory and behaviour modelling to explain why common property management institutions (in particular) can fail (see for example: Ostrom, 1994; Ostrom et al 1994; or Walton, 1998). The Nash Equilibrium and the Prisoner's Dilemma illustrate this point neatly: in the classic decision making model—the Prisoner's Dilemma⁸—the best possible move for player A given the best possible move for player B is to not co-operate. Thus the socially optimal outcome of the 'game' is not a Nash Equilibrium⁹ (Gibbons, 1992; (Jennings, 1999 pers. comm; Parker and King, 1995; Varian, 1990). McKean (1992:248) notes, in a similar vein that the short term benefits of cooperating are often outweighed by the costs. Consequently a community opts for the least-cost option which is to withhold their contribution to the collective goal.

A third explanation for the emergence of conflict has also arisen from the more recent New Institutional Economics school, this sees institutions and transaction costs as a key element.

From a new institutional economics perspective, institutions exist to minimise transaction costs and are a means of transcending the social welfare dilemmas that arise out of individual action and help maximise collective welfare (Bates, 1998:35). They are also the mechanism for dealing with 'gaps' left by market failure in insurance and risk assessment (Bates, 1995). Transaction costs are literally the costs involved in negotiating a transaction and have been described as the economic

⁷ The other option is of course to increase the *value* of that 'cake'. My thanks to Arthur Neiland for pointing this out.

⁸ This is but one of a number of 'games' used by game theory to analyse decisions. In the prisoners' dilemma two individuals, in separate rooms, have to decide whether to confess to a crime or deny it. If both deny they get a lesser sentence than if they both confess, but should one confess and the other not, the confessor gets an even lower sentence than the 'both deny' option, but the one that denies gets a much higher sentence. The dilemma is thus attempting to second guess the decision of the other prisoner while trying to ensure the best outcome for oneself.

⁹ A Nash Equilibrium occurs when player A's choice is optimal given Player B's choice. In other words if cheating results in a no profit situation, this is the optimal move for both players because it is better than a loss, which results from cooperation. Therefore, unless both players can agree to co-operate and reduce their profits, the best solution is cheating.

equivalent of friction in the world of physics (Hubbard, 1997). Transaction costs are the costs associated with gaining information, making decisions and carrying out decisions (Abdullah et al, 1998). 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. Kuperan et al (1999) argue that transaction costs in fisheries arise, mainly, from the fact that the fishery involve multiple stakeholders and differing objectives and long-term goals.

Institutions are important as resource allocation mechanisms – markets and fisheries departments, for example, both have a role to play in allocating scarce resources. What is more, it is now recognised that institutions matter for economic development and recent development research has recognised the need to ‘get the institutions right’ if effective economic development is to be achieved. Katterman (1998:294) points out that the OECD has finally recognised that technical co-operation, the long-time philosophical foundation of development practice, can amount to nothing if the institutions that it relies upon for success are weak. Thus for both successful natural resource management and economic development institutions able to adapt to changing circumstances are needed. There are two explanations about why institutions might fail in the face of change. The first relates to the supply and demand for institutional change, the second to transaction costs.

Thomson, Feeny and Oakerson (1992: 132) and Feeny (1988) discuss the supply and demand model for institutional change: when the demand for institutional change (to capture gains not possible under existing arrangements) outstrips the ability to supply change, failure emerges. They list relative factor or product prices, the size of the market, technological change and fundamental decisions of government as causes of change that lead to what they term ‘institutional disequilibrium’. However, they also recognise that change depends on the State’s willingness and ability to help new institutions emerge. This is a particularly pertinent issue in the developing world where, as discussed before, state capacity may be underdeveloped.

Because in the NIE perspective institutions evolve to minimise transaction costs (through minimising uncertainty) – when it is no longer able to do this effectively its position is weakened and it is increasingly unable to deliver services effectively or be

allocatively efficient (Klitgaard, 1998:337). Using the NIE paradigm and the supply and demand argument above it could, therefore, be argued that a rise in transaction costs, over and above the institution's ability to accommodate this change leads to inefficient operation. This rise in transaction costs could be due to development pressures (political and economic), environmental scarcity (perceived or otherwise) and structural problems (political and economic) which increase the costs mentioned earlier: the costs of collective decision making, information gathering and collective operation.

In the case of fisheries management, strong and flexible institutions are required at both the national and local level. Arguably, the more nested the structure, the lower the transaction costs between the top and the bottom of the system and the more efficient the institution in its allocation role¹⁰. In many developing countries this may not be the case. Communication between the different layers of fisheries management are frustrated, the legitimacy of the ruling body to assign resources is often missing or contested and political factions and the action of rent-seeking elites influence the vertical relationship.

Institutions, conflicts and fishing in Ghana

The political and economic context

Ghana, the former British colony of the Gold Coast, became the first African colonial state to gained independence in 1957. It has had a number of military coups, but is set, in December 2000 to become the first African state in which a military ruler has handed power to a civilian government through the ballot box. Unlike many other countries in the region, Ghana has experienced comparatively little unrest with its neighbours or amongst its diverse tribal and linguistic groups, and it is perhaps this aura of stability and peace at a national level which influences conditions at a local level. In the 43 years since independence Ghana has made some remarkable advances in development and has also suffered some serious set-backs.

¹⁰ Abdullah et al (1998) argue that co-management is liable to reduce transaction costs and Kuperan et al (1999) use data from the Philippines to prove this point.

Despite significant advances made in improving some of the standard development indicators (life expectancy has risen by 4 years since 1995; adult literacy has risen by 44% since 1970), Ghana is currently struggling with the dual effects of economic adjustment measures and external shocks. Economic reforms have seen public sector budgets slashed and the impact in the natural resources sector, to name but one, has been devastating. All departments are under funded, and in the fisheries department, this has led, in particular to a reduced ability to monitor fisheries effectively and enforce regulations. The need to raise revenue has seen the introduction of VAT at 10% which is set to rise to 12.5% later this year. Despite well intentioned publicity campaigns to educate the public as to the need for VAT, this is unlikely to ease the blow of a significant price rise on all VATable goods – particularly on basic grains that have shown sharp price rises since last year. Coupled to this is the rapidly devaluing national currency which, while making Ghanaian exports cheaper, makes servicing the national debt (currently \$580 million) more expensive daily and dramatically increases the costs of vital industrial inputs. Ghana is an oil importer, and recent OPEC price rises have also hit the economy hard. While exports have grown aided by improving terms of trade and export initiatives put in place as a result of economic reforms, these have tended to concentrate on cash crops such as cocoa¹¹.

In the context of fisheries, the prevailing economic conditions are having a number of effects. Firstly the day to day costs of fishing are rising. Fuel prices not only impinge on the length of fishing trips, but exchange-rate depreciation has increased the costs of imported inputs such as nets, ropes and outboard motors. The knock-on effects of such price rises are widespread. Education and health at the local level both suffer as more and more income is diverted away from the ‘add-on luxuries’ into the basic needs for survival. Although things have not reached crisis level as yet, there is evidence of malnutrition in fishing villages and primary schools lack basic teaching materials (supplied by the community). Despite this catalogue of economic problems, some very interesting results emerged from a recent study of the causes and management of conflict in coastal Ghanaian fishing villages.

¹¹ This crop was, however, hit by rapidly falling prices in the latter half of 1999 and legislation enacted by the European Union concerning the legal definition of ‘chocolate’. Briefly, by allowing an increased

The survey

Between March and May 2000 the Centre for the Economics and Management of Aquatic Resources in collaboration with the Ghanaian Department of Fisheries conducted a survey of 64 fishing villages along the Ghanaian coast (see table 1). This sample represents 33% of the villages listed in the latest Canoe Frame Survey (1995) conducted by the Department of Fisheries. These villages are spread amongst 4 regions. With no information on the variability of the population it was decided to select one third of all the villages in each region on a random basis. In order to gain a complete picture of conflicts within the coastal zone, interviews were also conducted with inshore-vessel owners and a number of industrial fleet operatives.

Table 1: sample distribution

Region	Total no. of villages (sample)	Rank no. of villages (sample)	Rank no. of fishermen (sample)	Rank no. of canoes (sample)
Volta	27 (9)	4 (4)	4 (4)	4 (4)
Greater Accra	48 (16)	2 (2)	2 (1)	2 (3)
Central	42 (14)	3 (3)	1 (2)	1 (1)
Western	75 (25)	1 (1)	3 (3)	3 (2)
TOTAL	189 (64)			

Ghanaian artisanal canoe communities are organised around the Chief Fisherman. A complex set of procedures has to be undertaken before any interviewing can take place and no interviewing can be conducted with permission from the Chief Fisherman. Consequently we targeted the Chief Fishermen who on most occasions was accompanied by a number of other village elders, usually comprising his right-hand man and the most skilful or successful fisherman in the village. On a number of occasions large groups of women traders and other fishermen were present at the meeting. For reasons of simplicity and speed a number of tools were adapted from the extensive PRA 'toolbox' to help build PISCES (Participatory Institutional Survey and Conflict Evaluation Study)¹² developed specifically for use with artisanal fishing communities to gather information on institutional arrangements.

proportion of vegetable solids in 'chocolate' major manufactures (and thus major importers of cocoa solids) are able to reduce costs without losing the right to sell their product as 'chocolate'

An oasis of calm in a sea of troubles?

Theory would suggest that given the economic context within which Ghanaian fisheries are operating, the open-access nature of the resource and the inherent instability of pelagic stocks, conflict should be widespread and the fisheries management institutions under considerable pressure. Initial analysis, however, suggests that this is not the case. At the time of writing data collection was still continuing in Central and Western Regions. The summary results below are therefore preliminary results on regions already completed.

Table 2: Conflict reporting by region

Region	% of villages that reported conflict	% of villages that reported a decrease in conflict	% of villages happy with current conflict management arrangements
Volta	88.9%	77.8%	33.3%
Greater Accra	100%	55.6%	88.9%
Central (part only)	100%	83.3%	66.7%
Overall	95.8%	70.8%	62.5%

Villages as institutions. From the results so far, Ghanaian coastal villages appear to be stable and differ little in their organisational structure along the entire length of the coast. The village chief is at the top of the hierarchy, the Chief Fishermen, first point of call for all fisheries matters sits beneath the Chief. Although by law the Ghanaian coastal line is open access (to Ghanaian citizens), in practice, a complex set of local laws and a system of reciprocity and responsibility govern inshore waters. 91.7% of villages questioned confirmed that although anyone could fish off the beach, in practice, they must seek permission or announce their intentions to the Chief Fisherman, this includes residents and migrants. The remaining 8.3% stated that anyone could fish off the beach, and did not qualify their answer.

No one reported ever having a request to fish denied. Once permission has been granted by the Chief Fisherman he then becomes responsible for the welfare of the fisherman and his kin. This system of ‘responsibility’ is not unique to Ghana and acts as a kind of insurance scheme. There are many internal migrant fishermen in Ghana – some are migrants that seasonally move from one area to another, others are migrants

¹² Developed by E Bennett and T Jolley, CEMARE.

that have been settled in a village for generations but, because they are from a different language group, are still classed as migrants¹³. The distinction between natives¹⁴ and migrants is so powerful that in one village in Western Region, there are two separate landing sites: the Fante-line and the Ewe-line highlighting the two distinct groups that have fished from the village for many years.

The institutionalisation of fisheries management. The local institutional structure of Ghanaian fisheries has, on the face of it, changed very little over the past centuries, and it is perhaps this stability and consistency that helps it remain comparatively peaceful. However, economic reforms, as described above have caused many significant negative changes to the national organisation of fishing in the past five years but in some areas have also ironically tended to bolster the local structures rather than threaten them. The most significant positive change has been the introduction of the Community Based Fisheries Management Programme (CBFM) under the auspices of the Fisheries Sub-sector Capacity Building Project. The success of the CBFM would appear to be largely due to the fact that rather than radically changing the status quo, it has strengthened the existing structures.

The Fisheries Sub-sector Capacity Building Project is a joint venture between the Government of Ghana and IDA/World Bank. Started in October 1995 its main objectives were to improve the long-term sustainability of Ghanaian fisheries. Within this main objective was also the aim to improve the capacity of the Department of Fisheries, address the issue of lack of an active management regime, weak institutional and legal frameworks for fisheries and a growing financial and resource crisis in the industry. In order for the sustainability of Ghanaian fisheries to be improved management plans were needed and for these to be successful they would need the full approval of local communities. The Project will run until 2001 when the funding will finish and the Government of Ghana will be responsible for seeing its continuation.

¹³ Migrants is a term used to describe Ghanaian fishermen fishing outside their home area – normally those from another language group.

¹⁴ This is a term used in Ghana to distinguish between those native to the region and those that have migrated from elsewhere in Ghana. It is not used here in the pejorative colonial sense!

As part of the CBFM, committees have been formed in each community and their first task was to draw up a list of by-laws governing fishing activity there. By drawing up their own by-laws and submitting them to the District Assembly for ratification, local norms would be lent weight and legitimacy. This has a two-way function. Firstly the community feels that its laws are valued because they are recognised by a higher authority and secondly, it engenders a sense of trust and liaison between the communities and the District Assemblies.

The make-up of the committees varies but as a rule consists of the chief fisherman and representatives of the various stakeholders. Typically this would include the indigenous and migrant fishermen, the fish processors, fishmongers and fishtraders, vessels, gear and engine owners, and a representative from the Fishermen's Service Centre.

During the course of the field work the villages in a number of districts in Central Region were going through the process of ratifying the by-laws which had recently been gazetted. The drawing up of by-laws has allowed existing norms to be institutionalised and has allowed 'best-practice' in fishing to be argued out amongst the fishermen and agreed up in a formal setting. A good example of this is the by-law that bans children from the beach during school hours (recognising that schooling is a very important part of village development) and the by-law that formally bans fishing with dynamite (an extremely contentious issue up to this point).

Conflicts and conflict management. In the regions so far covered, violent conflict between fishermen was very rarely mentioned. Day-to-day squabbles and difficulties are, however, common.

Table 3: Ranking of conflict types by region

Region	Struggle over fish at sea ¹⁵	Pricing of fish	Net entanglements ¹⁶	Thefts
Volta	1	3	2	3
Greater Accra	2	1	3	4
Central (part only)	1	2	3	4
OVERALL	1	2	3	4

Table 3 above ranks the four most frequently mentioned conflicts. Interestingly, the pricing of fish is regarded as a conflict, although it could be argued that this is an essential and integral part of how markets work and is a sign of competition not conflict. However, because the ethos of the survey was for the communities to identify what *they* considered to be conflicts, we have let it stand. Two other conflicts often attracted heated debate: the incursion of semi-industrial trawlers into water less than 30 metres deep (reported by 25% of villages) and fights among women over access to catches and credit facilities (reported by 29.2% of villages).

Although there was scant reference to a rising number of canoes or fishermen related to the presence of conflict, two examples stand out in particular. One was a fishing community in Accra which suffers from its proximity to the city centre and all the urban poverty problems associated with it. Here the Secretary to the Chief Fisherman mentioned that the landing beach was no longer able to cope with the number of canoes and there were many conflicts over landing canoes and off-loading catches. The other was Mumford, a well documented fishing village also reported problems with lack of landing facilities exacerbated by the increased number of canoes present in the village. Mumford's case is discussed in more detail later on.

Based on the answers recorded, conflict in Ghanaian coastal artisanal fisheries can be divided into a number of categories: conflict that results from outside influences, conflict that results from the internal allocation of resources and that which could probably be better described as competition. The typology below attempts to categorise the most frequent problems encountered, it should be noted that at the margins some conflicts could happily sit in a number of boxes. Those conflicts

¹⁵ This phrase was used to describe conflicts that usually involved the race to capture a shoal of fish.

¹⁶ Net entanglements usually resulted in communities that used drifting gill nets and were rarely considered to be deliberate entanglements.

caused by outside influences are the hardest to solve because they involve elements beyond the immediate control of the village.

External	Internal influences	Competition
Trawler incursions	Race to encircle a shoal of fish	Pricing of fish
Sea erosion	Political disputes between the Chief and the Chief fisherman	Race to purchase fish from canoes
Economic pressures	Operational problems at sea (net entanglements)	Abuse of credit facilities
	Thefts at the beach	

Because violent conflict is almost unheard of, it is perhaps useful to establish a conflict scale for Ghana that better distinguishes between the various degrees of day-to-day squabbles.

Class	Description	example
1	Violent conflict	Deliberate bloodshed or physical damage to canoes
2	Long term, major disputes affecting the day-to-day life in the community involving those outside the village	Land disputes, trawler incursions
3	Long term disputes located solely in the village affecting the day-to-day life in the community	Arguments over succession of Chief fishermen, thefts
4	Mild disputes over resources	Deliberate/accidental encircling of another's shoal, entangling of drift nets
5	Petty quarrels over competitive practices	Pricing of fish, canoe building contracts

Conflict management at the village level is highly structured and organised and it is perhaps a reflection of this that conflicts are few and far between. All villages in the survey reported that any conflict between fishermen is reported first to the Chief Fisherman who then, along with his panel of elders, comes to a decision on the issue¹⁷. In the case of damage to nets or boats caused by other canoe owners, the culprit is usually made to pay 2/3 of the damages (recognising thus that fishing is a dangerous activity and incidents are rarely deliberate). Although these cases may take a while to resolve – establishing fault and liability – they are not considered to be onerous. The conflicts that do take longer to resolve are those between different types of vessel - trawlers damaging the nets of canoe fishermen cause a frequent problem.

¹⁷ The only exception to this is in cases of violent crime resulting in physical injury. Such cases are reported directly to the Police.

Even when there are a number of witnesses and broad daylight has enabled the collection of the name and registration details of the offending vessel, the cases can take months to resolve. Such cases are reported to the relevant local fisheries office that then deals with them. Trawler owners often deny all responsibility for the damage and communication and transport difficulties between the administrative centres and the villages further lengthens the process.

During discussions other factors arose that, whilst not identified as conflicts by the villagers, were identified as making life in the villages more difficult. Two examples of these are the incidence of erosion and the rising costs of inputs. Sea erosion was frequently mentioned in villages in Greater Accra and Volta region to the east of Tema harbour. Sea erosion in the Bight of Benin is serious; current large scale project funded by international agencies are working to building sea defences to protect the coastline. Local lore suggests that without these sea defences Keta Lagoon (a significant water body close to the Togo border) will disappear into the sea in five years time. The building of Tema harbour was the most frequently cited reason for erosion in the east of the country. The knock-on effects of the Akosombo Dam, built on the Volta River are also cited for disrupting flooding patterns in the river delta (this has resulted in decreasing water levels in lagoons) and the disappearance of certain fish species at the mouth of the river. The rising price of inputs was universally mentioned as one of the hardest issues to contend with. Given that changing economic circumstances affect how communities deal with the day to day running of their lives, it is hardly surprising that there is a perceived link between increased economic hardship and conflict.

Some tentative explanations of conflicts in Ghana

Ghanaian artisanal fisheries present some interesting dilemmas in terms of conflict analysis and common property resources. Although Ghanaian waters are legally open access, a powerful sense of culture and tradition, shared amongst all groups has maintained a common-property system in the face of an open access regime. There is a profound sense of history and cohesiveness in fishing communities along the Ghanaian coast and this has undoubtedly allowed all communities to be able to control who does and does not fish off the beach. The overwhelming sense in all

villages that they were in control of their own destiny is probably also a factor that has allowed common property access rules to operate in these circumstances. The collective will to protect their right to the resource, and the fact that that collective will is recognised and respected by all the villages is probably the key to the success of the management systems here. Although game theory suggests that short-term gain will often win out over longer terms societal needs, this appears not be the case so far in Ghana. Those in the community willing to work towards social benefits still outnumber those looking for personal gain.

Rising transaction costs are a significant issue in Ghanaian fisheries management – both at the local and national level. Increasing economic pressures are making the day-to-day life in the communities harder. There is a boom in building projects in the country – particularly related to the tourist industry in the coastal regions. So far, however, only two villages have reported land-based disputes and interestingly both of these are close to the rapidly developing tourist industry under one hour's drive from the capital. In both cases a rush to secure prime spots of land has exposed the often fuzzy and complicated land rights in the region. While in one village the land dispute was a major issue but totally unconnected to fishing, in another the dispute between two rival villages (both claiming rights over a prime piece of real estate) has found its way out to sea. It was reported that whereas neighbouring villages would previously help each other at sea in the case of accidents, that is no longer the case and the incidence of damage to nets and canoes between the two communities is on the rise. Further research will identify how common a problem this is along the coast, but in the Greater Accra region it would appear that externally generated conflicts are the ones that put the most pressure on the ability of the community to solve its problems.

Economic policies are also caused the price of inputs to rise. This has a number of knock-on effects in the community. The rising costs of inputs impacts upon conflicts over the price of fish as both buyers and sellers aim to maximise their profits in increasingly difficult circumstances. The cost of fishing rises which, whilst not immediately causing more conflicts, puts added pressure on the day to day existence of fishermen and brings economic pressure to bear on the rest of the community. Despite the increasing costs of living around them the fisheries management

institutions within the communities would appear strong enough to be able to rebuff external shocks.

The rise in transaction costs is also evident in other sectors. An interesting problem that was raised by a number of villages was the lack of landing facilities. One community in Accra reported that there were too many canoes attempting to land on a small beach, and the village of Mumford in Central region reported a similar problem. Here the fishermen are not able to beach their canoes and have two options: leave them out at sea or take them to nearby Takoradi. Given the nature of the sea the latter option is preferred which has a number of impacts on the village. Firstly the transaction costs of the fishermen rise because they are travelling further to land their catch and have to negotiate access with the relevant Chief at the other landing place. Secondly, less fish is consequently landed at Mumford which impacts upon the livelihoods of the women fishmongers there. Travelling to meet the canoes involves transaction costs that, with the current economic climate are rising daily. It also involves the less obvious transaction costs of negotiating with fishmongers at the new landing site who now have increased competition in the purchase of fish. Once again, it would appear that the strength of the village communities and the mutual respect amongst the neighbouring villages has led such incidences to be considered as minor disruptions to daily and, so far, are not the source of any destructive conflicts.

The intrusion of trawlers into coastal waters is another factor that has seen transaction costs rise. Reporting the incident takes time and effort, resolving the issue requires even more. Travel and communication between many of the very isolated villages and the district headquarters is costly and time-consuming. The trawler owners are often based in ports far from the site of the incident and are reluctant to admit liability and often deny all charges. Despite mechanisms to resolve such conflicts, they often remain the most costly conflicts in terms of time and money. As the incidence of trawler incursions rises, so presumably will the transaction costs associated with this. Only increased funding of a monitoring and enforcement capacity and negotiation with the trawler owners is going to be able to better deal with this problem. This is supposed to be covered under the remit of the FSCBP, but as it liable to be a long-term goal. The root cause of the trawler issue – declining catches and rising costs pushing the trawlers into illegal areas—has a number of long-term solutions.

However, the trawler sector is facing severe economic pressures and any measures are probably too painful to contemplate at this juncture and beyond the capacity of the State (economically and politically) to implement currently.

The Community Based Fisheries Management Programme (CBFM) would appear to have had positive benefits to the communities. By using the existing institutional structure, the CBFM has enabled more formalised management to be introduced to communities without upsetting what was clearly a system that worked well to begin with. The only communities that appeared indifferent to the CBFM were those in urban areas (principally Accra). The reason given for this attitude is that fishermen in these communities tend to be better educated and have greater access to media and other information. They are more cynical of government promises of how things will get better in the future and more likely to rebuff any attempts by the government to interfere. Outside urban areas, the CBFM was the reason cited for the decrease in conflict or the satisfaction with the conflict management system in place. The gazetting of local by-laws was looked upon favourably by all those spoken to. So, in terms of transaction cost analysis, it could be argued that providing local institutions with a more 'legitimate' basis both within their own community and in the district as whole has helped maintain transaction costs at a stable level. In those communities where the incidence of conflict has declined, the CBFM may even have helped reduce transaction costs. There is, however, a corollary to this argument. Although the CBFM has had a number of positive benefits, it has also inserted bureaucratic systems into institutions that worked quite happily without them before. Further research needs to be done on this issue, but it would be interesting to see if CBFM has actually increased the transaction costs of some communities in terms of time spent at CBFM meetings, costs incurred in travel to meetings and the added costs of bureaucracy involved.

Conclusions

Conflicts arise in all fisheries regardless of size or structure. However, where the community has a degree of control and immediate interest in the health of the fish resource, there is more likely to be a collective will to manage the resource for the benefit of the community as a whole and to thus mitigate the effects of conflicts. As control of the resource is removed from the community of users, so the incentive to

act collectively diminishes and the conflicts erode any sense of ‘rules of engagement’. Although much has been written about natural resource conflicts, little is understood about how these conflicts emerge, develop and are managed. In an attempt to improve the understanding of conflicts, this research examines the role of institutions in the process. In particular, it is interested in the contribution that economics can make to the understanding of institutional capacity and conflict formation. Although physical factors often spark off conflicts: a rise in the number of resource users, the decrease in fish stocks, climate and ecological changes, it is the ability of institutions: both formal and informal to manage this change that is critical. In the case of Ghana, it would appear that strong local institutions, supported, albeit at a minimal level by the state, have helped maintain conflict at a low level, despite the rising transaction costs around them. A number of issues remain beyond the realm of influence of local institutions – sea erosion and trawler activity in particular. However, the fisheries management mechanism in Ghanaian coastal communities is strong enough to be able to absorb rising transaction costs and internalise them thus keeping conflicts to a minimum.

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