

**PROBLEMATIZING 'COMMUNITIES': THE CASE-STUDY
SITE OF SANTA ELENA, HONDURAS.**

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This dissertation is submitted as a part of
an MA or MSc degree in Geography at King's College London.



Artisanal fisherman working off Ross Cay, Santa Elena
(Chris Williams, 2005)

KING'S COLLEGE LONDON

UNIVERSITY OF LONDON

DEPARTMENT OF GEOGRAPHY

MA DISSERTATION

I, CHRIS WILLIAMS

Hereby declare (a) that this Dissertation is my own original work and that all source material used is acknowledged therein; (b) that it has been specially prepared for a degree of the University of London; and (c) that it does not contain any material that has been or will be submitted to the Examiners of this or any other university, or any material that has been or will be submitted for any other examination.

This Dissertation is 9919 words.

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Date 26-8-05

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SANTA ELENA, HONDURAS.**

ABSTRACT:

Community-based natural resource management (CBNRM) holds vast potential for livelihoods and resource protection. Many CBNRM projects have failed to achieve goals, as they have not involved the local communities in the decision-making process, causing problems through non-compliance with regulations. Through representing communities as homogenous and presenting their opinions as statistics, supporting conservation agendas, their involvement can at best be considered peripheral. It is this problem with utilising local knowledge and representing diverse community opinions, which hold the key to resource protection and sustainable livelihood generation in this case study site. This study presents fishermen’s knowledge, which compliments scientific knowledge.

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LIST OF ABBREVIATIONS:

CBC	COMMUNITY-BASED CONSERVATION
CBFM	COMMUNITY-BASED FISHERIES MANAGEMENT
CBNRC	COMMUNITY BASED NATURAL RESOURCE CONSERVATION
CBNRM	COMMUNITY BASED NATURAL RESOURCE MANAGEMENT
CCC	CORAL CAY CONSERVATION
DCS	DECOMPRESSION SICKNESS ('THE BENDS')
DFID	DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (UK)
IADB	INTER-AMERICAN DEVELOPMENT BANK
LEK	LOCAL ECOLOGICAL KNOWLEDGE
MPA	MARINE PROTECTED AREA
NBIPLA	NATIVE BAY ISLANDERS TRADE AND LABOUR ASSOCIATION
NR	NATURAL RESOURCES
NRM	NATURAL RESOURCE MANAGEMENT
NRMCs	NATURAL RESOURCE MANAGEMENT COMMITTEES
PMAIB	PROYECTO MANAJE AMBIENTAL DE LAS ISLAS DE LA BAHIA (ENVIRONMENTAL MANAGEMENT PROJECT OF THE BAY ISLANDS)
PRA	PARTICIPATORY RURAL APPRAISAL
RG	RESPONSE GRADING
RMC	RESOURCE MANAGEMENT COMMITTEES
RRA	RAPID RURAL APPRAISAL
TCI	TURKS & CAICOS ISLANDS

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9,919 WORDS

PROBLEMATIZING 'COMMUNITIES': THE CASE-STUDY SITE OF SANTA ELENA, HONDURAS.

(1) INTRODUCTION:

Gaps in scientific knowledge mean Marine Protected Areas (MPAs) are not as successful as possible. Future success requires local involvement and community support. 'Communities' are not homogenous entities, wherein all members support the same ideas and management options. Inconsistencies between theoretical and practical approaches to 'working with communities' must be viewed critically. This should reflect the innate diversity within groups of people- set according to local social and power structures. The case study examined in this thesis, using a qualitative methodology¹, contrasts with previous research conducted by Wiefels et al (2000, for Proyecto Manejo Ambiental de las Islas de la Bahia, PMAIB) that employed a quantitative approach. The problem with statistical representation is that it can obscure respondents' opinions through bias and misrepresentation of views on significant issues. It is too easy for the framing of quantitative approaches, involving local communities, to make incorrect assumptions and so fail to represent views, which might then be excluded from planning decisions, while appearing to conform to theoretical notions of 'participation' and 'co-management'. Consultation with the local resource users is often an afterthought, as opposed to true involvement in the decision-making process. Qualitative research is necessary to truly involve local resource users: the key to successful natural resource management, especially in the fishing communities living off the Caribbean reef system (see DFID, 2003). Results demonstrate that qualitative analysis is important on a very small scale; the representation of 'community', the importance of biases, positionality, motivations, and perceptions must be stated, as these are all integral to finding an inclusive, fair and representative solution to community-based conservation (CBC) and natural resource management (NRM).

The paper begins with a review of issues in current international literature. Combining local and scientific knowledge provides a possible solution to developing

¹ Research carried out in Santa Elena also included quantitative methods (see methodology section).

management schemes acceptable to both scientific and resource-user communities. The review serves to illustrate issues within CBNRM schemes² and situate the current research as an alternative methodology to studies previously conducted within the fishing community of Santa Elena. Due to a shift in the research focus during the fieldwork, the main debates within the surrounding literature form an integral part of the discussion section.

The background section frames the case study site within the literature and PMAIB funded research. The research purpose, methodologies employed, biases, ethical issues and research challenges are described.

The results section emphasises provides insights into how biases and ‘driving agendas’ can actually work to the detriment of research, providing only the ‘paper’ aspects of participation and community involvement. Results indicate that the fishing community of Santa Elena share the same opinions towards finding solutions to resource management problems as PMAIB, Coral Cay Conservation (CCC) and current literature. The conclusions and future research sections aim to highlight the vast potential of research, as well as the immediate need for a change in attitude which could facilitate truly inclusive ‘community’ dialogue, providing new management opportunities. The question is: will they be provided the chance, through power sharing, to be involved in ‘their’ fisheries management and MPA?

Appendices provide additional information on data analysis, details of interview respondents and supporting quote excerpts from interview transcripts.

LITERATURE REVIEW:

Integrating knowledge (local and scientific)

Local people must be involved in the management of local resources. ‘Top-down’ development models have frequently alienated them and hence been unsuccessful. This failure stems from inappropriate methodologies, which have “failed to understand the complexities of the socio-economic and cultural contexts in which indigenous livelihood and production systems function” (Binns, 1997, p.1).

² CBC, CBNRM and co-management all represent points along a continuum of involving local communities in natural resource management (NRM) and are treated as practically synonymous in this study. Their shortcomings all stem from the same approaches and methodologies of research, despite different scales of involvement by different actors.

Many arguments reflect this problem; the lack of holistic approaches and exclusion of (fishermen's) local knowledge, will only serve to cause future problems and potential failure for CBNRM programs, MPAs or development schemes. Alternative management solutions must be decentralized and include fishers' knowledge. More participatory research methods are the focus of current literature (Calheiros, 2000; Mackinson, 1998; Maurstad, 2002; Clifton, 2003; Wiber, 2003). Non-scientific information must be combined with typical scientific data. Combining knowledges would make the decisions more acceptable to the (fishing) community and assist management plans. Through consultation and documentation, their opinions are included in decision-making. Formerly dismissed 'local ecological knowledge' (LEK) would be of particular importance for fish stock assessments in future research. For MPAs to serve as a management tool, significant gaps in scientific research need to be filled, most probably by LEK.

A mismatch between decision-makers and locally affected communities stems from the power of 'agendas' in determining research emphasis (Faust, 2001). By government agencies and NGOs trying to protect biodiversity and consequentially limiting local peoples' resource use, their livelihoods, freedom and human rights could be adversely affected. 'Communities' must be consulted and included in the decision-making process ('co-management'), if regulations are to be enforced and a stronger collaboration forged between scientists and local communities.

Co-Management:

Pomeroy (2003) explains that 'co-management'³ is a phenomenon only recently to have reached the Caribbean region. Current research intends to add to the growing knowledge base as a case study of co-management in its pre-implementation phase. In the Caribbean, currently only 'consultative' co-management is in place, which means the government *interacts* with local people, but ultimately makes all the decisions (see Figure 3). The different forms of co-management are discussed in the 'research purpose' section. Pomeroy (2003, p.1) believes a "shared recognition of a resource use problem" is crucial to successful cooperation between resource users.

³ "[A] partnership arrangement in which government, the community of local resource users, external change agents and other resource stakeholders share the responsibility and authority for making decisions about management"- DFID-NRSP, 2003, p.26.

This 'recognition' was shared by all fishermen interviewed in Santa Elena and is discussed in results section. The desire for external assistance, community enforced rules and regulations, as well as punitive measures are also issues of commonality between respondents.

DFID's 'Increasing MPA effectiveness through working with local communities: guidelines for the Caribbean' (Garaway & Esteban, 2003), provided a framework (based on a variety of case studies) which served as a starting point for the research. Working closely with "the non-homogenous set of people who live in and around the MPA" (Garaway & Esteban, 2003, p.4) - or in this case; those who live around an area currently planned to become an MPA, is integral to any management scheme. For this reason, more representative and inclusive research, investigating the needs of the 'community', is crucial to any long-term solution.

Leach, Mearns & Scoones (1999) speak of the need for dynamic institutions if any form of 'co-management' of natural resources could ever be implemented. The UNCED suggested local-level solutions for natural resource management (lead by community initiatives) are the goal, which has the decentralisation of government, "devolution to local communities...and community participation" at its heart (Leach, Mearns & Scoones, 1999, p. 225). Despite the international attention of CBNRM, literature (Allison, 2001; Leach, Mearns & Scoones, 1999; Pollnac, 2001) suggests failures are commonplace. Local people have been treated as passive recipients of short-term projects with no clear criteria defined and hence, the poorest groups (that management regimes have most effect on) have been marginalized. These schemes may have failed due to the importance given to definitions of 'community', 'participation', 'institutions' and 'co-management', without investing any resources into actually carrying out the type of in-depth research required to truly represent people's views in any meaningful manner. It is in this context that the research aims to provide an example of qualitative, quantitative and inclusive research, to shed light on the diversity in opinions on key issues relating to NRM options, even between a small group of (15) fishermen from the same community. A diversity not represented in the management plan for the area.

CBNRM and the definition of 'Community':

The definition of 'community' is important in how any 'CBNRM project' is structured. Viewing 'community' as "a bounded, relatively homogenous entity" has caused problems (Mehta, 1999, p.15). It ignores the diversity in opinions and needs, smothering the notion that even within communities, conflicts between resource users are common. The potential for a truly 'participatory' CBNRM scheme in Santa Elena is huge. Dissertation research shows how diverse opinions exist within the fishing 'community', which itself differs from the village 'community' as a whole. By showing how divergent some views and perceptions are, the 'micro-scale' of the need to involve local people becomes clear. If the community is treated as a homogenous entity with only one opinion on each issue, this misrepresentation increases the risk of non-compliance, resource over-use etcetera, posing a threat to the success of any management scheme- in this thesis, the local lobster and conch fishery⁴.

The notion of a CBNRM approach, which promotes and includes 'local knowledge' should provide empowerment and facilitate control over natural resources, providing a possibility to halt degradation or restore key livelihoods. Differences in 'knowledge' therefore provide a very interesting future topic for truly representative and pluralistic research. Initiation of CBNRC, CBC or 'co-management' of resources also hinge upon the inclusion of divergent opinions and representative, qualitative research.

There is a problem inherent in treating a 'community' as a homogenous entity, and "downplaying issues concerning difference, power and politics" (Mehta, 1999, p.5) when it comes to resource management. These differing opinions are of critical importance in any conservation or development planning as otherwise the opinions asked are only those of the 'powerful'. This is not representative of the multiplicity of opinions. Natural resource management requires an inclusive and truly participatory decision-making process, to be able to compile all knowledge and therefore truly represent the views and livelihood needs of resource users.

⁴ CBFM "places decision-making at a level that should ensure that local knowledge of the resource is brought into play; it ensures participation by fishing families themselves in decision-making processes and it lifts from over-stretched governments the burden and cost of administrative functions" (Allison, 2001, p.384).

Goldman (2003) believes that 'community' has become the 'catch-all solution' to conservation and development problems. The shift has been from state-control to CBC, which aims to be participatory and inclusive, but results have not necessarily been positive. In a 'successful' example, the control of the management is devolved to local communities. However, if the 'community' is presented as a homogenous unit, this may well serve the institutional definitions of *modern* and *participatory*, yet this "hollow romanticized image" (Goldman, 2003, p.834) presents a problem as to whose opinions are represented as those of the 'community' and hence which management regime is imposed.

The literature review serves to frame the basic ideas of 'community', which are then dealt with in the discussion to avoid repetition. The challenge of retaining focus during the fieldwork period, when issues discussed bring up more interesting issues, provided a huge obstacle, one that shifted the research repeatedly. The amount of time spent discussing ideas, which ultimately do not figure in the thesis, was huge. Trust and friendship were built, which impacted the sense of what was important in the research. Issues of corruption, political gain, abandonment by the government and the inability to cooperate in the face of poverty and survival were discussed at great length. These are issues, which are hugely significant to the livelihoods and mentality of the islanders. The 10,000-word limit for the thesis, constrains the extent to which any issue can be dealt with. The research was empirically driven and integrating major littoral issues into the discussion section was deemed more useful than using them in the literature review. For this reason the discussion section contains a large amount of information from current academic literature.

(2) BACKGROUND:

Figure 1- MAP OF HONDURAS (http://www.lib.utexas.edu/maps/cia04/honduras_sm04.gif).

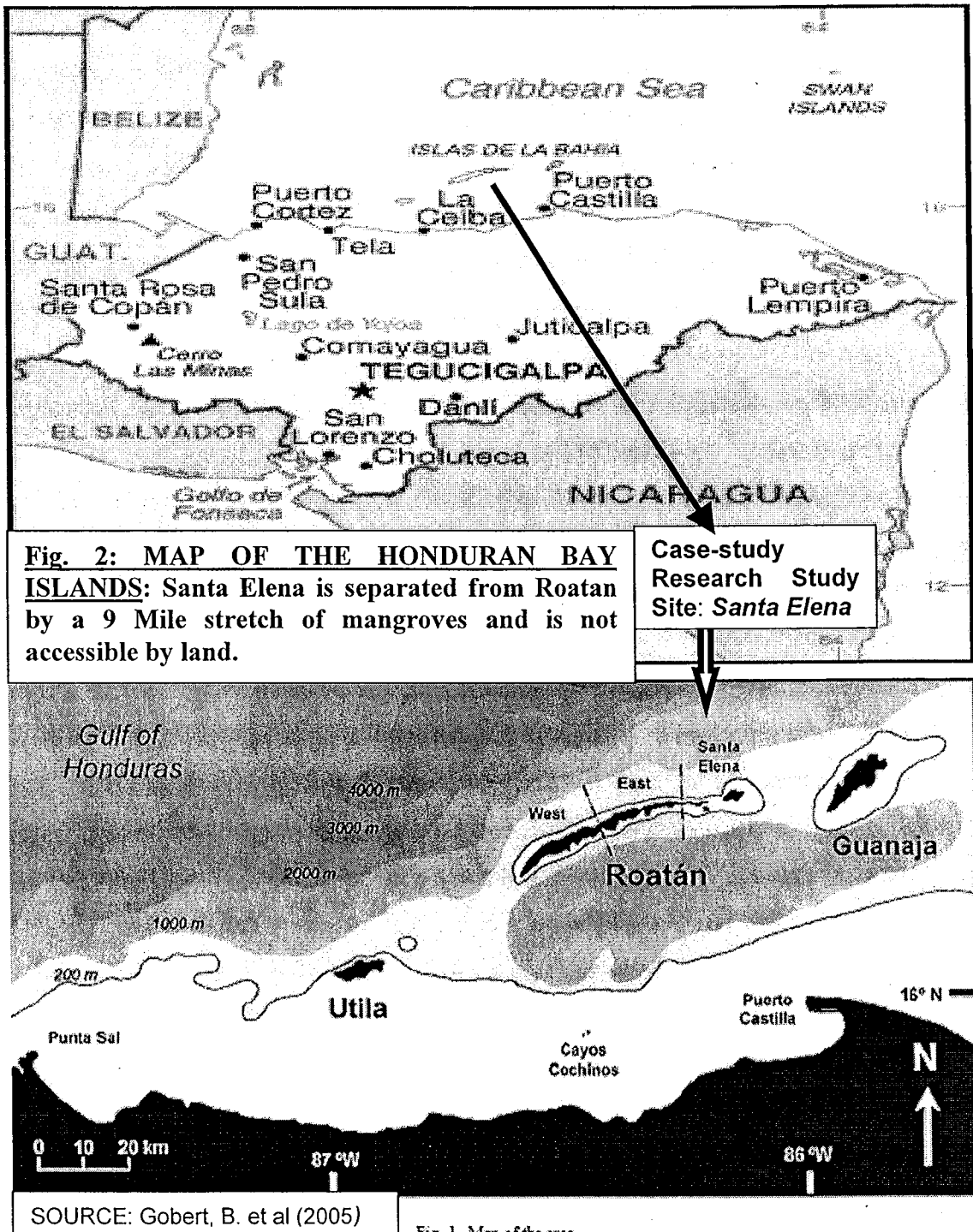


Fig. 1. Map of the area.

The Honduran bay islands are characterised by huge contrasts, from luxury resorts to entire communities without any facilities whatsoever, such as Santa Elena. The contrast is most stark between the tourism-driven 'West-End' of Roatan and the 'East-End' which is characterised by artisanal, industrial / commercial fishing and shipping (Figure 2). Luttinger (1997) believes that Roatans' economic base is

increasingly dependant on reef-based tourism, which in the 1990's led to resource degradation around the West-End, due to insufficient environmental policies and protection. Resource conservation strategies are often financially unavailable and the hope for the 'developing' East-End would be that local communities manage their own resources. In Luttingers' (1997) article, the idea of a 'community' MPA ('Sandy-Bay-West-End-Reserve'), actually relates to a large group of resorts, dive-schools, restaurants and other tourist facilities, which fund the MPA. Stakeholders are therefore very different from Santa Elena, which is a 'fishing community', not a 'community' of transient economic migrants, both from the western world and Honduran mainland. Only "20 local fishermen were trained and certified... to become dive-masters...many others were trained to work in the service sector of the tourism industry" (Luttinger, 1997, p. 15). On an island of 15,000 people (Roatan), where the majority have always lived off the ocean, this seems very little compensation for the amount of money gained and degradation generated by dive-tourism, an issue of grave concern to the fishermen of Santa Elena (see results and interview transcripts- Appendix 6). The West-End of Roatan is "not representative of Roatan or the Bay Islands at large" (Seidl, 1996, p. 87) and neither is the tourism industry⁵. Is the marine reserve therefore really community run? It appears that "poor islanders and Ladinos are precisely the groups most negatively affected by the reserve since they are the ones who were most dependant on the common property resources of the reserve- fish and shellfish" (Seidl, 1996, p. 91). Much has changed since 1997 and hopefully CBNRM in Santa Elena could prevent the same from occurring again.

Santa Elena is an island of under three square miles, separated from Roatan by a nine-mile stretch of mangroves (Figure 2). This isolated community lacks any formal institutions⁶ and government support. 'Helene', as it is known locally, is populated by English-speaking Afro-Caribbeans who descended from the Cayman Islands and have been living in the Bay Islands for around 150 years. Livelihoods

⁵ The majority of the tourist industry on Roatan is foreign owned. The area around Santa Elena (Fig. 2) could be different due to its high cultural and biological value, including 500Ha or 2/3 of Roatan's Mangrove species (Wiefels et al, 2000, p.6-13). A 'co- managed' MPA which is controlled by a *true* island community as opposed to the 'community' MPA in Sandy-Bay-West-End has been planned, although the nature of 'participation' remains unclear.

⁶ Institutions can be distinguished from organisations. Institutions are 'the rules' (patterns which have become regularised through behaviour) and organisations are 'the players' of a game. Organisations exist because of institutions. These rules are constantly adapted and re-made through people's practises, which "eventually constitute institutions" (Leach, 1999, p. 237-238).

depend mainly on fishing, whether subsistence (artisanal), commercial (industrial- on the fishing 'Banks') or as divers, captains, cooks etcetera. Lobster and conch have provided the most economically valuable (and therefore most exploited) products'⁷. The main lobster fishing techniques are 'free diving' and 'tank-diving' (SCUBA). Hooked iron rods and in some cases fishing/lobster pots, gill nets and traps are also used.

Hodgson's (1999) research into Reef Check data shows that lobster in the Caribbean have shown a major reduction, an issue which the fishing community of Santa Elena have also witnessed at a local level. In terms of the fisheries of Roatan (and the Caribbean), the most economically valuable marine resource is lobster, *Panulirus argus*; "In 2000, almost 36,000 metric tons were exported from the Caribbean and Western Atlantic alone (FAO, 2002)" (Hodgson, 2001, p.23). The effect of this decline was the initial focus of research conducted. This later evolved to become focussed upon discrepancies between previous research (Wiefels, 2000) and my own and offers an explanation as to why. The discussion section explains how one-dimensional views of 'community', the role of 'agendas' in driving research outcomes and the inherent problems of bias cause misrepresentations over key management concerns.

Coral Cay Conservation (CCC), a UK-based environmental NGO working with the community and PMAIB ('the Environmental Management Project of the Bay Islands') is currently mapping out the coral reef surrounding the island and conducting workshops with local fishermen, women and schoolchildren. In 2004, workshops including 'reef ecology & conservation' and 'safe diving practises' were undertaken with local fishermen.

PMAIB, are a government agency in the Ministry of Tourism (and CCCs host-country project partners), who aim to develop a sustainable tourism strategy for the Bay Islands⁸. PMAIB are Inter-American Development Bank (IADB) funded and are planning to implement an MPA 'Zone-7- AMP04/04' around the region of Santa Elena (Figure 3). Problems with this plan, issues of bias and misrepresentation are

⁷ Fish and lobster / conch stocks are a 'common pool resources'. Maintaining resources of this kind is difficult as everyone 'entitled' to them. "In tropical developing countries where formal institutions are weak, social networks remain important for controlling opportunism and solving social dilemmas" (Rudd, 2001, p.140).

⁸ <http://www.coralcay.org/expeditions/marine/hn1/overview.php>

necessarily exist. The significance of the PMAIB research's 'driving agenda', in biasing results and misrepresenting opinions can be considered critically. In terms of tourism being a viable solution, 88% of island fishermen surveyed were interested in tourism although many were unsure how it would work (Wiefels, 2000). This is interesting when compared to my own case study research in Santa Elena, where opinions on tourism and all other issues discussed by Wiefels (2000) in the PMAIB 'artisanal fishermen sociological report'⁹ are sometimes interestingly different. Proposed solutions to resource degradation, were presented as: 37% 'Don't Know', 8% 'Nothing can be done', 14% 'Restrictions', 41% 'Education and awareness' (Wiefels et al, 2002, p.28). This provides another very interesting contrast to my personal research, as the majority was in favour of using restrictions and regulations, but none even mentioned education and awareness as a solution, in two months of discussions and interviews. The agenda of PMAIB as 'environmental educators' has possibly impacted or biased the results. Hence, the research purpose emerged as a complimentary / critical appraisal of the accuracy of the representation of the 'community' in question.

Biases frequently determine the outcome of research. Despite every motivation for representative research, PMAIB are an agency of the Ministry of Tourism. When research was carried out, the main conclusion was that artisanal fishermen throughout the Bay Islands (and in Santa Elena specifically) thought tourism was 'a good idea', 'agreed' with the need for protection and felt education was critical. These results were obtained quantitatively, i.e. the findings are 'accurate', however the meaning of 'agreement' as 'they want tourism and need it' is, according to my research, a misrepresentation (see results and discussion sections). Quantitative data, such as that used by PMAIB, does not provide the answer to representing resource-user needs.

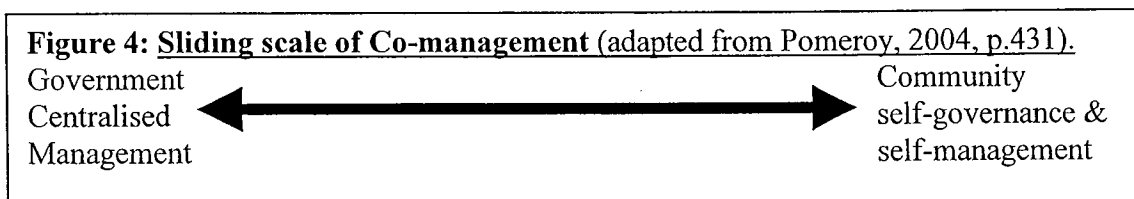
(II) PURPOSE OF RESEARCH:

Pomeroy (2004) and DFID funded research into co-management options for the Caribbean framed the ideas of the research project. On the Island of Helene, currently no rules and regulations exist or are enforced by the government- however, a

⁹ 'INFORME SOCIOLÓGICO DE LA PESCA ARTESANAL EN LAS ISLAS DE LA BAHIA', 'Sociological information on artisanal fisheries in the Bay Islands', Wiefels, 2000.

management scheme, which would “ensure that people...especially the poor, can effectively engage in successful partnerships with government for sustainable livelihoods in the context of well-managed coastal resources” (Pomeroy, 2004, p.430) could be achieved.

Santa Elena is undoubtedly in the pre-implementation phase of any form of co-management, so the importance and urgency for accumulating community perceptions of natural resource decline, causes and future options is clear. “[C]omparing ‘before’ and ‘after’ conditions...is less feasible in the Caribbean than...Asia” (Pomeroy, 2004, p.432), yet Santa Elena provides a notable exception as currently the island is in the ‘before’ stage. It is in this context that the research is situated. My research provides a further case study of a pre-implementation (and therefore potentially more promising) phase of CBNRM or co-management NRM plan.



Objectives of the research were:

- To document the perceptions of the Santa Elena fishing community on the state of their marine resources, causes for changes and possible solutions, i.e. to understand how their ‘local knowledge’ relates to resource management and whether or not this coincides with ‘scientific knowledge’ and approaches to ‘conservation-driven’ resource management.
- To examine results obtained by Wiefels et al (2000), on behalf of PMAIB, to determine whether inconsistencies existed between their research and mine. Divergences can best be explained in terms of biases dictating research methods and data analysis, and therefore outcomes. This information can then be used to assess needs of the fishing community and provide a basis for further investigation into LEK and increased dialogue, which could lead towards a sustainably run, co-managed fishery and MPA in Santa Elena.

ISSUES OF DIVERGENCE FROM PMAIB REPORT (by Wiefels et al, 2000).

PMAIBs census and report are used as a basis, but it must be borne in mind that over the last five years the populations has grown (another census is due to begin in July 2005) and opinions may have changed, possibly quite considerably. The general make-up in terms of religion, language, and profession can still be taken as reasonable accurate and representative, as can perceptions of 'lacking / deficient education', community organizations / institutions, commercialisation of fishing, aquaculture, territoriality and fish sales¹⁰. Issues involving stock decline, tourism, natural resource protection and fisheries management from PMAIBs study were compared to data gathered over the period of May-July 2005. PMAIBs summary of the 'community' was that Helene has a 'Black, English speaking community, who respect and take pride in their ancestry and heritage from the Cayman Islands, have a rich culinary tradition and depend upon the sea, a relationship of which they are also proud'. Helene is seen as a 'semi-autonomous' population as it is very remote and self-sufficient in food, water and electricity. The findings present the opinion that islanders ('Helenians') think differently to other Bay Islanders, but are internally homogenous in terms of opinion, even intra-generationally (Wiefels et al, 2002, p.76), an issue which my personal research hoped to shed further light upon. This following paragraph serves to summarise the major issue of discrepancy between PMAIBs findings (1999-2000), and my own.

According to PMAIBs study only 7% of islanders did not 'like the idea' of tourism in their community. The 93% majority stated they 'liked the idea' (Wiefels et al, 2000, p.52). The contrast to my personal research here is noticeable and it must also be borne in mind that despite biases in answers given to me (which are unavoidable) the agenda of PMAIB to convert portions of the fishing grounds into eco-tourist sites, means that the respondents involved could have been biased towards answering questions with this agenda in mind. Answering the question of 'liking the idea' is taken to be evidence that tourism is a requirement for the 'community', something 'needed and wanted' as it is presented in the concluding section of the PMAIB report. This issue is examined in the results section as despite the quantitative responses generally being in favour of tourism to some degree (as it is considered

¹⁰ These were not the focus of my research but are available in the form of the CCC report compiled alongside the dissertation.

inevitable), the qualitative interview responses prove a degree of uncertainty and skepticism about its potential (Appendix 6).

I argue here that this case-study represents an example of how diverse views can be over certain issues. Even within the fishing 'community' of fewer than 150 people, issues of disagreement and potential conflict surface, which have been ignored in previous sociological study carried out (now five year old). For their use in management plans, specifically the plans for the Santa Elena MPA, more information on the divergent opinions, concerns and future options must be examined thoroughly and dealt with qualitatively to ensure that biases are understood, accounted for and that conclusions are reflexive enough to realise their own shortcomings. Perceptions of 'tourism' were examined, as were the proposed solutions to resource decline problems. This 'local knowledge' was then compared to 'scientific knowledge' in order to establish similarities, differences and potential issues of conflict for the proposed reserve.

METHODOLOGY:

Although the research carried out could never qualify as 'truly participatory', the ethics, motivations and methods drew inspiration from PRA literature and relevant research (Chambers; 1983, 1989, 1994, 1997; Mackinson, 1998; Calheiros, 2000; Maurstad, 2002; Clifton, 2003; Wiber, 2003; Bergmann, 2004; Scholz, 2004). Showing respect, interest and humility are crucial, taking ones time, not interrupting, being polite and professional whilst retaining a good rapport and friendship, were all deemed crucial to obtaining accurate results. Wiber (2003) has noted 'Participatory Research' problems in previous work. The main problems involve viewing fishermen as 'subjects' that academics study, training them to become 'research assistants', that collect data determined by the researcher, or having fishermen determine research questions, following which data and analysis are undertaken by graduate students. To this end Wiber's study was undertaken in a 'truly participatory' manner; however, to fishermen "control represented a burden rather than an opportunity...It required significant contributions of time and effort and a level of competency that most felt they did not possess" and the "challenge that confronted ...[Wiber's attempt]...to develop a fuller participatory engagement was the problem of time constraints. Fishing is a full-time job and one that fishers feel they are competent to do. Most have

neither the time nor the inclination to become social scientists” (Wiber, 2003, p.4). This was highly relevant in the case of my research as time, financial and other limitations, meant that PRA could not be carried out (or claimed to have been). My research in Santa Elena was ‘participatory’ only in the sense that preliminary findings were re-laid to the fishermen first, discussed and adapted as a consequence. The data and final report (extended version also provided to CCC and PMAIB) will be distributed to the fishermen via the ‘resource management committees’ (NRMCs)¹¹, which have been recently initiated.

Figure 5: Fieldwork and selection process

- Fieldwork was carried out during May and June 2005; 15 fishermen, the head of PMAIBs natural resource department, 3 CCC field staff and 2 environmental consultants were interviewed. Fishermen were asked if they would like to participate and when they would be available for an interview. No-one asked to be interviewed declined, and schedules were flexible (based around availability, generally after the days fishing was over). “All fishermen were interviewed voluntarily with the understanding that they were not required to relinquish any information if they did not choose to do so” (Scholz, 2004, p.339) and the semi-structured format applied was identical for all respondents, although due to the conversational nature of the interviews, other aspects received a different amount of attention between respondents.
- The entire process resulted in 21 viable interviews, 15 response-grading (RG) questionnaires and three focus group discussions, which were triangulated. The process was iterative and fishermen were encouraged to adapt their answers or add details they omitted in the subsequent group discussions, where “similarities and inconsistencies among the aggregated information” (Scholz, 2004, p.340) were discussed. Information was obtained through 6 months of informal

¹¹ Fishermen of each ‘village’ on Helene set up the NRMCs. Issues relating to fisheries management and the protection of the coral reef are discussed and voted on by members, although the committee is currently unrecognised legally.

discussions (April-August 2004¹²) and 2 months of formal interviews, group discussions, participant observation and response graded questionnaires (May-June 2005).

- People were happy to spend their time discussing their personal feelings and opinions, whereas in other meetings, the majority of those invited failed to turn up and one or a small group of vocal participants generally dominated discussions. By combining the group discussions and semi-structured individual interviews, it was hoped that this would provide supportive results. The triangulation of these various methodologies are presented in the results section and discussed. The interviews provided an insight into a cumulative 316+ years fishing experience (see Appendix 4).
- The selection process of fishermen was non-random, in that some were selected for their work with CCC, some as they have had little or no contact to CCC, some due to their position as boat captains for example and others due to their role in the 'Resource Management Committees' (NRMCS) which have been recently formed for each fishing community on Helene. Discussions and interactions were founded on months of communication, questions, discussions and exchange of opinions. The decision was made to combine local 'expert' and 'average fishermen' opinions, to obtain a diverse sample of the fishing community. Including the opinions of boat captains for example, provides insight into certain larger scale spatio-temporal changes in the resource base.
- With the exception of David and Kennedy Belcarest, all interviews with fishermen were conducted on a one-one basis, at a time and place requested by the respondents. All candidates were asked the same question types, although a level of adaptive change was always necessary as the experiences and perceptions were not to be guided or biased by the researcher. All the information recorded from the interviews was from memory, but nevertheless the detail and

¹² I spent six months on Santa Elena (2004) as Project Scientist (PS) for Coral Cay Conservation (CCC).

agreement between respondents was very close (see results section and Appendix 5).

(I) BIASES

‘Rural development tourism’ (Chambers, 1983), as it has been labelled, refers to the biased and superficial approach witnessed in many investigations into rural livelihoods. Working alongside many of the divers and fishermen, claims of ‘development tourism’ on the part of the researcher, would be harsh and unfounded. The bias of being treated as an outsider (who previously worked for a conservation organisation) has an effect on the results and must be accounted for. Trust is a key issue in social-science research and spending eight months living in the community, the researcher feels that he was well trusted. I was asked to eat with families and invited to take part in a variety of events, including basketball, football, church congregations, BBQs, Domino sessions and also fishing-trips (which unfortunately had to be declined due to responsibilities with CCC).

A ‘Western bias’ obscures the ‘true’ identification and assessment of problems in the global south, while simultaneously misrepresenting and marginalizing the views of local people (Binns, 1997, p.4). Given this statement it is almost impossible to carry out any form of research that would be deemed acceptable. In this case, the researcher acknowledges that responses will have been biased, but to exclude any of the results and denigrate them as worthless would be unproductive and ultimately pointless. The research was explained as being thesis research, of primarily informational value. This was explained to respondents before the interview began. The value of local knowledge and the need for honesty in responses was emphasised. The research will be distributed to the community (via CCC) through the NRMCs. A risk is that “we (the authors) do most harm when we impose our interpretations on what we claim are ‘authentic voices from the field’ (Czarniawska, in Mølberg Jørgensen, 2000, p.44) and should therefore never claim the ‘absolute truth’ of any research. The motivation for responding in the first place must be dealt with as a form of bias. Possibly taking part was seen as “a way to improve their situation” (Maurstad, 2002, p.163), which the researcher felt might have biased results. Every respondent could have exaggerated issues of resource decline if they felt a more urgent solution

or attention was needed for their livelihoods to be sustained. Financial gain, support, being 'nice', long term benefits for the community and other factors were considered as reasons for locals to answer.

The reality for Santa Elena is that ideas may have shifted due to CCC being present: potential benefits (financial, tourism, practise, community support) may have shaped reality and thereby must be considered a potential bias. Having spent half a year in the community working for CCC a conservation organisation, the respondents will at some level be reacting to prior perceptions. Undoubtedly a different investigator (a local fisherman, a female, Black, Hispanic or government employee) would have resulted in a different outcome to some degree. Seeing the researcher as a friend, visitor, white, male, European, educated, working with PMAIB, 'rich', 'privileged', compassionate, or someone 'guaranteeing' solutions would also bias results. Comparatively however, 'Spaniards' (from the Honduran mainland) and the 'Government' are two groups of people who are very unwelcome within the community. Fishing, in Helene, is exclusively male and attitudes towards a female researcher may have biased results further. There was a very strong male bias (100% of fishermen, 81% of total) in the research and future research should include perceptions of women to be more thorough and shed light on any possible differences. A reasonable distribution of ages, families and communities were selected from the island (for additional information see Williams, C., 2004, CCC PS Report, unpublished).

(II) ETHICS

The research documents 'oral knowledge' which could provide a dilemma. Scientific knowledge serves the purpose of being published and being publicly accessible, even internationally. In contrast, fishers' knowledge (LEK) is distributed selectively. By the researcher being given permission to enquire about fishermen's' perceptions of the resource decline it was deemed important to fully explain the purpose and use of the information and that anonymity or withdrawal / changing of information was always possible. The final document will be sent back to the 'NRM committees' of respective communities (as well as CCC and PMAIB), but "publications are of better use to some fishers than others" (Maurstad, 2002, p.162). This is seen to be the minimal repayment and hopefully the research will be followed-

up, investigated in another manner, or for another purpose. Dissertation publication for KCL is of course not the same as putting the information on the Internet, but for future research, involving LEK, the issue of distribution must be considered.

(III) CHALLENGES

Major challenges resulted from my initial attempt to combine qualitative and quantitative methods of research. The questionnaires provided a great deal of data, which was analysed statistically and yielded no interesting patterns of divergences between respondents, according to their social status or economic position. For this reason those results are treated as secondary (Appendices 2, 3, 5, 6, 7). The results did yield information on areas of divergent opinions, which pointed the research in the direction of 'problematising communities', as their view had previously been represented as unanimously in favour of tourism. Hence a more interesting, yet broader issue emerged, which guided the focus group (FG) discussions and subsequent comparison within international literature.

Initially the aim was to document the perceptions of resource decline in the area, based on the work undertaken in 2004. I thought it would be interesting to document 'local knowledge' and compare it to scientific knowledge for lobster stocks. Early on in the research it became clear that the degree of similarity was very high, this was also to be assumed as over-fishing, combined with technological advance- in this case tank diving- had lead to a noticeable decline in stocks. As the research continued, other issues emerged which were far more interesting, issues which made me question why management plans are drafted with all the participatory jargon or 'buzz-words', when in reality that is all they are- words. The research undertaken to create the management plans ignores the diversity within the population, ignores their idea for management and is yet 'perfectly participatory' in terms of the theoretical basis and data gathering.

As discussed subsequently, mapping (NRM) proved to be impossible as the fishermen were not forthcoming in offering information about fishing-grounds or spatio-temporal changes, which could have provided a more substantial basis to comparing local and scientific knowledge.

Literature included issues of LEK, co-management, fisheries management and approaches to MPAs: either locally run, government imposed or funded through eco-

tourism. My aim was to document resource changes and map them over time to establish causes, effects and solutions through the eyes of the fishermen. In the end, their views were almost identical to those of the scientists, managers and conservation organisations. This did not prove as interesting as I had hoped. What did emerge however was an example of a case-study, where although the ‘community’ had been included in the research in 2000 (Wiefels), the quantitative approach had misrepresented the opinions and hinted at notions of the option of an eco-tourist funded MPA, very much in-line with PMAIBs agenda, a result of their role as a branch of the Honduran Ministry of Tourism.

TABLE 1: Research Methodology, justification and practical adaptations made during research (adapted from Clifton, 2003; Bergmann, 2004; and Calheiros, 2000).

Semi-structured Interviews (qualitative data)	• Fishermen’s views on the causes of stock decline, the need for resource protection and solutions / requirements for the future were discussed. Semi-structured Interviews provide an insight into many aspects potentially overlooked by a questionnaire, where only limited responses are possible. • Formal interviews typically took around an hour. This was considered enough time to answer questions, without demanding too much time from the respondents. Interviews were carried out with 15 fishermen from Helene by the researcher, to avoid introducing additional bias. This was seen as an adaptation of some of the main tools used in PRA, but simplified due to limitations in both time and resources. • Interviews were undertaken after respondents stated a time and place to best suit them. Most of the formal interviews with fishermen were carried out at their homes (generally after being invited for food or
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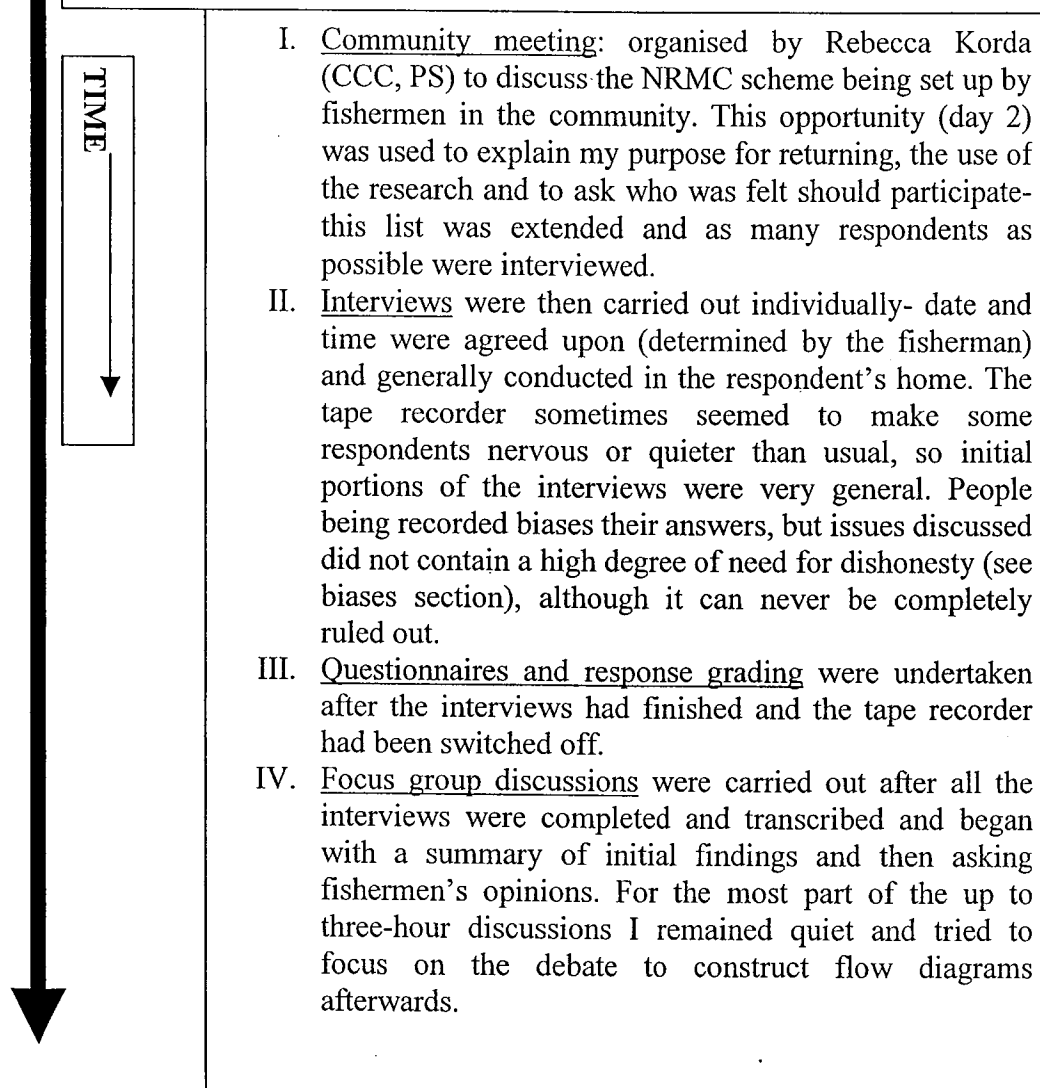
	drink). Others were undertaken on public wharfs, or CCC's base camp / benches outside. • The interviews were semi-structured and open-ended but the researcher asked specific questions, as time constraints limited both sample size and duration of interviews. • All interviews were recorded using a SONY VOR TCM-400DV 'clear voice' Dictaphone and transcribed phonetically to represent the islanders English dialect (540 minutes = 101 pages of transcripts, excerpts from which appear as supporting appendices). • All fishermen were responsive and helpful during the interviews and the aggregate knowledge was analysed in the results section. • No 'CCC' T-shirt was worn - I explained that I was doing independent research, although to some degree the association will still have been maintained. Most wanted to be interviewed again, which seemed to demonstrate that "they were grateful for the opportunity to share their information face-to-face" (Maurstad, 2002, p.162), but due to time constraints I invited them to join in the focus group discussions. • The 'scientific' interviews were more formal and conducted in the office of PMAIB, or at CCC base camp 'Coral Lodge' in the 'Point' village of Santa Elena. • In terms of the people interviewed, a portion took part in reef ecology & conservation workshops in 2004. <i>Initially</i> the focus was on comparing local knowledge (fishermen with no exposure) to a 'fusion group' (who had worked with CCC) and finally a 'scientific' group (comprised of PMAIBs head of
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	natural resources, CCC staff and 2 Independent Environmental Consultants). • The fishermen interviewed were either recommended to me ('snowballing'), were people I had met the previous year and knew fished for a living, or fishermen I met this year who were members of the NRMCS who agreed to be interviewed.
Questionnaires / Response Grading (quantitative data)	• Questionnaires ('response grading') provided the quantitative data (together with PMAIB census data) from which trends and patterns in responses could be graded to discover issues of high agreement / disagreement. • The numerical scale used for the response grading was 1-5: where 1= disagree strongly, 3= neither agree nor disagree and 5= agree strongly (see Appendix 2). This 'positivist' approach implies that 'reality' can be generalised by experiments, in this case grading answers to the same questions. • This scaled approach is more useful than YES / NO answers, as uncertainty can be accounted for. • Questions were modified when problems were encountered with the phrasing of particular questions (see Appendix 3). • The responses were grouped or 'clustered' according to similarities and differences in levels of agreement with individual questions (see Appendix 5). This did not provide a clear pattern and hence only served as an exploratory tool.

Participant Observation (qualitative data)	• Observation is key in any situation as body language can indicate which issues are more important or raise dilemmas or conflict. Also, since there is no way of ‘filtering’ questionnaires or interviews in a methodologically valid fashion, “we have to assume that the respondents answered the questions to the best of their knowledge” (Bergmann, 2004, p.378). These uncertainties could contribute to wrong conclusions being drawn or strong biases being introduced- these in turn cannot be measured empirically, but observation can help.
Focus Group Discussions (FGD-qualitative data) Results are presented in the form of a flow diagram, Figure 6. Images from FG discussions are shown - Figure 7.	• FGD were less formal but very productive in terms of data; notes had to be compiled from memory as it was felt that recording the discussion would entail the same biases as recording interviews, so recording one and not the other seemed a fair way to balance techniques and the inherent bias of people knowing they are being recorded. • Semi-structured interview data was used to back up the quantitative data generated by ‘response grading’ questionnaires. This was presented before focus group discussions and debated. Fishermen were “consulted through all phases of the research process” (Calheiros, 2000, p.690), but preliminary findings were never presented to a fisherman who had not yet been interviewed, as this may have biased his answers. • Focus group discussions provided a forum for the results to be discussed with the fishermen, so any agreements / disagreements or inconsistencies could be dealt with.

	• The focus group discussions were fairly spontaneous; one was before a BBQ, which CCC arranged as a 'thank you' to the community. The second was outside a shop/ bar in the 'Bight' community. • The results of the discussions were recorded as notes and flow diagrams, after the discussions had taken place, so as not to interrupt or distract the group. These results can be seen in the flow diagram in Appendix 4.
Natural Resource Mapping (NRM-Quantitative / Qualitative).	• NRM was <i>not</i> used for this study as from the literature and the initial phase I (Table 2, below) discussion with the fishermen suggested that fishermen would not be honest about their fishing grounds and keep secrets. Issues of confidentiality could be breached and the territorial nature of these grounds would bias data. Family-based differences could emerge and shift the focus of the research (work by Bergmann, 2004 and Maurstad, 2000 implied the same problem). This could be an area of significant trouble for future LEK research.
Triangulation	All information was triangulated: findings from the individual one-one interviews, focus group discussions, participant observation and informal interactions / discussions with many of the respondents lead to conclusions being drawn.

TABLE 2: PHASES IN RESEARCH: MAY-JUNE 2005



RESULTS:

- ✓ Results present the opinions of 15% of Santa Elena's fishing community, or one in 6.6 fishermen. For details on demographics, i.e. gender ratios, average respondent age, average years fishing experience and cumulative experience of respondents see Appendix 4.
- ✓ Results obtained from responses to RG questionnaires showed that 100% of respondents from the fishing community have perceived a decline in stocks over their lifetimes, especially over the last decade, and are concerned over the future of the islands fishery.

- ✓ The causes for the decline were distinct depending upon respondent but overlapped to a great degree. Tank –diving, foreigners, other islanders, lack of seasonal enforcement, generational differences, population growth and an increase in fishermen were all seen as responsible by respondents from both the fishing and scientific ‘knowledge spheres’ in their interviews.
- ✓ Solutions also overlapped strongly between fishermen and scientists. A ban on SCUBA diving, size restrictions, the banning of landing ‘berried’ (pregnant) females, seasonal restrictions, community empowerment in decision-making and protection, were seen to be very important alongside enforcement of rules and regulations.
- ✓ All fishermen believed that the NRMCS presented a step forward in this regard. The newly formed NRMCS will be able to draft and maintain rules and regulations, which reflect their knowledge and will as a consequence be respected by the fishermen, in contrast to ‘top-down’ regulations, which have failed in many cases due to their un-inclusive and unrepresentative nature. This could prove very important in initiating a ‘formal’ institution (a pre-requisite for any co-management scheme, according to international literature and DFIDs guidelines for the Caribbean) within the fishing community.
- ✓ Four in five fishermen believed that tourism would overtake fishing as the main income generator in the future and, although this cannot be treated empirically, the general idea of a future shift is apparent. This question does NOT imply that people are in favour of tourism, a point acting as a possible divergence from PMAIBs findings. The current research demonstrates how easy it would be to claim ‘80% of the community are in favour of tourism’, despite this being quantitatively true, as interview excerpts show a dislike of the West End, ‘Gringos’ and changes associated with tourism mean it is not perceived as positively as could be claimed (see Appendix 6 for diverse perceptions of tourism).
- The percentages cannot be taken as empirical ‘truth’, but are an indication that fishermen are in accordance with each other on certain topics. This can then be contrasted to those issues that cause divergence, and hence heterogeneous

issues can be understood and documented. The value of qualitative research is to show that the involvement with local people must be given a higher priority than it has been so far. Without their involvement and consultation no CBNRM schemes will succeed, as agendas are *forced* upon resource users, despite the overriding aims and targets being broadly compatible. A lack of dialogue and in-depth research seems to be what is disabling the process, not a lack of information, support or incompatibility of scientific and local knowledge.

- The prospects for a community-based fisheries management seems feasible, although progress is slow and attendance at meetings was generally perceived as being too low- causing some degree of conflict and disagreement between fishermen. The study presents a basis for future research.

Issues of overall agreement, disagreement or uncertainty from Quantitative RG Questionnaires:

The following results were obtained by comparing quantitative 'Response Grading' (RG) questionnaire answers (see Appendix 2 for original and 3 for modified RG questions) between fishermen using PRIMER (see appendix 5) and standard deviations <1> to determine which issues stood out¹³. This tool was used to cluster issues discussed and develop trends or patterns. Although this was useful in exploring the data, the clustering did not reflect any clear pattern. This is testament to heterogeneity, generally not given acknowledgement in the literature. This simplifies 'resource users' and 'local communities' for the ease of report compilation. 'Collective views' as such, are not found within the respondents interviewed; generally scientific and local opinion are close and sometimes the difference between scientists, or between fishermen, are more prominent than the division between the two 'knowledge spheres' (see quotes section, Table 4 and Appendices 6 & 7).

¹³ In order to explore the presence of patterns of respondent concurrence on *individual* survey (response grading) questions, the standard deviations were calculated for the value ranges of the variables recorded for each question. The questions with the lowest standard deviations may be assumed to be those with the highest level of concurrence of opinion within the respondent sample. A high standard deviation means the results deviate further from each other, i.e. are less similar to each other.

TABLE 3: Issues of agreement, disagreement and uncertainty in RG questionnaires. See Appendices 2 (RG questionnaire sheet) and 3 (modified RG sheet).

Agreement Questions: 1, 4, 5, 6, 10	Clear agreement could be observed over the issue of decline; every fisherman interviewed had noticed lobster and conch decline over their lifetime (variable from 16-56 years of age), which implies that the increased level of depletion has been fairly recent. All fishermen also agreed that this presented a threat to the islands fishery and that protection would help. The subsequent agreement for Q6 confirms this, as the negative phrasing ('protection will <i>not</i> change anything') was responded to negatively, i.e. protection <i>will</i> change this situation. All respondents also agreed that resources needed to be managed by the community if the system was to be respected or implemented. Finally, all were in agreement that the currently initiated 'NRMC scheme' was the best way to organise fishermen to discuss and determine rules and regulations to protect their livelihoods, independent of any organisations or government bodies.
Disagreement Questions 2, 7, 8, 9	Issues that produced a high level of disagreement were questions dealing with over-fishing. Nine respondents believed over-fishing (of fish as opposed to lobster / conch - Appendix 3) <i>will never</i> be a problem, i.e. they believed it to be totally sustainable. In contrast four fishermen believed this <i>would</i> present a problem, much as the 'over-harvesting' of lobster and conch had done (two were unsure). The issues of highest disagreement were on whether rules and regulations would be ignored (Table 4); this is significant in that disagreement suggests that depending upon financial resources and/or position within the village, some fishermen may have no option other than continue exploiting lobster stocks. If no alternative is available, none can be opted for. Another issue of disagreement was on livelihoods of the future. Many fishermen believe fishing will always remain the major livelihood and income

	generator whereas other believed that tourism would replace fishing in the future (Q 8 & 9). This contrasts to PMAIBs study.
Uncertainty Question 3	The cause of decline (Q3) provided an area of uncertainty; as all respondents, except one, believed the decline in products was due to an increase in catch. Many did not feel that the islanders were to blame, but rather felt that foreigners or people from ‘down the island’ or Guanaja were responsible for the current situation, many interviews demonstrated divergent opinions of ‘blame’ and causes of the current problem. ➤ This demonstrates the importance of qualitative research, as all the reasons for the stock decline were different, yet many overlap. This information was only obtained in the one-one interviews and group discussions.

What this demonstrates is that a ‘community’ (even a fishing community of around 100 fishermen) is not a homogenous entity, as it is often explained to be in international development literature (see literature review). Management plans for natural resources, especially those that claim to be involving local communities, must bear heterogeneity in mind. Even when only 15% of the fishing population of Santa Elena are interviewed, there are certain issues, which produce disagreement. Which members of the community are consulted often reflects power (or at least influence) distributions within populations. This affects future management schemes. Thesis research aims to shed light upon the level of heterogeneity found within small groups of a local community, serving to demonstrate the importance of a ‘micro’ scale localised research approach. This is crucial to truly represent and reflect the level of differentiation between groups previously (and generally) presented as uniform in terms of knowledge and opinions. The issues and knowledge, which have been found to be in agreement with ‘scientific knowledge’, provides hope that is the case of Santa Elena, *if given the opportunity*, fishermen will manage their own fishery and be actively involved in the decision-making concerning the proposed MPA (Table 5: FG discussions overlap almost entirely with interviews with representatives of PMAIB and CCC).

Table 4: ISSUE	Divergent views of two fishermen from interview transcripts;
Will rules and regulations be respected?	<i>C: and do you think people will stick to those regulations round here?</i> <i>Peter: they will stick to it - they will have to...because there will be a law then, you won't be able to do it...if you do it then you'll can get 'moulta' (fine) and I know the people won't want that.</i> VERSUS <i>Ewings: I not sure. That not easy to do.</i> <i>C: do you think the community trusts each other enough?</i> <i>Ewings: I not sure because...it don't go by trust, like sometimes you got families, no money, no nothing and the onliest way out is the sea... I think some people can't keep promise or them die.</i>

(II) Table 5: Summary of focus group discussions FGD: supporting quotes from interviews are used in the left margin (*).

<i>*“Why it change, because there a lot of people that...all the older folks them die out, and a lot of younger people come up and they don't care you know, they just kill out the things...like crazy.” (Daniel Belcares)</i>	<u>FGD#1</u> ➤ Preliminary findings from the interviews were presented to the group who then discussed them. The discussion began with generational differences and the belief that the ‘youths’ attitude towards natural resources was destructive and unsustainable*, combined with the issue of parental responsibility today, compared to the scoldings received if they caught small lobsters or were wasteful as children. ➤ The second issue, was the upcoming ban and restrictions imposed by the government: all lobster tails have to be above five inches in length, pregnant females are not allowed to be caught and the closing of the season was discussed. ➤ The next topic was the responsibility of buyers who were blamed by the group for buying out of season, under-sized or pregnant lobsters, which was in turn creating a demand, leading to resource depletion. ➤ Tank (SCUBA) diving was discussed as the majority around the table agreed it was to blame for the depletion of lobster and conch stocks over the last decade. The risks involved, stories of ‘The Bends’ (DCS) and death were also discussed. (Issues surrounding the possible economic approach to banning SCUBA by requiring each diver to be provided with a BCD and lifejacket for each canoe were also discussed as an option, although most felt that once the boat had left the harbour with a few divers, the vast majority would paddle out to avoid the cost for the captain so the regulation would be useless). ➤ Restrictions and enforcement were a major topic of discussion, all were in agreement that something had to be done and that government restrictions were the only way to go about it. Part of
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	this discussion involved the fact that conch had become banned entirely as stocks had reached a critical state. All concerned were unsure if the conch season would ever re-open. ➤ Finally, industrial 'shrimping' was discussed as an example of the least sustainable fishery operating: 15 lbs of 'by-catch' for every pound of shrimp caught. The method of 'shrimping' was also explained. ➤ When asked what the captains would do for the time while stocks are catching up after a ban, one captain remarked that it did not matter as they would have to find something regardless of a ban, as within five years there would be no lobster left if current trends continue.
<i>*"Chris, there's only one solution that help...if they would heed to It that is – stop the tank diving completely for diving lobster and conk and fish, - quit it. And in 2 years time, it would be improved back; I would say approximately 20% more than we been having..." (Calix Forbes)</i>	<u>FGD#2</u> ➤ The discussion began sitting with group outside a bar, where Helene's biggest boat owner / captain was telling stories and the history of his work as a treasure diver in Panama and Ecuador; this lead on to the captains discussing the need for a secure approach to diving, the issue of lobster size and the definitive need for restrictions and rules regarding season, size and individual quotas. Tank diving was presented as very dangerous, negative and unnecessary, were it not for competition with other boats- and needing to be banned*. The idea of portable recompression chambers was brought up, as was the issue of responsibility and payment when diving related injury or death occurs. ➤ This lead to a discussion of how things used to be in terms of both stocks and attitude towards the resources. This lead in many different directions (see Fig. 5) including the issue of threats to their way of life and culture by 'Spaniards' i.e. Hondurans from the mainland. They are seen as 'invading' the Bay Islands and destroying both the resources and lifestyle, causing social problems, gang ('Mara') violence and immigrants squatting until they gain entitlement to land.

	➤ ‘Big business’ was blamed for the majority of problems the community are facing: resource depletion, immigration, and corruption. Severe mistrust of the government at every level and the understanding that economic self-interest is what is driving ‘everything’ on the Island of Roatan was emphasised. ➤ Tourism as a potential source of revenue in the future was also mentioned (Appendix 6), but the fishery, corruption, and their perceptions of possible solutions and restrictions dominated the roughly three-hour discussion. ➤ The group comprised the highest income group: owners and captains who were very aware and well-informed about all the issues, rules, regulations, market conditions etcetera and provided a great insight into the scale of perceived corruption and political advantage to be gained from the over-exploitation of a declining resource.
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Figure 6: Themes discussed and linked in focus group discussions

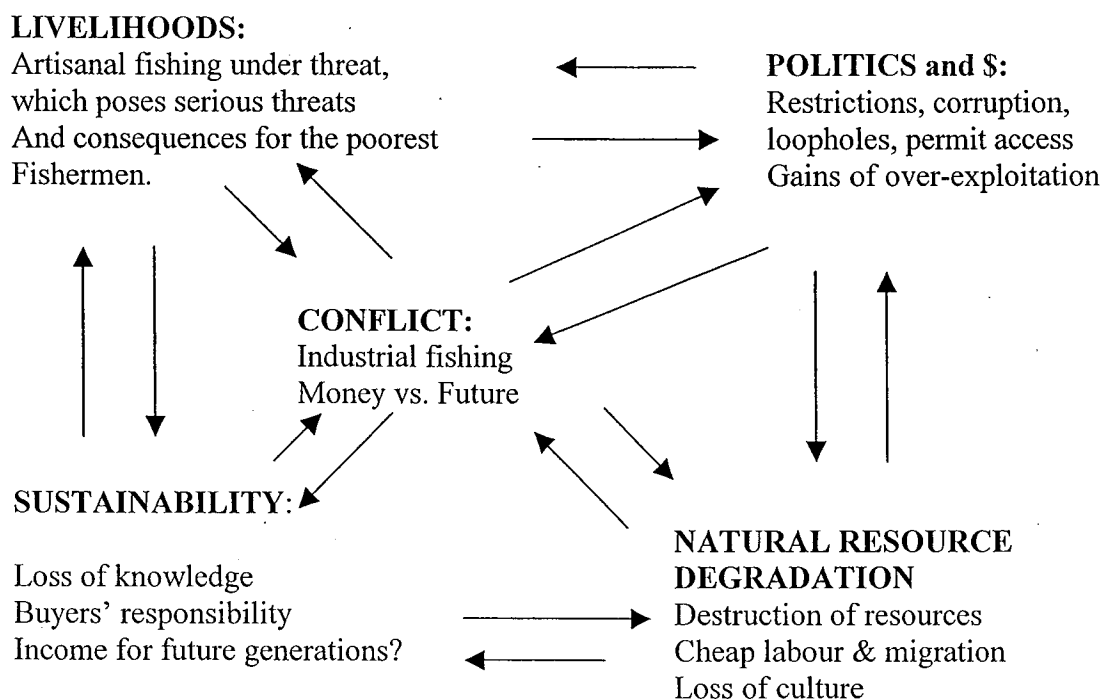


Figure 6 was constructed subsequent to the FG discussions, to be able to document issues raised. The inter-linkages as perceived by the fishermen were very interesting and guided the research towards the issues of political ideas, representation and the importance of agendas and corruption in driving management changes, opposed to involving the locally affected communities. Artisanal fishing, the key livelihood for most islanders, is under threat from industrial fishing, tourism, resource degradation and destruction and a loss of knowledge caused by immigration and economic changes within the Bay Islands. These changes are frequently guided by political decisions, thought by the fishermen to be based upon individual gain and ignorance of detrimental effects to the environment, local communities and the traditional 'island way of life'. This is a cause of conflict between politics, sustainable resource use and local livelihoods. Resolution is dependant on involving local fishermen and communities in these ongoing changes as their opinions and needs will either support management plans, or condemn them to failure.

Dialogue between and within knowledge 'spheres'

The multiple-use reserves described by Agardy (2000) are similar in nature to that planned for Santa Elena-Barbaretta (see PMAIB Zone-7 management plan and designation, Figure 4). On paper 'customary user rights' and 'participation' are guaranteed, but 'scientific experts' drafted the management plan, five years ago, without any consultation with the local community. The possibility for eco-tourism, emphasised by PMAIB, and 'zoning' would have to be discussed (if not dictated) by the fishing community who will undoubtedly be asked to forfeit valuable fishing grounds, as these can be assumed to be of interest to recreational divers as well (Arin, 2002). The valuable lobster and conch fishery must surely be the primary management target for any form of sustainable development of the island, as the majority of livelihoods currently depend on it. According to the research carried out, many fishermen (notably Calix, Doel, and Hess) believe it will remain the major livelihood of the future. Those that disagree, see tourism as the logical replacement, yet are concerned to varying degrees about it (Appendix 6). In any case, any form of conflict could result in non-compliance and therefore failure of the proposed MPA. This could be minimised by including local fishermen in the decision-making process, documenting their views, perceptions and ideas for possible solutions and aiming for practical participatory management.

Many of the fishermen may have answered ‘yes’ to a question asking them if they liked the idea of tourism per se, or as an easier income earner. This does not, however, mean they ‘want’ tourism in any form experienced in the Bay Islands thus far. The sometimes extreme differences in opinion between fishermen and scientists within their own ‘knowledge spheres’ is considerable. Especially regarding ideas of over-fishing and tourism. These differences are displayed as tables (Appendix 6 & 7).

One very interesting aspect that Pomeroy (2004, p.443) notes is that a “shared recognition of a resource use problem” is a key condition identified for co-management. This was clearly the case in Helene, where 100% of respondents had noticed a decline in lobster and conch stocks and believed that this was causing a problem and threat to the islands’ fishery. Two examples below show how a young fisherman (Ewings) and Willis (non-fisherman) both responded to the question as to whether the decline in stocks worried them:

Table 6: Quotes from Interview Transcripts showing common concerns

Willis:	<i>“[I]t worry me, it worry me very much to see how scarce the reef is although I’m not a diver because its still benefit for me and my children, because I can still go out there and show the tourists them lobsters and I can still make a few bucks out of that...I can carry them out on the reef and show them fishes, show them turtle...and I could still make a few bucks out of that...it still benefit.”</i>
Ewings:	<i>“I think so, because if everything keep up like this, then the next years...the next five years, it wouldn’t be very much product to get around here...”</i>

Helenian fishermen share the common perception of a crisis in terms of lobster and conch stock decline. According to Pollnac’s studies (2001, p.691) “[b]eing located on a small island and perceptions of a crisis in fish abundance has a positive impact on the degree of adherence to rules”. Cultural and religious homogeneity are also seen as positive factors contributing to community-based reserves. Santa Elena fits the picture very well in terms of these criteria, as the whole island is Protestant, English-speaking, Afro-Caribbean and fishing is the dominant livelihood (tourism is currently virtually non-existent within the community). Based on these criteria, the future for Helene has the potential to be a successfully managed community fishery and MPA. Due to its population size, the agreement of crisis perceptions and

organisational assistance (CCC/PMAIB), combined with potential municipal government inputs, Helene could present an exemplary CBNRM system.

Undoubtedly there is much to learn from the fishermen of Helene and despite management plans having been drafted and affirmed by PMAIB, their opinions have not been asked on any significant scale. More work needs to be done to assure that their views are represented, as otherwise, as has been seen so many times in the Caribbean before, their exclusion could lead to non-compliance and lack of support for any 'top-down' management scheme. In the 'report-based' world of science, maybe financial resources could be better spent finding out the major problems from the main resource users and any socio-economic problems related to resource decline. Pollution and other factors damaging the resource-base could be dealt with immediately, as opposed to foreign 'experts' being hired to compile reports on a situation, which seems to have a clear root in poverty and lack of government support. *Practicality over formality* would better serve the fishing community and be more likely to contribute to a sustainable fishery in the future.

(3) DISCUSSION

It appears that "despite the rhetoric of devolution and community participation" (Goldman, 2003, p.834), conservation planning, implementation and research remain top-down and ignore local opinions, pursuing the agenda of conservation over community involvement. This has been claimed by Ferguson (1994, in Goldman, 2003) to be due to conservation management plans being created by foreign experts' scientific knowledge (true for the case of PMAIB where a French consultancy group carried out the research at immense cost) and thereby does not include local knowledge as anything other than a 'buzz-word' in the documentation. Seemingly, to justify IADB funding, PMAIB need to provide quantitative scientific data to justify their conservation objectives. The polarized view of 'local' versus 'scientific' knowledge is a major part of the problem: as my research has shown, in terms of perceptions of the problems affecting the locality, fishermen are very aware, have a greater insight into the causes of the problems and have devised solutions which are almost identical to those proposed by conservationists. The current research shows that despite their being differences in the literature, attitudes of the fishing community and the scientific community overlap to a great degree and opinions are

closer than expected, although the reasons for this convergence may be quite different in origin and nature. Surely this knowledge should be included as the 'gap' is apparently not as divisive as expected. Practical solutions that would be supported by the fishermen are needed, rather than bureaucratic ('paper') solutions, which will be ignored on the ground unless the stakeholders can be included in the decision making, as opposed to being misrepresented as an afterthought. Are the various 'plans' for different areas of the Bay Islands not just fragmenting communities and causing division? Why are different areas geographically, ecological and biologically divided when the 'fishing community' of the Bay Islands is treated as homogenous? Is 'zoning' even a viable option for a fluid, dynamic and changing environment such as an ocean and coral reef? 150 years of 'Helenian' fishing experience and management knowledge for maintaining a livelihood has not been questioned. Are the 'community' being asked about the MPA, or told?

This brings up the point of why resources are managed: conservation versus survival is essentially the conflict, which drives agendas. If the 'community' is represented as uniform and in accordance with each other, this one-dimensional group can easily be seen to support conservation goals. Positionality is very important in driving research agendas, on the part of the government, NGOs and even dissertation research: an agenda is always being pushed to some extent. The PMAIB case study provides an example of 'classic bias' being introduced into research, the agenda driving it has meant that results differ to those obtained in my research. This implies that it is sometimes easier to get people to tick boxes (which fit an agenda), rather than asking qualitatively what peoples opinions are. If local people are misrepresented due to these biases, what chance does a CBNRM scheme have to succeed, given the abundance of literature stating previous failures?

The challenge is to change the representation of 'community' and 'environment' in development and conservation literature, as currently this seems to be an apparent part of the problem of CBNRM, CBC and co-management projects failing. Heterogeneity is being ignored in literature, the multiplicity of institutions is also simplified and many informal institutions are not involved in the decision-making or acknowledged. This diversity and 'social difference' must be identified and allowed to contribute. Institutions play an integral role in mediating at all scales: from a group of fishermen forming a 'committee', through to PMAIB and so on. The scale of the institution determines the access and control options over resources (Leach,

1999). Formal and informal institutions are the result of people-environment interactions. In the case of Helene, an institution is a requirement of 'active management' as without a ratified, legal institution representing the community, their role in resource management can at best be considered 'passive'. Being granted user-rights' in this case known as 'customary use rights' may well be guaranteed but does this equal participation? Or do the 'community' require *training* and *supervision* to be involved in management? Has local knowledge been considered in the management and zoning of the resource, or simply included as an afterthought to fit this 'modern participatory' approach to CBNRM?

Institutions clearly need to be adapted and power devolved. The most important question however remains: "what type of participation will be utilized to incorporate communities into the conservation process?" (Goldman, 2003, p.856). 'Participation' and 'community' are ambiguous terms, which currently serve as 'buzz-words', which make 'top-down' conservation agendas seems more concerned with local people than previously. Actors such as PMAIB can thus present themselves as modern and holistic- this may make management plans seem better on paper- but in truth, on the ground, little changes in terms of ignoring those resource users whose livelihoods the plans affect. Negotiation could provide a more inclusive solution, although the issue of power becomes even more prominent when the debate encompasses more people of varying socio-political and socio-economic situations. Power relations must be examined so that the 'weakest' can participate. This will involve capacity building to provide the social capital necessary to provide inclusive solutions for resource management.

Representations of 'resources', 'knowledge' and 'community' need to be presented as more heterogeneous than is acknowledged in much of the literature. Management plans and development doctrines must follow accordingly. Assumptions that need to be challenged include: the notion of a distinct 'community', and stable 'environment', which has the concept of equilibrium at its root. Degradation of natural resources, which can be rectified by the community, provides an image of harmony, balance and potential stability between livelihoods and resources – a harmony that was disrupted at some point. This provides the "development narrative" (Leach & Mearns, 1999, p. 229), which frames the situation fitting a particular agenda, the solutions to which are provided by management plans. Many of these narratives stem from Malthusian ideas of population growth; incidentally an issue that many of

the fishermen interviewed believed to be a major problem (also noted by Barrick and Ewings in Interviews, see Appendix 7). Institutions provide the key to re-generating or bringing the environment and community back into harmony. Institutions associated with Santa Elena include the recently formed NRMCS and the Patronato, two groups that will have to be key in any kind of co-management of the resources in the future. Of course, these narratives serve a purpose and justify current interventions. The oversimplification of both 'community' and 'environment' is a major reason why so many MPAs, CBNRM schemes and CBC attempts fail or fall short of the potential.

Communities actually contain a variety of communities within them, based on family, profession, age, gender, religion, wealth, social status, origins and other factors important in social identity. This diversity, rather than "shared beliefs and interests" (Leach & Mearns, 1999, p. 230) is what defines communities. They cannot be treated as "static, rule-bound wholes, since they are composed of people who actively monitor, interpret and shape the world around them" (Leach & Mearns, 1999, p.230). For this reason it could be the idea of 'external agents' causing change that is the problem. Could the root of the changes not lie in the 'community' and their actions in shaping the environment around them? My research indicates that the fishermen of Santa Elena feel that they have indeed shaped the current situation regarding their stocks. A non-equilibrium perspective could serve to find more easily implementable strategies for livelihood maintenance within the community, stressing spatio-temporal variability, rather than harmony and equilibrium.

An interesting similarity between this research and Leach's (1999) work, regards the importance of the government's stance towards certain issues in the drafting of management plans. Tourism is the fastest growing industry globally. The Honduran Government aims to replace industrial production (mainly clothing) and agriculture with tourism, as the main national revenue within a few years.¹⁴ In the Bay Islands, tourism is hoped to overtake fishing, shipping and small-scale agriculture as the major income generator. This hope is of course integral to management solutions proposed. In the case of the Zone-7 management plan (Figure 4), which will affect Santa Elena, the previous census established that 97% of the community were 'pro-tourism'. But is this 97% a fair or representative reflection? If there is such a problem

¹⁴ Enoc Burgoss & Artley Brooks, personal comments, 2004

with even defining 'community', the how can the views of a few individuals be taken as representative. This contrasts to my personal research, where one of the areas of highest disagreement and uncertainty involved tourism (Appendix 6). Hence, it can be seen that the draft of the management plan involves this 'community perception', although the response is, in my opinion, questionable. The questions of who has been asked, what has influenced or biased their decisions and whether they are representative of anything other than themselves, in terms of what their opinions are being used to promote, remain unanswered by the PMAIB document.

Representations of 'community' have strategic value even if they can be shown empirically to be untrue. This case study serves as a counter-narrative to the research carried out in conjunction with PMAIB in 1999-2000, demonstrating the divergent and convergent opinions of a percentage of the fishing community, which contrasts to previous research. The use of a 'representative' community view can be made to fit agendas: conservation or any other depending on who is taken to be representative of which group. All institutions, formal or informal, are dynamically involved with each other: agencies, organisations and local government. These interactions must be examined more thoroughly if institutions are to be made use of for CBNRM in Santa Elena.

CONCLUSIONS

- Documenting LEK, regarding lobster stocks, proved impossible. 'Knowledges' were mapped through interviews, questionnaires and discussions. Similarities and differences within / between 'knowledge spheres' were documented.
- Convergences regarded the causes and solutions to NRM problems. Divergences were greatest regarding tourism. Difference in quantitative (Wiefels) and qualitative research methods, PMAIBs agenda as environmental planners / educators, and their role within the Ministry of Tourism, appear to have biased results.
- A co-managed MPA / fishery will only be successful if LEK is involved in decision-making. Time and resources invested in 'working with communities'

must reflect diversity, if rules and regulations are to be respected. Santa Elena has the potential for exemplary CBC.

- Problematizing ‘communities’ has caused difficulties in literature and practical applications for CBNRM.
 - Newly formed institutions may hold the key to representation in Santa Elena.
- Conservation remains ‘top-down’. ‘Expert’ knowledge guides decisions, rather than presenting resource-users’ views. Management schemes, reports and plans are positional, compiled dependant upon funding or socio-political agendas and are hence biased. Qualitative research presents a better option to representing ‘community’ opinions. The case-study research demonstrates the wealth of knowledge and understanding within a fishing community is compatible with scientific knowledge. This overlap between knowledge spheres must be made use of, to prevent future CBNRM failures. Gaps in knowledge can be filled. Practical, representative solutions, inclusive institutions and participation must dictate a new narrative if a ‘locally’ respected solution on resource protection is to succeed. Misrepresentations regarding key issues must be avoided in the future, discussion and dialogue must replace ‘buzz-words’. Qualitative research provides a starting point to re-directing the inherent problem with ‘community’ and associated problems in NRM schemes. Future, qualitative and inclusive research in Santa Elena could potentially lead to a much needed success within the field of CBNRM approaches to resource management, fisheries management and conservation.

(I) FUTURE RESEARCH

The generational exchange between fishermen means knowledge and observations are passed down through families or social groups, providing a huge amount on ‘knowledge resources’, which is made little use of (Allison, 2001, p.374). In the case of Santa Elena, all fishermen had knowledge and experience about natural resources, even potential data on catches (per ½ lb) and spatio-temporal changes in resource use and abundance. These quantitative data (LEK) are readily available and would be very valuable for future research. Current knowledge can definitely be expanded, in central literature and specifically the case-study site of Santa Elena.

Other questions could be asked, maps and timelines constructed and even the language used in interviews could be analysed. The integration of fishers' knowledge will no doubt prove invaluable to expanding our scientific knowledge and therefore management options. The subsequent suggestions fit a variety of future research options.

TABLE 7: Future research possibilities

Research Direction	Purpose
LEK	LEK should be put to use in constructing spatio-temporal distributions of lobster and conch resources, which could lead to novel data being obtained. This could prove invaluable for the future management of the lobster and conch fishery on the island. Has 'LEK' ever been identified or asked for? So, how can LEK be praised in literature and simultaneously ignored at the policy level? Mackinson (2001) answers that it appears to be perceived as 'anecdotal' in nature and not well suited to 'mathematical representation'. An alternative method of representation is needed to integrate this knowledge resource. What is the point of acknowledging LEK if this resource remains untapped? Differences should not be exaggerated as overall the similarities will allow cooperation and participation on an entirely new level if given the chance.
GIS	Bello (2005) shows how GIS analysis has been used for a spiny lobster fishery in Mexico. In the future, similar research could be carried out in Helene and this, together with mapping, timelines and socio-economic research, could be combined into a holistic 'participatory' framework for future resource use, protection and management.
'Dynamics' and Institutional analysis	"Local communities may be shown to be dynamic and internally differentiated" (Leach, Mearns & Scoones, 1999, p.226) an issue that is frequently ignored in many institutional guidelines (see DFIF, PMAIB, WRI...) other than <i>on paper</i> . The dynamics of natural resources and institutions is something that could easily be examined in the case of

	Santa Elena and would no doubt provide interesting data, which could be integrated into future management plans. Mehta's (1999) ideas of 'Participatory action research' would also provide a good framework for subsequent studies.
JDC and stakeholder analysis	Future research could involve joint data collection (JDC) and analysis of stock production, mapping of fishing territories or assistance in the formation of the NRMCS, the implementation of rules and regulations or their enforcement. Socio-economic analysis or stakeholder analysis would be a logical follow-up to the initial research. Organisation is key to any community-based management. Capacity-building at some level will be influential in the future development of Helene's fishery.
CCC	The role of CCC could also be examined in the future. CCC provides education, training and support and although the community is very supportive and in favour of their work, does a conservation group have nothing to learn themselves from generations of resource users? CCC could initiate participatory research, aiming to successfully map LEK and compile crucial information for the planned lobster fishery.

Prospects for future research are immense, as is the potential for a successful example of a CBNRM scheme, which could serve as an example for a well-managed fishery and co-managed MPA in the Caribbean. The real problem in 'pushing the agenda' as opposed to co-formulating it, is best explained by a quote from PMAIBs head of natural resources:

"Ok. The best opportunity in order to obtain the best result for the management plan is to be obtain the local cooperation. Without local cooperation we call it in Honduras a 'paper protected area', just on paper, not a reality. We need to be...to talk to them, to convince them, that we need to protect and how and why we need to protect...and the value of the protection, because its going to be for themselves..." (Enoc Burgoss, PMAIB).

Figure 7: Images of Santa Elena, Honduras (Chris Williams, 2005).



NRM & fishing committee meeting:
Chris (KCL), Becca (CCC), Ezzard, Algi, Kennedy, Wimbsy, Peter, Weword, Dorwin, Dan (CCC boat captain).



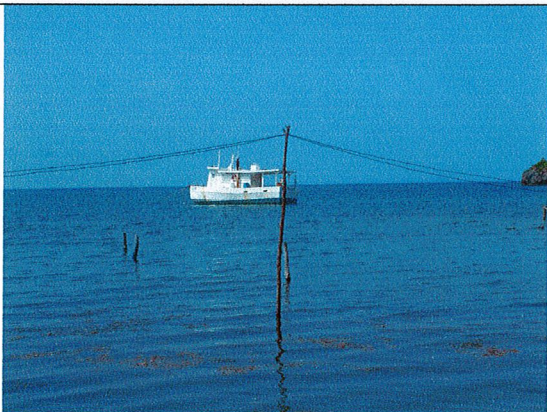
NRM committee meeting:
Becca (CCC), Chris (KCL), Ezzard, Dovens, Algi, Wimbsy, Kennedy, peter, Weword, Dorwin, Wilbert, Raymac.



FG Discussion



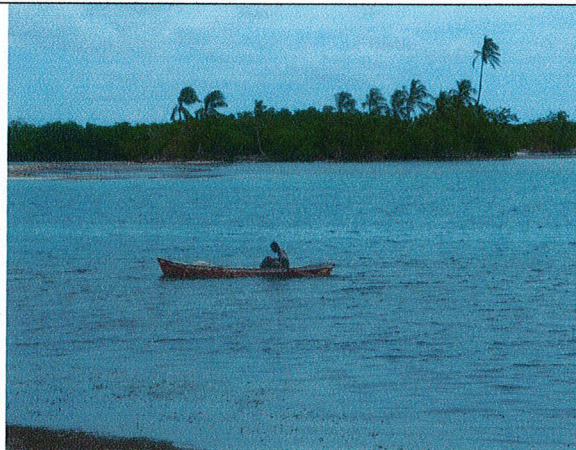
FG Discussion: Barrick, Doel, Austin, Raymac, Shay (CCC)



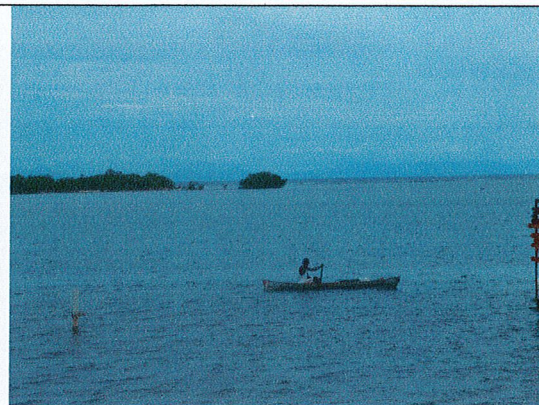
'Captain Smith' fishing / free-diving boat



'The Lady Affi' fishing / free-diving boat.



Artisanal fisherman (Warnan) at work, Santa Elena



Artisanal fisherman in canoe, Santa Elena



FG Discussion: Audlin, Calix, Shay (CCC), Elbert



FG Discussion: Dan, Audlin, Elbert, Shay (CCC), Calix

APPENDICES

Much of the additional data obtained (from the PMAIB report, interview transcripts and additional literature) has been compiled in a separate report for CCC and the NRMCs in Santa Elena. This could easily be used as a basis for future research.

Appendix 1: List of interview and Focus Group respondents

FORMAL INTERVIEWS (SEMI-STRUCTURED & RECORDED): <u>Scientific:</u> T = 6	Jenny Myton & Ian Drysdale (Environmental Consultants: 'Luna Consultores Ambiental'- West-End) Enoc Burgess (PMAIB Director of Natural Resources) Shay O'Farrel, Rebecca Korda, Haley Rose (CCC)
<u>Local:</u> T = 15	Ewings Bennett, Ezzard Bodden, Peter Belcarest, Barrick Bodden, Calix Forbes, Willis Gordon, Delson Bodden, David

	Belcarest, Kennedy Belcarest, Hess Bodden, Doel Bowman, Daniel Belcarest, Austin McKenzie, Guillermo Hernandez, Daniel James.
INFORMAL (PERSONAL COMMUNICATIONS, T=>20):	These were not analysed, but used to formulate ideas. Main communications with members of NRMCS who were not interviewed, due to time constraints or inability to partake due to working hours. Including; Artley Brooks (NBIPLA) and Carlos Acero (PMAIB)
FOCUS GROUP I (NOTES & PICTURES): LOCAL 26-06-05 (* captain, ° respondent in one-one interview)	Austin McKenzie*, Doel Bowman*, Raymac Pouchie, Daniel James°, Calix Forbes°, Barrick Bodden, Audlin Bodden, Fordie Pouchie, Kennedy Belcarest°, Don Gale, Ezzard Bodden°, Willis Gordon°, Elbert Rich & Shay O'Farrel (CCC). Also present; Peter Belcarest°, Ewings Bennett°, Willy Bowman, Tyree Bowman. T=18
FOCUS GROUP II (GROUP DISCUSSION): LOCAL 27-06-05	Wally Bodden-Bowman* (Boat owner, supplier), Watson Bodden-Bowman (co-owner and SCUBA compressor owner), Raymac Pouchie, Austin McKenzie*°, Wilson Bodden-Bowman, Doel Bowman*° & Shay O'Farrell° (CCC). T=7
FOCUS GROUP III (RECORDED): SCIENTIFIC	CCC: Rebecca Korda° (PS), Haley Rose° (SO) & Shay O'Farrell° (Chief Technical Advisor)

Appendix 2:

RESPONSE GRADING: Questions 12-14 were not analysed as only some participants have worked with CCC over the past year, the information is reserved for CCC to investigate fishermen's perceptions of the CCC program (incidentally 100% of respondents were very happy and grateful for CCCs involvement with the community and mapping of the coral reef system.

Response Grading: Santa Elena, Roatan, Islas de la Bahia, Honduras.

Please respond to these questions using a scale of 1 - 5 where 1 means 'disagree strongly' and 5 means 'agree strongly'. (I.e. 3 means 'neither agree nor disagree').

- 1) Lobster / Conch have declined noticeably over my lifetime _____

- 2) Over-fishing will never be a problem _____
- 3) The decline in stock is due to over-fishing _____
- 4) The future of the islands fishery is threatened by the situation of decline _____
- 5) Protecting our natural resources will help _____
- 6) Protection will not change anything _____
- 7) Rules and regulations will be ignored _____
- 8) Fishing and Diving for lobster / Conch will remain the major livelihood for people on this island _____
- 9) Tourism will replace fishing as major income earner and livelihood generator in the future _____
- 10) Resources need to be managed by the community if rules and regulations are to be respected _____
- 11) The committees scheme is the best way to do this _____
-
- 12) Working with CCC over the past year has changed my perspective on the need to conserve our natural resources _____
- 13) Conservation and scientific education will be beneficial for the future of our community _____
- 14) An increase in dive-tourism will cause problems and conflicts within our community _____

Appendix 3:
Modified Response Grading Question's

Please answer with 'agree strongly' or 'disagree strongly': adapted to "could you tell me how much you agree or disagree with this" as the numbers system of the original set-up seemed confusing and the negative probe questions were answered oppositely so they had to be adapted and re-done.

"I don't know" and "not sure" were graded with 3, as that is the same as "neither agree nor disagree".

Problem words that were adapted: 'increase', 'decrease', definition of 'over-fishing' vs. problem of 'over-harvesting' lobster in their understanding.

Questions # 1-11 used for analysis, # 12-14 for CCC.

- 1) Lobster and conk have got less in my life _____
- 2) Over-fishing of FISH will never be a problem _____

This was modified as over-fishing was understood to mean just fish; therefore it had to be adapted as the respondents were all sure that the decline in lobster and conch was due to over-harvesting.

- 3) 'Product' getting less is because of catching too much _____
 - 4) The future of the Helene fishery is under threat _____
 - 5) Protecting our natural resources will help _____
 - 6) Protection will NOT change anything _____
 - 7) Rules and regulations will be ignored _____
 - 8) Fishing and diving for lobster and conk will be the main livelihood here on Helene in the future _____
 - 9) Tourism will replace fishing as the main livelihood in the future _____
 - 10) Resources need to be managed by the community if rules and regulations are going to be respected _____
 - 11) The committees that have been set up is the best way to do this _____
-
- 12) Working with CCC has changed my ideas about protecting the environment _____
 - 13) Education about these things will be important for our community _____
 - 14) More tourism will cause problems and conflicts in our community _____

Appendix 4: Demographics of research; Santa Elena

PMAIB carried out a sociological census of 'all' fishermen in the Bay Islands (Roatan, Utila, Guanaja). 522 of the Bay Islands (Total = 1,984) fishermen were included in the census, providing information from 1 in 3.8 fishermen, which was considered to be sufficient to treat the results as 'representative with reasonable confidence' (Wiefels et al, 2000, p.9). The sociological survey conducted recognizes the risk of possible conflicts with fishermen over the MPA and aims to minimize them based on 'creating support and providing alternatives'.

The information below relates to my findings in Santa Elena:

Male %	100% of fishermen, 81% of total interview respondents.
Average age	32.6 years for the fishermen, slightly younger than average for Bay Islands.
Average years fishing	21 years of fishing experience.
Total experience	316 years of cumulative fishing experience between the 15 fishermen.

Calculation of percentages of fishing community interviewed: statistics taken from (Wiefels et al, 2000, p.42-53).

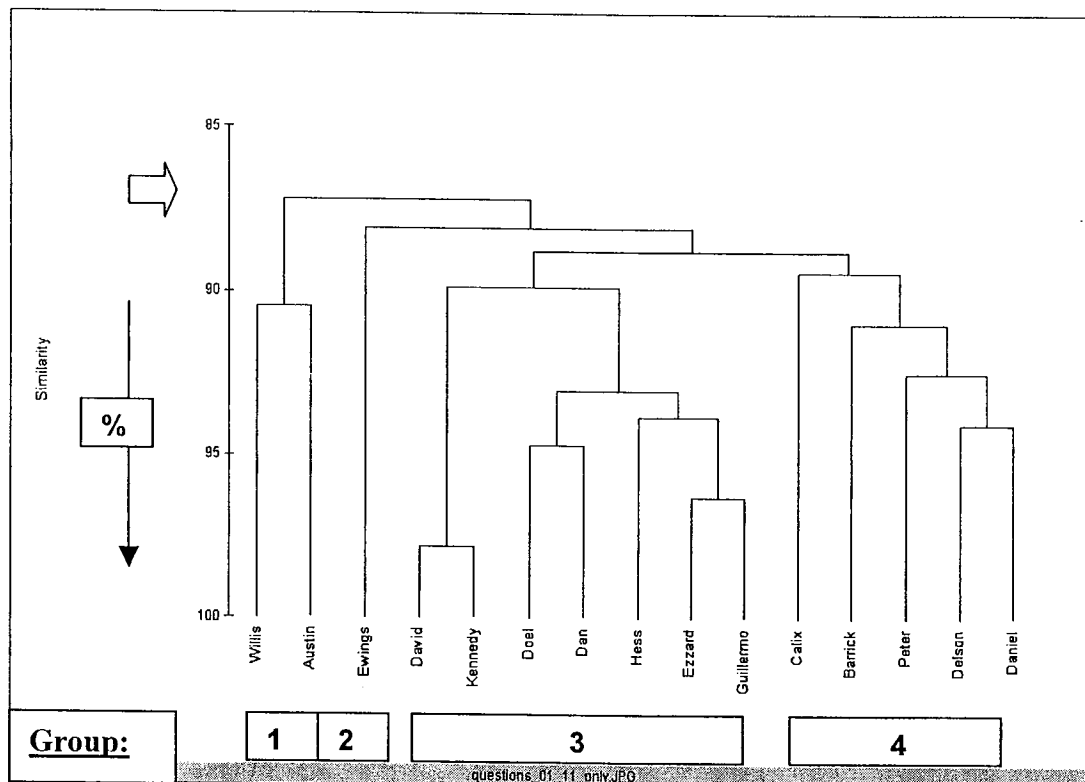
Census of Inhabitants (2000) Santa Elena,	Total population = 668¹⁵ .	Current estimates (of local fishermen) range from over 700 to 1000.
Calculations of respondents as % of fishing community	51% male = 341 men	Fishing and diving are exclusively male activities.
	56% of which are of age to fish = 191 potential fishermen	16 is the age at which males provide via fishing / diving.
	52% of which are fishermen = 99 fishermen	The 15 FISHERMEN interviewed represent approximately 15% of Helene fishermen, or one in 6.6 fishermen.

Appendix 5: DATA CLUSTER (DENDOGRAM) QUANTITATIVE ANALYSIS.

In order to highlight natural groupings within the sample, the Bray-Curtis similarity coefficient was used to compare each variable (answer) from each respondent with the corresponding variable from every other respondent. This coefficient is expressed as a percentage and the resultant values were used to create a 'similarity matrix'. This matrix then underwent the hierarchical cluster analysis routine in PRIMER¹⁶ (Plymouth Routines In Multivariate Ecological Research) to produce a dendrogram (below). Groups of respondents were created to try to analyse why perceptions were more /less similar to each other. These groupings were initially used as a tool to examine correlations between people and their opinions. Groupings did not relate to family, age, community in which they live, fishermen versus diver, years spent fishing, working with CCC, financial or power status within the community, or any other influence, which could be generalised. What this demonstrates is that the level of heterogeneity within a small group of related fishermen is still present, significant and needs to be considered if the future of the islands fishery, resources and 'eco-tourist' potential are to be realised.

¹⁵ All information courtesy of Artley Brooks (NBIPLA & PMAIB, 2004) The 160 families live in 8 settlements around the island (for more information see PS Report, 2004, Williams for CCC, unpublished).

¹⁶ An Ecological Program to show relative similarities (CCC)



From the Dendrogram above it can be seen that groups of respondents have an overall similarity of above 85% (similarity axis $\Rightarrow$). Each respective branch (divide) becomes less similar. Respondents to the right side of the dendrogram are also more similar to each other. It can be seen that the opinions of Daniel and Delson are most similar; then Peter, Barrick and Calix (Group 4); the next group consists of Guillermo and Ezzard, followed by Hess, Dan and Doel, David and Kennedy (Group 3- David and Kennedy's opinions overall were most similar- they are brothers, fish together and were interviewed together); the next group comprises only Ewings (Group 2), despite his overall similarity in response being almost 90%; the final group consists of Austin and Willis (Group 1) Willis is the only member of the entire group of respondents who has never been a full time fisherman or diver).

This output demonstrates a very high level of concurrence or agreement between respondents on the Q's 1-11 of the 'response grading' (quantitative) portion of the interview. Each group showed a very high level of agreement overall: Group 1= 90%, Group 2 = 100% (only one respondent), Group 3= 92%, and Group 4= 89%). This was used as an exploratory tool to indicate that there was high level of agreement, in general, between members of 'response groups'. This does not imply that people are 90% similar in their views, it simply provides a visual representation of similarity

which can then be examined in terms of why people should have more close responses to questions posed.

As no clear pattern exists as to why people feel a certain way, this dendrogram is attached solely as an example of how divergences and convergences in opinion can be mapped to establish groups and therefore enable a more structured approach to understanding and representing 'local knowledge's'. Quantitative research does not provide insight into *why* people have certain opinions and can therefore very easily misrepresent key opinions.

Appendix 6:

Qualitative demonstration of divergence in respondent views:

TOPIC: TOURISM	QUOTES: C= Chris Williams (researcher)
13 differing responses to the interview question: <i>what do you think of tourism coming here?</i> Increasingly negative view of tourism 	1) Ewings: I really wish it would happen here. C: why do you wish that? Ewings: 'cos it would be a better life for the people dem...because if someone can get a job, they wont be out on the sea. They'll be able to get money to feed they're family. The part like you can get a job and work make your money...don't have to go on the sea and destroy the products...well not destroy them but make them catch up...so when you don't have a job you can go out and catch some. 2) Guillermo: that would be great. C: do you see and potential problems or conflicts? Guillermo: with the tourists? I think it won't be a problem, I used to work wit tourists in years gone by on a cruise ship...I liked it. C: do you think it's easier money? Guillermo: well I think it will be easier...because working at fishin' is kinda hard... 3) Doel: that would help a lot. Tourism would help a lot. It would provide the guys them here with jobs. You know guys that doesn't like to live off the water, off the sea, would get jobs, and it would even be benefit for guys that live off the sea because they maybe could get a job and they wouldn't have to go out and catch the lobster, nor conks, nor fish. 4) Daniel Belcarest: I think that's a good idea...it should be organized by the people them from Helene. If they all unite together and get together and do it you know, it could happen. 5) Willis: tourism, right now tourism is one of the greatest thing right now on the island....its a good help Pearly-May: we need like a resort so the boys tem could get a job as a waiter and cooks and stuff, like the guys down the island.. 6) Becca (CCC): Tourism or eco-tourism. What you have here is a community that are still living pretty much as they have always done...you could have people come out and see Caribbean fishermen, fishing their traditional way, working their traditional way, people always want to have a cultural experience... 7) Daniel James: well, I think Helene will become like other parts of the Bay Islands in time to come...like West End or Guanaja, with resorts and ting in time to come...but that will be in a couple of years later...in these years now we ain't gonna have any kind of that thing going on around here...'cos Helene is kinda a little behind time with convenience and stuff for tourism to come in...get here by boat, no electricity, water problems, no highway that you can ride on...

Increasingly negative view: to better understand exactly what peoples concerns are regarding major changes to their livelihood, research must focus on representing the diverse opinions within even small 'communities' of people- otherwise the presumption made by quantitative research pushed by conservation or development agendas, will bias results and misrepresent views.

8) Barrick: well the tourism, for me, I don't for my knowledge believe in the tourism...I don't bother with tourists. If the tourists come round and say they want to buy something I'd say it, but I wouldn't walk around be like 'do you want to buy this?' or ... I don't bother people like that..

9) Delson: um, in the future, tourists is comin' in here now and people is really into tourists up here right now...and if they can make money out of making business with tourists then they definitely won't be fishinin' as much as they do....really it won't cause a problem if it's run by the community..... Old people are very concerned about tourists here. They think that tourists can bring in more money, hut they also think that tourists can be a bad influence for young people....like the lifestyle that we live here is a lot different from the lifestyle that other people live, one of the thing that they very concerned about is the way that young people dress on this island, so tourists don't dress properly as people here, so they think that that would be a lack of respect for the community...I think the west end develop in a really financial and project like people is getting their business up and running and fast, but I think it is like really a very bad place...like to hang out and stuff, it's not, it's a very corruptible place...

10) Calix: It makes things more expensive, and it makes the youths them more lazier, 'cos they get used to makin' easy money, and it makes the cost of livin' goes to an extreme high...that's what tourism really does, so in this case here, it shouldn't cause any problem but the cost of life would go right up....

11) Ezzard: ...I mean the tourism is comin' in and there is so much money to be made out of tourism right now and people will do anything to try and keep you know, the environment the lobster and conk and fish- because of the tourists. Really, we is not prepared for tourists. We got a lot of things what tourists would love to see but we are not 100% ready for dem. I know tourists coming I mean the finance will be good but the way they react in living probably might be an effect to this community, well we have bar on this island, yes, but I was down in the west end the other day and the tourists is doin' that I don't want happen on this island... We need we islanders workin' inna hotel, we need we islanders working inna boat, we need we islanders managing like even a dive instructors and we need to be in control.. there ain't nothing wrong with someone coming in teaching how to run it...but there is a problem when they want to run it...the way they want to run it.

12) Peter: well, I would like some money to come in...but I wouldn't like no tourist to come in and rule this...things would be a lot different. We wouldn't got nothing out of it...but if we use out head and build...raise money and build the things ourselves and then tourists come in an spend like that then things would be good brah... because the gringo dem...they got everyting take over brah.. the gringo dem payin' the local people what they want you know..the local people should be getting the money down there bro...but..that what I'm afraid of...that gringo's come in an do what the do west end...'cos you know man it's pretty bad down there...I been there a lotta times...

13) Shay (CCC):...I personally do not see tourism as being sustainable- not just because of impacts but because it relies so much on global factors, all you need is another 'September 11th' and if you have an industry based on tourism- it collapses. Tourism is the biggest industry in the world now, it's the fastest growing industry in the world, but in 10 years, 20 years, 50 years time...that whole thing may shift again, it may change again and at that point you're shafted. Let's say for the fishery itself, the lobster, people are always going to need to eat, there will probably always be a demand for seafood...and this might sound like weird thing to say but the 'sustainable lobster fishery' is actually the alternative livelihood...not weaving things for tourists and selling it to them...one thing I find very unusual in Helene- it's the only place I've come across it- where

Increasingly view of tourism negative ↓	fishermen, not only accept there is a problem and recognise that it is because of over-fishing, in Europe and anywhere else people try to find something else to blame, but people here have actually accepted that...and it was actually one of the fishermen himself, when I raised the alternative livelihood question, you know 'if they ban the lobster diving next year what are you going to do?' and he said: 'in 5 years time there won't be any lobsters left anyway, so we will have to do something else, so now or later we have to eventually.....there is a biological bottom line that you cannot cross...and I've never come across that before that level of awareness...that gives great hope that people know they have to do something about it... this is their livelihood and this is also potentially a really good livelihood and could be really sustainable and I personally would suggest that they put their eggs in that basket rather than chasing tourism...there are only a certain number of tourists in the world and a certain number of places they can go- it just takes a political problem in Honduras and all the tourists stop going there...and then off you go...
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Appendix 7: WILL OVER-FISHING EVER BE A PROBLEM?

Scientific and local knowledge overlap: the division exists within each knowledge 'sphere'. This result demonstrates that cooperative research and dialogue holds huge potential as, unlike assumed in many cases, the fishermen of Helene share many views with the scientific community and accept their own role in their resource decline.

no problem	problem
PMAIB- SCIENTIFIC KNOWLEDGE Enoc (PMAIB): ok. This is not too much problem. At this time is almost in balance. Is not a problem. But in the near future when lots of people is coming around they will knew that is a very nice productive area and the pressure is going to be increased. And this is the problem that we need to take care about that.	CCC- SCIENTIFIC KNOWLEDGE Shay (CCC): ...just quickly on the fishing: from your work fishermen seem to think there is no problem with the fishing here- that fish stocks are not declining- which is always possible, but seems very surprising as they are throughout the rest of the Caribbean and the rest of tropical world...a common problem with tropical fisheries is because they are 'multi-specific' they catch different types of fishes, whereas our target fisheries at home, cod for example, when the cod is gone you realise you have a problem...whereas people here won't realise because what they actually do is they switch species; and what they tend to do is fish out the large carnivores first of all...so in fact the actual biomass of the reef is decreasing although you're actually landing the same catch each year...you're still landing 20 tonnes of fish every year but the biomass is decreasing to a point at which you only have damselfish left and it all goes pop.
LOCAL KNOWLEDGE Barrick: well, my hope is that something else could come up, for a better livin' you know. Besides livin' off the sea- divin' and fishinin'. We have a lot of here – in Honduras- is a lot of fish, there's a big fishin' industrial, but not for fish, just lobster, conk and shrimps...so, if we can get a good processing plant for just getting fish...you could make some serious money off the fish here... C: so you don't think the fishing here are getting	LOCAL KNOWLEDGE Daniel James: everything decrease, it all decrease, 'cos I remember when I was around 14 , 15 years I used to right off the pier here and I used to catch all kinda fish; red fish, barracuda, jacks, bonefish and now I can hardly see one....it's almost the same, the fisherman he goes out there, and whatever he catch- the fisherman have to protect the fish- he protect some for today so he can have some for tomorrow... if you go out and catch small that is too small, you know you have no market for these fish so why kill them?... catch

less? Barrick: no. there's a lot of fish still.	big fish that you coulda make your livin' offa...
LOCAL KNOWLEDGE Doel: well, concerning the fishing...in those days, like the early part even the late eighties and early '90s, fishing around here was....there wasn't too many fishermen like what there is in these days, I didn't have any competition at all, but now there's a lot more...onliest problem we got here around mostly is with lobster and conks, with other guys comin' in and taking our stuff, like divers from Guanaja... C: but with the fishing you don't think... Doel: with fishing, thank the lord; we got no problem with the fish...	LOCAL KNOWLEDGE Peter: well I guess the fish dem getting less too...but right here we got plenty fish, I tell you the truth...but right here the lobster and the conk them is really getting low.. ... just like that, don't catch the she-ones, leave the she-ones...like with condor's man, if you wait like maybe a year or two, if you wait on it then you'll see our future back man...

Appendix 8: Malthusian causes for resource decline

Ewings: I think it just, in dem days it wasn't as much people as it is now...cos right now man there is a lot of people and there isn't that much job so, they gotta get fish, lobster and conch. ----- Daniel James: Every year produce more fisherman...every year..it be more, because you get a kid who is 11 years, next year he be 12, so he become a diver and now from the last time, from the beginning when I was 11 years old and now I'm 42 years old...you know how many more fishermen we got...so that makes out production become more scarce you know. And until now the reef and ting is going down, we got to do something, have some kind of season or something...then it would be good for the younger boys who be comin' up...right now I'm not gonna do much more diving and ting but lets say my kids or people who got kids comin' up say 12, 13, 14 years, therew won't be nothing if we don't try to do something, you know...	Barrick: no, well, my belief is just that the place is getting' over-populated. You know, more people. It's simple like, if you got a big family – or if I got a big family and you got a small family and you save 5,000 Lempira for the month and it may take me ten or fifteen... so it's simple just like everything else. C: does that scare you though, that things are getting harder? Barrick: yeah. Of course. ----- Barrick: well here in Helene? Well really I think it is too much, I think we got too many divers round here right now... C: tank divers or free-divers? Barrick: well both.
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