The Importance of Small-Scale Fishing to Rural Coastal Livelihoods: A Comparative Case-Study in the Bijagós Archipelago Guinea Bissau

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Thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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January 2014

Declaration

I, Helen Clare Cross hereby declare that this thesis is my own and that the work described within is my own, except where explicitly stated otherwise.

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Abstract

This study compares the significance of small-scale fishing (SSF) for local Bijagós and in-migrant residents on the Island of Uno, Guinea Bissau, by integrating quantitative and qualitative analyses into four empirical chapters. The role of commercial SSF as an occupational safety-net is explored. Determinants of contemporary involvement in fishing are presented. Catch dynamics of the in-migrant fleet are reviewed and the significance of protected areas and protected species discussed. Finally, the adoption of livelihood strategies is investigated, through an analysis of the asset-constraints underpinning local and in-migrant household economies.

Bijagós male villagers recall substantial former involvement within commercial SSF. In-migrant fish-workers describe entry strategies into SSF which differentiate long-standing members from new arrivals. Late entrants driven by political and economic circumstance support the role of SSF as a safety-net which provides an escape from chronic poverty. Demise of the local sector is attributed to an over-riding commitment to animist initiation rituals, (from which control of land and labour flow) coupled with declining agricultural yields and growth of in-migrant fishing.

Today, fishing for the Bijagós is a marginal, mainly subsistence-based activity. In contrast, in-migrant workers display little non-fishing occupational involvement. Resultant conflict between these groups illustrates disempowerment of the Bijagós villagers. In-migrant landing surveys highlight the persistent use of local and State

Protected Areas while illustrating the overlap between commercial near-shore fishing grounds and potential elasmobranch nurseries. Household economic surveys reveal the importance of cash loans in promoting endurance of the SSF sector. The insights delivered from this analysis inform our understanding of the constraints and limitations of existing management arrangements, which govern the commercial SSF sector in this region.

Acknowledgements

This study would not have been possible without help and assistance from many people. This ‘thank-you’ can only name but a few. To my supervisors Katherine Homewood, Caroline Garaway and Marcus Rowcliffe; for your enthusiasm, perseverance and guidance through endless drafts of ideas. To the NERC and ESRC for co-funding this endeavour. To the UCL Graduate School Fellowship, Access to Learning Fund and the Parkes Foundation for additional financial support. Thank you to all fellow students at UCL and IOZ for your encouragement. On Uno, a special thank-you to my hosts and the *mindjeres garandis* for looking after your *ospri* and to everyone in Ancoyem for your insights and more importantly, patience. To the encampment residents for guiding me through a foreign landscape and always inviting me to ‘chop’. To all research assistants for your time and engagement with this study. To the team from Noé Conservation, for your insights. To Manitesi in Bissau, for your hospitality whenever I arrived unannounced. To IBAP in Bubaque for always being so welcoming. To Radio Djan-Djan for helping me to keep in touch and to all *marineros* for carrying me so travel safely (and soberly) across the water. To my family for your sincerity in listening to my never-ending remembering. And, last but not least to Euan and William for keeping my feet on the ground and a smile on my face!

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Abbreviations

APC: Average path coefficient (β)
ARS: Average R squared
AVE: Average variance extracted
AVIF: Average variance inflation factor
CECAF: Committee for Eastern Central Atlantic Fisheries
CFA: The Central and West African Franc
CIPA: Centre of Applied Fisheries Research
CPR: Common Property Resource
CPUE: Catch per Unit of Effort
DWF: Distant Water Fleets
ECA: The Eastern Central Atlantic
EEZ: Exclusive Economic Zone
FISCAP: Inspection and Control of Fishing Activities
GN: Gill net
IBAP: Institute for Biodiversity and Protected Areas
IUCN: International Union for the Conservation of Nature
IUU: Illegal, unreported and unregulated fishing activities
LL-SH: Small-hook long-line
LL-LH: Large-hook long-line
LS: Livelihood Strategy
LSA: Locally Sacred Area
MAB: Man and Biosphere Programme
MDG: Millennium Development Goals
MA: Millennium Ecosystem Assessment
MN-M: Motorised monofilament net
MN-P: Paddle powered monofilament net
MPA: Marine Protected Area
PAIGC: African Party for the Independence of Guinea Bissau and Cape Verde
PCA: Principal Component Analysis
PLS: Partial Least Squares Regression
PNM-JVP: National Marine Park of Joao Vieira and Poilão
PNO: Orango National Park
SIDS: Small Island Developing States
SLA: Sustainable Livelihoods Approach
SSF: Small-Scale Fishing (but also small-scale fishers and fisheries)
TA: Time Allocation
VIF: Variance inflation factor
WeD: Wellbeing in Developing Countries

Chapter One

The Importance of Small-Scale Fishing to Rural Coastal Livelihoods

Chapter Overview

West Africa is described as a "ruptured landscape, the entanglement of the then and the now" (Gable, 2003) in which access to resources depends upon participation in a variety of social institutions, material wealth and markets (Berry 1989); but which has also, for many, been undermined by a steady rate of appropriation of the most valuable common properties by colonial and then postcolonial governments (Alden Wiley 2001). The presence of mobile small-scale fishers (SSF)[1] and their juxtaposition with local residents is seen by many as a major fisheries management obstacle, common throughout the region (Duffy-Tumasz 2012). To others, the constraints limiting development of a SSF agenda, inclusive of local and in-migrant ideals provide a lucrative opportunity. The West African food crisis does extend beyond fish. The region is also scarred by a prevalence of extreme poverty with more

[1] The term SSF is used forthwith to denote small-scale fisheries, small-scale fishers and small-scale fishing as appropriate

than 49% of the population surviving with less than $1 each day, of disposable income (Béné 2008). General food production per capita has declined with growth (MA 2005). Yet, the capacity for rural Africa to '*supply urban labour, endure oppression and deprivation and to re-construct broken economic and social systems*' is deserving of greater attention than is granted under the popular 'failing Africa' narrative (Mortimore 2005: 47).

Chapter one of this thesis contextualises SSF in West Africa. To begin, a working definition is devised (1.1). Next the crisis facing the world's fisheries is contextualised (1.2). The chapter then focusses upon four dimensions of SSF with which the thesis is engaged (1.3). These include (i) the importance of SSF as a 'safety net', (ii) the challenges associated with access to fish, (iii) the paucity of data associated with SSF and (iv) the associations between SSF and poverty. Next, two analytical frameworks are presented (sustainable livelihoods and wellbeing) through which the social analysis of SSF has been advocated (1.4). Finally, the objectives of the thesis are outlined, followed by the structure of the chapters to follow (1.5).

1.1. Small-Scale Fisheries (SSF): A Working Definition

Fisheries are a human construct, the interconnected expression of an ecosystem with human, social, ecological, political and economic systems that become increasingly complicated with population growth (McGoodwin 2006: 191; Allison and Horemans 2004). The terms primitive or artisanal, native, tribal, peasant or traditional are often deployed, to describe SSF activities, renowned for their cultural and technological heterogeneity (McGoodwin 1991; McGoodwin 2002:10; Caddy and Seijo 2005;

Béné 2006; Carvalho et al. 2011). The term 'small-scale' generally avoids any distinction between the use of home-made nets, dugout canoes or small-motorised crafts (Charles 1998; McGoodwin 1991). Vessels may be mechanized but are often manually operated and SSF tends to use smaller gears than industrial activities with concomitantly limited operating abilities (Berkes 2003; Pauly 1997). The term SSF has resultantly been used to summarize perceptions of typically low capital-investment (Kent 1997; McGoodwin 1991). However, it is argued that in reality the capabilities of SSF are constantly evolving as new technologies are introduced (Béné 2006). SSF occurs in inland (freshwater), inshore, coastal, near-shore, deep sea and distant water fishing grounds (Charles 1998; McGoodwin 1991). Roughly 60% of aquatic-protein for human consumption is derived from marine capture fisheries' and of this up to 75% originates from SSF activities, which proliferate in developing countries (Kent 1997; Berkes 2003; Andrew et al. 2007:4; FAO 2007; McClanahan et al. 2009; 2011 Paterson 2010; Béné et al. 2010b; Brander 2010; Carvalho et al. 2011; Béné 2011; Ratner and Allison 2012; Hardy et al. 2013). Due to the typically tropical nature in which most SSF occurs and the multitude of gear-types associated with the sector, biological diversity of SSF catch is typically quite high (Salomon et al. 2011). This presents an additional challenge to interpreting the importance of the sector. Global estimates suggest that 30 million tonnes of fish are landed annually by SSF, compared with 40 million tonnes for large-scale operations (McClanahan et al. 2009). However these figures are considered largely unreliable as the countries in which SSF activities proliferate are characterised by limited monitoring. As a result, information regarding SSF is generally scarcer, less accessible, and more difficult to interpret than data derived from observations of industrial operations (Branch et al.

2012). In this thesis, the term SSF is used to denote both subsistence and commercial activities[2], undertaken inside the near-shore marine environment and including multiple gear-types used both with and without boats, but with an upper limit of 40 horse power, on motorised engine capacity.

1.2. Contextualising the Crisis in Fisheries

For many, overexploitation of the world's fisheries has undermined productivity, to such an extent that a state of crisis can be declared (Watson 2013). The crisis, it is argued is evident from numerous instances of stock collapse, species extinctions and the trophic changes observed when demand driven catch-yields outpace the natural productive potential of fish populations (Christensen et al. 2003; Guiterrez et al. 2011). One major threat involves irreversible change, resulting in increasingly fragile marine ecosystems highly susceptible to perturbation. Another is that fish may no longer be available into the future to provide millions with a secure food source. West Africa, for example is hugely dependent upon fish for protein, given a lack of farmed-fish or similarly-priced animal alternatives at market (Kroese and Sauer 1998; MA 2005). Levels of malnutrition in this region are already high (Kawarazuka and Béné 2011). Recent studies link fish and terrestrial wild-meat consumption, providing evidence to show that when fish-availability is poor, terrestrial hunting pressure increases; conversely, when wild-meat availability declines, fish is commonly used as the protein substitute (Brashares et al. 2004; Rowcliffe et al. 2005). Fish farming can provide, in other regions, the surplus needed

[2] However, distinctions between subsistence and commercial activities will be highlighted

to nourish expanding human populations. In West Africa this is highly improbable, given the present lack of attention to dual goals of development and food security in respect of fisheries (Hall et al. 2013). Food security in West Africa and globally, is also threatened by the international market for fish. Almost 40% of total seafood production enters into the international trading arena with Japan, the EU and the USA collectively importing 72% (Mansfield 2011: 89). Across the USA and China for example, fish intake has risen five-fold; in the space of one hundred years for the former and in only 40 years for the latter (Jacquet et al. 2009). Sub-Saharan African (SSA) in particular, is known as Europe and Asia's 'fish basket' because of cheap harvesting and export opportunities available (Alder and Sumaila 2004; Béné 2008). In SSA, fish consumption per capita has stagnated since the early 1970's while high rates of population growth continue to present enormous challenges (Béné 2008). These trading disparities and the resulting consequences of resource re-distribution continue to raise serious concerns, yet to be fully addressed in fisheries policy (Srinavasan et al. 2012).

Drivers of the global fisheries crisis are multiple. Between the 1950's and 1990's technological advancements greatly enhanced capability such that vessels were able to capture, store and process larger volumes of catch while expanding spatially into previously under-fished areas (Watson et al. 2013). The declaration of national Exclusive Economic Zones (EEZ's) during the 1970's forced a negotitation of access to many developing country fishing grounds, which were inaccessible to national fleets due to limited technology. The EEZ declarations did little however to reduce global levels of effort and capture by developed industrial nations. During the

1970's, financial assistance also aimed to expand SSF activities in developing countries. A niche had been recognised within which SSF could bolster global fish supply, fisheries could also provide employment and attention could be diverted from numerous agricultural crises. The greatest challenge today which has emerged from the global fisheries crisis requires confronting two opposing objectives; one involves restoring, sustaining and conserving marine biodiversity, the second maximising both aquatic food-production and employment opportunities (Brander 2010; Salomon et al. 2011; Branch et al. 2012).

1.3 Investigating the Importance of SSF

(i) Employment Opportunities

Estimates of global employment within the SSF sector are varied and considered biased by the definition of a 'fisher'[3]. Yet, in the developing world more than one hundred million people are thought to currently depend directly upon SSF and post-harvest activities (fish processing and fish trading) for at least part of their income (Béné 2006; Béné et al. 2010a). SSF also employs millions of fishery associated workers including fish processors, carpenters, transporters and traders of goods critical to the sector (ice, salt, petrol food; and non-food goods) as well as fish. In contrast, employment opportunities in the domain of large (industrial) operations are considered relatively limited due to the advanced technology in use (FAO 2007; FAO 2008). For example the marine SSF sector is said to employ up to twenty-five

[3] And whether this includes full-time and part-time fishers; or those involved in aquaculture

times more workers than its industrial-scale counterpart (Pauly 2006, cited in Jacquet 2009).

In West Africa more than 60% of the population are aged thirty or less and are largely under-employed, with few paid working or educational opportunities (Cockayne and Williams 2009). For some, SSF is seen to provide a critical opportunity. Coastal areas on all continents offer resources, variable extractive opportunities and living spaces that prove attractive (Brugère et al. 2008). West African population densities along the narrow Atlantic coastal fringe have soared (both intrinsically and through in-migration) illustrating a willingness to relocate coast-wards in search of opportunity (Vogt et al. 2010) Globally the rate at which individuals are entering fishing (and fish farming) is said to be higher than population growth (World Bank 2008). However, this is contested by other reports declaring that regional variation does exist. For example, growth of fisheries is reportedly in decline in Malaysia, stable in Tanzania and slowing considerably in Bangladesh (Tietze et al. 2000).

Exponential growth of SSF in West Africa challenges one common belief that all fishers typically descend from a long-standing history in the activity. More than 90% of SSF in the region are considered new-arrivals or displaced entrants, indicating that fishing does present an opportunity (Chauveau et al. 2007). Mobility into fishing has been linked with widespread regional unemployment; drought, poor soil and unfavourable farming conditions; conflict, land reforms and the rising price of fish relative to agricultural produce. However, in general it is argued that we know very

little about the 'new arrivals' into fishing compared with our knowledge of cultures historically engaged in fishing activities (Béné 2006; McGoodwin 2006). Transitions in employment status within the fishing sector have also been observed, such that some fisher-groups have shifted from part-time (or seasonal work) to a full-time engagement in the sector (Samba and Faye 2006 cited in Njock and Westlund 2010; Binet et al. 2012). These attributes suggest that the 'face' of SSF in West Africa at least, may be changing.

For some, growth of SSF is the most worrying development, said to be creating an accumulation of effort ultimately detrimental to fishery resources (Pauly 1997). Others argue that fisheries, like numerous other small-scale production activities[4], are most often described as an occupation of last resort or a last-chance effort for desperate, unskilled, jobless and destitute people; when really the porosity and accessibility of SSF is a huge advantage, given its prevalence in developing countries where alternative employment opportunities are rare (Allison and Ellis 2001; Jul-Larsen 2002, Jul-Larsen and van Zweiten 2004; Béné 2006; McClanahan et al. 2009; Béné 2010a). This capacity of the SSF sector to absorb surplus labour (providing a "safety net" or "labour buffer") creating alternative sources of food, employment and income; and socially protecting the unskilled, unemployed and the unfortunate, is seen from a poverty reduction perspective as the sector's greatest merit (Jul-Larsen et al. 2002; Béné 2006; Béné et al. 2010a; Béné 2011; Njock and Westlund 2010). This is considered particularly relevant for those whose "normal" means of income-

[4] For example, Hilson (2010) associates the artisanal or small-scale mining sector with a "pathway out of hardship" and a "poverty driven activity".

generation has been disrupted; in periods of individual or collective turmoil, in the face of short-term unexpected shocks, forced migrations, displacements and crises; due to civil wars, natural disasters, political and social upheaval (FAO 2008). Furthermore, it is argued that the skills exhibited by individuals arriving into fishing, are largely undocumented; but where they have been captured they have been proven to be numerous, varied and multi-sectoral (Hannesson 2002).

The processes which have shaped decisions to enter SSF, have been documented for East African and Asian fisheries in particular (Pollnac et al. 2001; Cinner et al. 2009; Islam and Herbeck 2013). The West African marine SSF literature lacks an attention to this detail (Allison and Horemans 2004). This study therefore aims to disaggregate the largely undifferentiated West African fishers in this regard, to investigate the variability in entry strategies and how these shape the dynamics of the resultant commercial SSF sector.

(ii) Access and Conflict

In West Africa, the 1982 curtailment of 'freedom of the seas'[5] transferred control of coastal property into the hands of each national state. Coastal property encompasses territorial waters (demarcated twelve nautical miles offshore) and EEZ's restricting exploration activities within 200 nautical miles (Witbooi 2008; Alder and Sumaila 2004). One year later, fishing authorisation was further centralised within each EEZ, as localised authority over fishing grounds was smothered by a 'higher' State-level responsibility (Binet 2012). Today, SSF prevails in 136 maritime countries, many of

[5] UNCLOS the UN Convention on the Law Of the Sea

which are characterised by confused and poorly defined property rights, which often result in *de facto* open access that operates under a regime of nominal State governance (Andrew et al. 2007; Cheong 2008; Teh and Sumaila 2013). A prevalence of conflict associated with expansion of the fisheries sector, movements (migrations) of fishers in West Africa and underlying confusion over access-rights have all been highlighted (Wilson et al. 1994; Atti-Mama et al. 1999).

Apparent open-access conditions often result from an overshadowing of localised, legitimate and often more effective pre-existing tenure regimes. These pre-existing systems have been documented for various natural resources, including fisheries, water-stores and forests. One widely-documented comprises the common property resource (CPR) system in which resources are controlled by a group who agree to abide by rules regulating membership and use (Ostrom 1990; Johnson 2004). Despite their relative strengths, CPR systems are by nature hugely vulnerable to both competition and encroachment, particularly from larger and more powerful political and economic systems (Smith and Wishnie 2000). Erosion of CPR systems has occurred to such an extent that they are now considered as endangered as the resources which they evolved to defend. Examples of CPR systems, where they do persist have become a focus for investigating collective management. There have also been widespread efforts to use their organisational structure as a model, through which to establish management systems *de novo* as 'community based' initiatives. CPR systems are defined as critical institutions which can mediate the relationship between a population and the environment. They are considered particularly useful when a population changes in size or composition (Curran and Agardy 2002).

However, despite a growing body of practical support for the recently emerging community-based management ideals (many of which attempt to re-create CPR systems) numerous shortfalls have been identified.

Through these constraints, the co-management agenda emerges as a *silver-bullet*, widely discussed yet believed by very few to harbour any potential for conservation goals, good governance of natural resources or improved rural livelihoods (Nielson and Lund 2012). Instead, the 'community' it is argued, which forms the foundation of natural resource management re-form, is at best dynamic and at worst, a 'myth', emerging from the multiple social relations that people create (Cleaver 2002; Blaikie 2006). The issue of elite capture is raised, which Jentoft (2005) cautions, develops when collaborative management empowers the elite; entrenching inequalities which already exist. Béné et al (2011) concur, explaining that in the majority of cases involving fisheries, attempts to improve governance have simply modified the status-quo by altering power distributions among stakeholders. Instead, an 'elite' or privileged group have been frequently observed to hijack management reforms, in order to serve their own interests (Njaya et al. 2012).

Due to the tendency for SSF to work closer to shore where smaller stocks are often targeted, collisions of interest with weakly supported customary governance systems overlooked by central State authority are a particular problem (Berkes 2003). Where these localised systems are over-ridden by larger management agendas, confusion often emerges as different groups variably interpret access, use and harvesting rights. Out of this confusion, the 'dilemma' of open-access emerges, a first-come first

served mentality, which drives desire for personal possession and creates an incentive for individuals to overexploit; even though this is not in any longer-term collective interest (Hardin 1968; Bromley and Cernea 1989; Cinner et al. 2005).

Despite extensive erosion of CPR systems and the emergence of State-associated bilateral fishing agreements (for example with the EU) which proliferated after the Cold War, West Africa's fishing grounds are still considered 'one of the greatest resources of fish left in the world'[6]. Many countries in this region in the past (and to date) have lacked the capacity to fully explore their fishing areas and it here that the strategy of leasing fishing-rights to distant water fleets (DWF) first arose (Pauly et al. 2002). DWF fishing poses an enormous threat to supplies in the region as does the recently recognised expansion of illegal, unauthorised and unreported (IUU) operations (also known as 'pirate' fishing). IUU activities it is observed, operate at a level significantly higher (at 37%) in West Africa than the global average (measured at 18%)[7] (Worm et al. 2009). Further, IUU activities undertaken by regional fishers (small and large scale) and vessels from distant nations (including the EU, Russia, China, Taiwan and Korea) has greatly skewed our understanding of activity in the region given that these vessels are commonly registered with 'flags of convenience' (Agnew et al. 2009). Flags of IUU ships normally represent developing country states; however the vessels themselves are usually owned and operated by developed country companies (Agnew et al. 2009). Many are also operating at a 'distance' from their point of origin. Along with high economic losses, pirate fishing in West Africa

[6] http://www.guardian.co.uk/global-development/poverty-matters/2012/apr/02/steps-prevent-collapse-west-africa-fishing (*Accessed 14-07-2013*)
[7] As observed during the period 2000-2003

is severely compromising the food security and livelihoods of coastal communities, as well as influencing political decisions at the State level (EJF 2012; Srivanasan et al. 2012).

As both fishing effort and competition have grown, the need to find, capture and sell fish for a profit has intensified. Larger-scale operations may be assisted by tracking devices and financial ability. For the SSF sector, migrations of fishers are commonly undertaken and have for decades been considered an essential element of fishing in West Africa (Haakonsen 1991; Chauveau et al. 2007; Randall 2005:3). One purpose of migration was to find fish and it was initially assumed that fishers only moved in order to maximise their catch. However, a long history of fishery related migrations and relocations, suggests that migrations pre-date any evidence of stock decline (Boujou 1991). Instead and more recently, improved access to markets, better prices, avoidance of conflict and changing circumstances through time, have all been cited as drivers of fisher-relocations in the area (Alhaji 1997; Overa 2001; Mpandou 2004; Randall 2005: 4; Tati 2008). Incidences of violent conflict are also reportedly rising. Disentangling the foundations of such conflict in West African coastal fisheries and investigating management strategies which are sensitive to the issues uncovered, are clearly worthy of greater attention. This study investigates the importance of access to fishing areas in shaping circumstances of conflict inside an island system.

(iii) Capturing Information

The up-wellings off West Africa provide an abundant, fluctuating but relatively predictable supply of marine fishery resources (Binet 1997). Despite their critical

importance and the growth of competition to harvest however relatively little quantitative information is available, concerning fish stocks or resource abundance in this area[8]. This is not unusual and information concerning fish-capture from developing countries is generally quite sparse due to limited funding, monitoring; access to training and computer software.

The value of catch data today remains under scrutiny and the argument questioning its' validity is described here. Many fisheries scientists acknowledge the importance of catch data (which is essentially used to estimate the total weight of fish captured) in developing maritime countries, where little fisheries-independent investigation of stocks ever occur; due to funding and logistical constraints (Pauly et al. 2013). An opposition to this view however, (outlined by Hilborn and Branch in the same publication) is that the numbers of fish captured (as inferred from catch-data) cannot truly reflect the number of fish in the sea, as numerous other factors influence catch; including management and fishing regulations, fisher skills, market prices and demand for specific fish (Pauly et al. 2013). Instead, these authors argue that only when coupled with fishery independent surveys (such as acoustic trials and visual transects) can catch data provide any insight into stock-status and subsequent health of a fishery. The paradox, as outlined by Pauly, is that developing-country catch-data is already quite sparse and questioning the use of this minimal knowledge runs the risk of a future with no information at all. This author concludes that the most at-risk and most-valuable global fishery resources will be compromised, if no fish catch data

[8] www.frms.fao.org (*Accessed 14-07-2013*)

at all is collected. In response, Hilborn and Branch (in Pauly et al. 2013) argue, that the use (and misuse) of catch data has persisted for decades contributing only to numerous and varied alarmist visualisations of the state and fate of marine fish resources. Worm et al. (2006) for example, predicted the complete collapse of currently exploited global fisheries by 2048, given the extent and growth of fishing pressure. It would seem from this recent publication that while few would argue that many fish stocks are in crisis, quite how much we know or can accurately predict about the future of fisheries remains a hot-topic over which the scientific community remains firmly divided.

Here this thesis argues, that recognising the potential limitations of catch data the information gleaned from records of fish landings could prove critically important in broadening our understanding of SSF in developing countries, including those inside the wider West African region. Improving our knowledge not only of what is caught during excursions to fish but also how it might be recorded, supports the premise that data-collection programs at a local level could contribute to our knowledge of the status of world fisheries, particularly for the developing world (Agnew et al. 2013). This study therefore investigates fish harvest levels from multiple gear-types used by commercial SSF operations and in particular focuses upon catch groups considered most at risk to fishing pressure due to their behaviour and ecology. This analysis does not however make any conclusive statements concerning the health of fishery resources in the area.

During the last twenty years the value in shark fishing off West Africa, driven in part by international demands from the far-East, has been realised. The particular importance of Hong-Kong as an international trading centre for fish body parts (including elasmobranch[9] fins and croaker swim-bladders) is likely due to their value as both a medicinal tonic and food delicacy, coupled with the inability of local stocks to keep pace with demand (Clarke 2004). Demand for shark-meat from countries inside the West African region particularly Ghana, have been described. Elasmobranchs are especially vulnerable to fishing pressure as they are characterised by 'slow life-histories' (long life-expectancy coupled with slow-growth and reduced fecundity: Dulvy and Forrest 2010). Furthermore, their use of shallow water, near-shore habitats as nursery-areas, and the tendency for juveniles to remain inside these coastal waters for several years after birth, makes them more vulnerable to capture, given their reliance upon space utilised by SSF activities.

With SSF in West Africa providing critical food and employment opportunities for millions, resultant pressure upon elasmobranchs is most likely to increase into the future (Kroese and Sauer 1998). The global plight of elasmobranchs has been highlighted (Myers and Worm 2003; Lucifora et al. 2011). However, most studies of interactions between SSF and elasmobranchs have been centred in the Pacific and Indian Oceans and the Caribbean Sea. This study aims to contextualise and provide a critical insight into the importance of SSF interactions with elasmobranchs on the West African coast.

[9] The term 'elasmobranch' applying to sharks, skates, rays and guitarfishes

(iv) Poverty and SSF

It is estimated that by 2015, 53% of the global poor will be concentrated in Africa where as already stated many populations are already afflicted by disastrously low incomes (Béné 2008). Poverty is considered one of the environments' greatest threats (Broad 1994). Yet the term poverty is also considered 'value-laden' and instead increasingly recognised as a multi-dimensional concept. Too narrow a focus in the study of poverty risks overlooking social relations, socio-cultural identities, everyday meanings and individual aspirations (Alkire 2007; McGregor 2008).

Prior to the Millennium Development Goals (MDG), development research was increasingly concerned with poverty reduction rather than biodiversity conservation (Roe 2008). Meanwhile conservation science, largely through the Convention on Biological Diversity (CBD) was pledging to shift its focus from single-species to an ecosystem perspective. Empirical evidence gradually brought together the biodiversity-poverty conundrum illustrating that financially poor, socially and politically marginalised populations are commonly the most dependent upon living species in bio-diverse ecosystems for their livelihoods and ecosystem services (Adams et al. 2004). The persistent degradation of ecosystem services (of supportive, provisioning, regulating and cultural value) is still declared a significant barrier to achieving these MDG's (MA 2005). Yet, despite further work, the term 'ecosystem services' defined in the MA as '*benefits that humans obtain from ecosystems*' is still considered 'ambiguous' or elusive and the field of research remains in a very early stage (Fisher and Turner 2008; Nicholson et al. 2009; Daw et al. 2011; Cowan Jn. et al. 2012; Agarwala et al. *in press*).

Understanding and tackling the underlying causes of why rural African populations continue to experience both high rates of poverty and environmental degradation, remains a huge challenge, greatly complicated by external drivers including those related to land and resource grabbing (Liyama et al. 2008; Zoomers 2010). It is however proposed that in-depth intra-community assessment of poverty indicators may assist in disentangling the root causes and impacts of inter-relations (Jayne et al. 2003).

In terms of fisheries, the emergence of two well-cited paradigms "we are poor, therefore we are fishers" and "we are fishers, therefore we are poor" have certainly re-invigorated the debate surrounding the causal drivers of poverty in association with SSF. Investigations have highlighted the importance of fishing activities in both reducing (lifting people out of) and preventing poverty (by the meeting of immediate needs: Béné et al. 2010a; Daw et al. 2011). In response, the notion that fishers are actually income poor, has been refuted on many counts; particularly when compared with full-time agriculturalists (Béné 2003; Allison and Horemans 2006; Allison et al. 2006; Sumaila et al. 2008; Béné et al. 2010a). Rather than experiencing the hardships of wider-spread but specific income-poverty, SSF have been shown to exhibit multiple characteristics associated with poverty; many of which are typically found in developing countries where small-scale activities have proliferated. Others are circumstantially specific to fishing. These dimensions include inadequate health-care services, low levels of education, lack of access to land, remoteness and geographic isolation, poor infrastructure, minimum access to micro-credit; little political free-will, high exposure to accidents (due to the nature of fishing work) and increased

susceptibility to HIV and AIDs related illnesses (Townsley 1998; Allison and Seeley 2004). With recognition of these traits, fishers emerge as one of the most vulnerable socio-economic groups due to their particularly high exposure to natural, occupation-based, health-related or economic, shocks and disasters (Allison et al. 2006; Béné 2009). A recent review of the literature on poverty in fishing communities concludes that targeting the vulnerable – those with a high chance that they will fall into poverty – may be as important to poverty alleviation as focusing on those who are currently the poorest in income or material asset terms (Macfadayen and Corcoran, 2002).

Comparative analysis between geographically close communities, markedly different in livelihood activities, could provide further empirical evidence of the role SSF plays in association with poverty. This study undertakes one such comparative approach to investigate the importance of SSF in generating income and enabling households to avoid longer term chronic poverty.

1.4. Social Research and SSF

This section outlines two key approaches (Sustainable Livelihoods and Wellbeing) through which deeper analysis of socio-cultural values and dynamics associated with SSF have been advocated. The need for a more in-depth analysis of small-scale natural resource based activities (including fishing) has emerged from a heightened global awareness of change and increasing resource scarcity. This has highlighted the challenges which proliferate in the arena of resource management and have prompted the question of how management might respond to global change. Complementing

this awareness has been a parallel shift in focus from 'resources' to 'humans and nature'. This transition is largely attributed to recognition that the fate of natural resources will lie ultimately with the relations towards, behaviours surrounding and demands exerted by humans upon them[10] (Andersson et al 1995: 13; Agrawal and Yadama 1997; Berkes et al. 1998; Wackernagel and Silverstein, 2000; Cote and Nightingale 2012). Furthermore, this new-understanding appreciates that humanity will always depend upon the life-support functions offered by ecosystems, irrespective of technological change (Berkes et al. 1998).

1.4.1. Sustainable Livelihoods Approach (SLA)

The conventional definition of sustainability is that used by the World Commission on Environment and Development, which is "*an approach to progress which meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED 1987). Since the 1992 Earth Summit, sustainable development has emerged as comprising three dimensions commonly referred to as the 'triple bottom line' or metaphorical three pillars. These comprise ecology, economics and society (Lehtonen 2004; Hall et al. 2013). Development of the SLA has been powered by livelihoods research investigating the societal-pillar which supports sustainability. Principles behind 'livelihoods' evolved during a search for a more "effective and meaningful methodology to support people and communities" (Appendini 2001:24) as development studies ultimately sought to further our understanding of poverty and the life-limitations imposed by such circumstances

[10] Theory of structuration- Giddens (cited in Granfelt 1999)

(Chambers and Conway 1992; Ashley and Carney 1999). Ideas behind livelihoods therefore arose from a desire to understand how different people in different places live (Ellis 1998). The approach was promoted as 'non-sectoral and grounded in the multi-dimensional reality of daily life' (Kalbe et al. 2004: 49). As the agenda gained momentum, attention shifted towards the way in which a living is obtained; through assessment of the capabilities, assets (material and social resources) and activities involved (Ellis 2000; Scherr 2000). The inclusion of individual capabilities was informed by earlier publications on entitlements from the development literature (Sen; 1981; Sen 1991).

The livelihoods approach positioned assets or capital (in natural, human, social, physical and financial forms) as central, mediated by contextual policies, institutions and processes. Early applications of 'livelihoods' quickly captured the importance of either individual or household diversification; deliberately, as an involuntary response, or through choice and opportunity; but ultimately as a means of reducing the risk of income variability or failure (Ellis 1998; Ellis 2000; Barrett et al. 2001: 35; Thorpe 2004: 21). The ability to undertake diversification was observed to have complex affects on rural inequality; by increasing survival chances of the poorest (in income terms) but also favouring the wealthiest, ultimately able to access more lucrative opportunities (Ellis 1998; Ellis 2000). In fisheries, the SLA has informed social research by exposing the vulnerabilities of those associated with fishing through external threats (Allison and Ellis 2001). This has been crucial given that social research in SSF is lagging. Furthermore, the SLA has revealed that the ability

of fishing individuals and their livelihoods to cope with risks and recover from shocks, essentially define their sustainability (Allison and Horemans 2006).

Shortfalls in strict applications of the livelihoods approach have been recognised (de Haans and Zoomers 2005). For example, the framework is criticised as over-emphasising the materiality of life; focussing upon asset holdings and economic gain while paying less attention to social and cultural norms which regulate how assets and income may be used. It is also argued that the livelihoods agenda fails to capture longer-term shifts and changes, for example in power or politics; climate effects or rural economies (Scoones 2009). In terms of fisheries research, it has been cautioned that the livelihoods framework only lends itself to partial investigation of deeper beliefs, needs and aspirations and only narrowly engages with the social and cultural values associated with SSF (Macfadyen and Corcoran 2002; Coulthard et al. 2011). The SLA is still considered a holistic approach to understanding socio-economics of fishing, but one that places greatest emphasis on materiality and assets (Weeratunge et al. 2013).

1.4.2. Wellbeing Approaches

More recently, the concept of wellbeing has emerged as the boundaries of poverty research have extended, prompted not only by shortfalls in the SLA but recognition within the Millennium Development Goals (MDG's) that education, gender-equality, health and environmental sustainability as well as poverty, are core components of development (Agarwala et al. *in press*). Wellbeing, unlike many approaches has embraced the positive being-well, considered an inherently 'good thing' (White and

Pettit 2004; White 2010). The Wellbeing in Developing Countries (WeD) research group based at the University of Bath pioneered development of participatory research into wellbeing which they defined as "a state of being with others and the natural environment that arises where human needs are met, where individuals and groups can act meaningfully to pursue their goals, and where they are satisfied with their way of life" (McGregor 2008). A universal definition of wellbeing remains contested however and rather research focus is upon 'what is or could be meant by wellbeing' given its very grounding in social and cultural contexts (White 2010; Agarwala et al. *in press*).

Measurement of wellbeing was initially pursued through two separate channels; by economists, psychologists and sociologists and otherwise by collaborations between clinicians and psychologists (White and Pettit 2004). More recently wellbeing has been integrated into development and anthropological analysis. Avocation of wellbeing in the Millennium Ecosystem Assessment (MA) brought the ecosystem closer to social-science and development studies, by asking how changes in natural systems influence human wellbeing (MA 2005; Milner-Gulland 2012). In attempting this, the MA broadly defined five categories including security, basic material needs, health, good social relations and freedom of choice (MA 2005). However, this definition has been criticised for encouraging aggregate 'social analysis' which overlooks any existence of subgroups and is therefore limited in any ability to inform of intricacies which influence circumstances of poverty (Daw et al. 2011). Furthermore, Bevan (2005) emphasised that for many rural-poor in low-income developing countries, ill-being might still prevail as a more relevant focus.

Despite necessary cautions outlined in its application, wellbeing harbours potential for furthering our understanding the impact that current and future environmental changes may have on the worlds' poorest and most vulnerable populations. Wellbeing therefore both builds upon and furthers social analysis beyond the materiality of the SLA and the concept of individual needs, capabilities and freedoms. It does so by emphasising the collective interplay between individual and group-level requirements (White 2010; Coulthard et al. 2011; Armitage et al. 2012). Wellbeing approaches also focus beyond the materiality of SLA by considering (i) the 'relational' interactions involved in generating and maintaining social, political and cultural identities and (ii) the 'subjective' components which encompass cultural values, norms and beliefs; notions of self, individual and shared hopes and aspirations; levels of trust, satisfaction, dissatisfaction and confidence (White 2010; Coulthard et al. 2011; Armitage et al. 2012). From a personal perspective, wellbeing therefore engages with the social and cultural foundations upon which institutions are enacted (White 2010; Coulthard et al. 2011). Wellbeing research has also identified a need for improved knowledge of the perceptions and motivations behind resource-use in order to identify factors that influence extractive decision-making and behaviours (Coulthard et al., 2011).

1.5. Thesis Objectives and Structure

Over the course and time-frame of this thesis, many publications have described the accepted limitations of the SLA framework. Meanwhile, the strengths underlying wellbeing have begun to propel social analyses of SSF, beyond the realm of livelihoods. Resultantly, the debate now stands on grounds that focus upon fishing as

a 'way of life'; projecting 'living' beyond the earlier stricter definitions that only, emphasise material assets, wealth and income (de Haan and Zoomers 2005; Pollnac and Poggie 2008; Coulthard et al. 2010; Coulthard et al. 2011; Armitage et al. 2012). However, despite developments promoted through both the SLA and WeD frameworks and the applications which have been made to fisheries, the importance of the 'social pillar' in fisheries policy still remains marginal and secondary to concern for environmental and economic prospects (Britton and Coulthard 2013; Hall et al. 2013). This thesis therefore aims to address this gap and further our understanding of the complexities underlining social and cultural dynamics of SSF.

The chapters that follow open with a geographic and demographic overview, of the area in which this study takes place. The Bijagós Islands in Guinea Bissau, West Africa, have received very little attention in SSF research. Chapter 2 provides a general overview of this area. In Chapter 3, the two specific study-sites on an island known as Uno are introduced. These sites form the basis of this comparative study. One comprises two small, adjacent Bijagós villages which form part of a larger population nexus. The second site is a stand-alone in-migrant fishing encampment. Integrated into the overview of these sites is an outline and critique of the data collection methods used. Four empirical chapters follow. Each is presented with a review of relevant literature, a definition of the data used and a discussion of the analytical techniques adopted. Following each chapter analysis, consideration is given to the limits of the derived insights. Each data chapter is intended to address a specific theme which will investigate the importance of SSF in this locale and contribute to our understanding of the 'social pillar' which access to SSF provides.

The point of departure in this investigation is an examination of entry-strategies into commercial SSF. This is attempted in Chapter 4, by bringing together experiences and narratives from local Bijagós villagers and in-migrant fishing encampment residents. The chapter attempts to culturally contextualise residents within the two focal study-groups, by investigating the 'safety net' function provided by commercial SSF for those that have entered into the sector. Next the investigation moves into an analysis of contemporary livelihood activity patterns, examining the significance of fishing relative to other activities. Chapter 5, which is again comparative between the two focal (Bijagós and in-migrant) groups, addresses the issue of access into fishing grounds and the mechanisms through which this is achieved. Chapter 6 takes a very different perspective and focuses exclusively upon the fish catch attained by different gear types used within the commercial SSF activities on Uno Island. This analysis considers the fishing grounds in which the different gears are used and the significance of the vulnerable slow-growing elasmobranchs within the landed catch. Chapter 7 turns to the household economy to explore what involvement in SSF can mean by comparing the households of Bijagós and in-migrant encampment residents. This analysis investigates the specialisation which underpins household livelihood strategies inside the two study groups and addresses the associations between fishing activities, income generation and poverty. The final chapter brings together these findings in a discussion which relates back to wider literature debates. Chapter 8 uses a political ecology approach, to present the wider constraints of future SSF management options, inside this study-area, which emerge in the light of this research.

Chapter Two

Guinea-Bissau and the Bijagós Archipelago

Chapter Overview

This second chapter focusses upon the location in which this research was undertaken. The study area introduced here is Guinea Bissau and the Bijagós archipelago. Section 2.1 focusses upon contextualising the Bijagós Islands. Section 2.2 provides a historical overview of Guinea Bissau in colonial and independence times. Section 2.3 introduces the importance of the fisheries sector to the national economy, differentiating between large and small-scale operations. The chapter concludes with an overview of near-shore SSF management practices.

2.1. General Climate and Population

2.1.1. Geography

Situated between Senegal and Guinea Conakry, Guinea Bissau comprises 28, 100 km^2 of low-lying forest and savannah; these border an extensive estuarine system within which, seven major river systems empty into the Atlantic Basin (Campredon and Cuq 2001; Feka and Ajonina 2011; Figure 2.1). The country boasts the longest (3,180 km) coastline in West Africa and the second largest mangrove area which in some parts stretches to more than 160 km inland (UNEP 2007; Feka and Ajonina 2011). The climate comprises a dry season (November - April) and rains (June - September); with May and October considered the seasonal transitions. Located offshore, the Bijagós archipelago is the only island-system off the West-African coast. It comprises some 80 islands strewn across an extensive sandy and shallow continental shelf. In total, the land of the archipelago measures some 1000 square kilometres, while a further 1000 square kilometres or so are "*uncovered twice daily by the retreating tide, of which at least 760 square kilometres are mudflats and 350 square kilometres are mangroves"* (UNEP 2007). Land on the islands is covered mainly by mangrove (32%) and closed palm forest (26%: Limoges and Robillard 1991 cited in Auliya et al. 2012).

2.1.2. Population, Ethnicity and Development Status

The human population of Guinea Bissau is approximately 1.5 million, comprising at least 30 ethnic groups, one of which dominates- the Balanta.

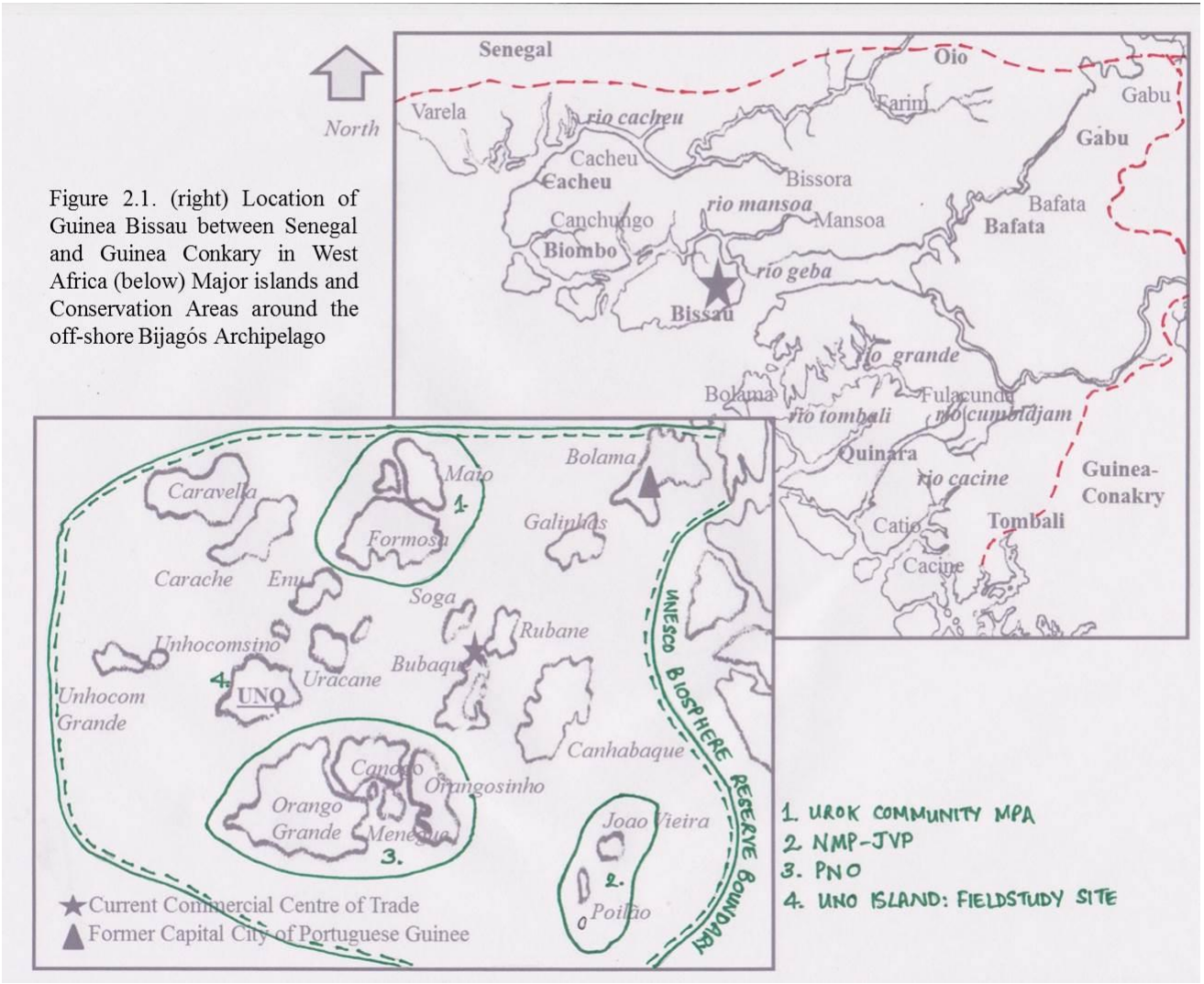

Figure 2.1. (right) Location of Guinea Bissau between Senegal and Guinea Conkary in West Africa (below) Major islands and Conservation Areas around the off-shore Bijagós Archipelago

Approximately 25% of the national population reside inside the capital city, Bissau[11]. The remaining 75% are spread across the major provinces. The offshore islands are occupied predominantly by the Bijagó[12] ethnic group, numbering approximately 2% of the national population. Of the eighty islands only twenty are permanently inhabited; others are used as sacred lands, seasonal agricultural sites or refugia for domestic livestock. The twenty permanently inhabited islands are grouped into four divisions.

Today, Guinea Bissau is ranked towards the bottom (176) of the Human Development Index (HDI) and has been given a Gini equality rating of 0.353 (Table 2.3). The official national language is Portuguese but with high rates of illiteracy[13] an unofficial Kriole language is most widely spoken. The government relies upon three main sources of revenue: export taxes, import taxes and fishing licenses (Carneiro 2005). An estimated 88% of national residents survive with less than $1 per day[14]. On account of the Bijagós Islands, Guinea Bissau is also a 'small-island developing state' (SIDS) considered a "*special case for both environment and development*" in that superfluous challenges are often faced in the planning and implementation of development goals (Briguglio, 2004). Due to this, Guinea Bissau is considered highly vulnerable to potential climate change impacts (Allison et al. 2009).

[11] Census of the National Institute of Statistics: INEP (2009)
[12] Also cited as *Bidjogo, Biyoko, Bijuga*
[13] Stemming from the colonial era
[14] DFID (2005) describe the gross national income (GNI) per capita (2002) at $130

Table 2.1: National Development Parameter Measures for Guinea Bissau[15]

National Development Parameters	Guinea Bissau
Child mortality at under 5 years of age	193 in every 1000
Life Expectancy	47.3 years
Years of Schooling	9.1 years
Adult Illiteracy	47.8%
Gross National Income (per capita)	$962
HDI	Rank 176

2.1.3. Bijagós Origin and Cosmology

Several theories surrounding Bijagó origin have developed; all commonly beginning with the expansion of the Malian empire in the eleventh century and a mass population movement from inland West Africa towards the coast. Rodney (1970) observes that the different Bijagós islands today show close affinity to different mainland ethnic groups[16]. This he proposes suggests that the Bijagós ethnicity has emerged from multiple regional origins[17]. In an ethnographic account of islanders on Bubaque, Scantambulo (1991) argues that according to Bijagós mythology, arrival onto the islands was through one mother of four sons, named *ogubane, ominca, oraga and oracuma*. Each son subsequently married and created four matrilineal clan groups present across the islands to this day. In more recent ethnographic accounts from Bubaque, Bordonaro (2006) aggress with Rodney and asserts that linguistic and behavioural variation across the Bijagós Islands as observed today, have been exaggerated by the later campaigns of pacification (see Section 2.2.2) by Portuguese

[15] Source: www.undp/en/data/map
[16] These are the Beafada and Quinada to the north-east; the Nalu to the south; the Papel to the north and the Diola-Felupe to the north-west
[17] See Gallois-Ducquette (1983) for ethnographic maps of Guinea Bissau

colonialists. These campaigns '*split up ethnic groups and exacerbated pre-existing high levels of ethnic and linguistic diversity*' (Bordonaro 2006: 121). After their arrival and as initial Bijagós populations expanded many centuries ago, land areas across the islands were colonised and settled by clan-groups[18]; who staked ownership and appointing a chief[19] to stand as their authoritative power. Today customary Bijagós governance strategies vary between islands (Maretti 2003) although village areas are still customarily held by a land chief <*chefi di chon*> a descendant of the original settler clan. The village land chief is advised by members of a Council of Elders[20]. Beaver (1803) describes the chiefs as possessing a position of great power, yet also compares them to a father figure or family head "*wearing the same clothes and eating from the same bowl*" (Beaver 1803:328-338).

Today, inside the villages most Bijagós are Animists. Their belief centres upon 'another world' inhabited by sacred spirits <i*raan*> and those of deceased ancestors or kin. Maintaining good relations between the present and a spirit after-life is considered fundamental to human well-being (Maretti 2003). A village chief[21] undertakes responsibility for communicating with this after-life through powerful ceremonies <*ronia*>. These ceremonies commonly involve animal-sacrifice.

Animist life-events also focus upon a point of initiation <*fanado*> during which, individuals pass from youth to older age. The process of initiation is organised

[18] For further details see Santos-Lima (1947)
[19] Known in kriole as the "*chefe di chon*" and in Bijago as "*oronho odoko wa moto*"
[20] Known as the "*garandesa*"
[21] Known in kriole as the "*regulo*" (or less formally simply as "*homen garandi*") and in Bijagós as "*oronho"*

through age-grades known as cohorts or <*camadas*> the *fanado* of males and females occurring separately in time and space. De Sousa (1999) describes the Bijagós age-grade system as a "*juxtaposition of clan and kin*", though related to ancient military organisation, societal defence and war. For men, initiation is a means of reaching age; and a position known as the elder or <*garandi*>[22]. Initiation is a place of opportunity to pass forward information, knowledge from which the elders can discipline the young; while receiving respect, obedience, food and other goods in return (Maretti 2003). Initiation ceremonies are timed and conducted by a diviner <*baloberro*> able to predict the future (Helmholz 1972; Appendix 2, Photograph 1). This individual assumes responsibility over the Bijagós shrine <*baloba*> and controls the organisation of ceremonial proceedings.

Bijagós Animistic belief contends that after death, an individual soul returns to its natal village where it exists with sacred spirits and ancestors watching over members of the existent population. Souls of uninitiated Bijagós, including very young children, cannot make this journey into the after-life. Instead, the spirits from their deceased bodies are left wandering within the confines of their natal village, vulnerable to the intentions of other spirits and harbouring the potential to cause disruption. At initiation, women are overtaken by animated spirits, powerful enough to reach into the beyond and negotiate with the *iraan*. They become guardians to these souls of the uninitiated youth, directing them through a peaceful life-course after death (de Sousa 1999; Henry 1994; Appendix 2, Photograph 2). And female initiation due to this crucial role of guarding the souls of deceased pre-initiates,

[22] Age at initiation is variable across the islands. On Canhabaque, initiation is renowned for occurring later in life, when individual males reach 40+ years of age

serves a very different purpose to that of men. Lyall (1938) observes that female initiation is performed before an individual carries her first child and is therefore earlier to that of males.

Full post-initiation rights are only declared to an initiated male cohort after teaching has been completed of the next generation of warriors (Fernandes 1989; Maretti 2003). Henry (1994) thus calls the initiation process of the Bijagós a "*fabrication of the male force*" as men must be both initiated and involved in the initiation of the next generation, in order to attain a spiritual force comparable to that of women (p. 103). The animist associations between this world and the next and the importance of sacred spirits in forging connections between the two have been documented, for the Bijagós for several decades. Weissenborm (1906) describes the transmigration of Bijagós souls into the bodies of animals. Many terrestrial and marine animals[23] are revered and considered to hold mysterious powers. They are represented in religious activities in the forms of masks and dances and wall paintings which decorate the village houses and animist shrines *baloba* (Tous et al. 1998; Appendix 2, Photograph 3).

2.2. Colonial Political History to Present

2.2.1. Early Colonial History

The first Europeans, having journeyed by sea, arrived on the mainland West African coast in this region, in 1446. Portuguese navigator Alvares Fernandes then claimed

[23] Particularly the sharks- hammerhead and guitarfishes, skates and rays; but also sea turtles

sovereignty and exclusive trading rights (Mendy 2003). Yet despite these notions, by 1670, only one flag was mounted "*on a small piece of land*" which was bought from a local chief on the northwest coast (Teixeira 1950:8; cited in Mendy 2003).

During the 1500's, the Bijagó war canoes[24] were observed terrorizing inhabitants of the wider mainland region and Rodney (1970) observes that "*south of the Gambia, it was only the Bijagós almadia that traversed the open sea*" (Rodney 1970:17). A journal-entry dated 1732 from the French merchant worker Jean Barbot (1655-1712) confirms "*tails of raids and ransoms*" (Lundy 2006). Earlier historians claimed that a propensity for Bijagós Animists to commit suicide rendered them unsuitable as slaves (cited in Rodney 1970). Hawthorne (2010) disputes this, and uses an analysis of slave-inventories from Brazil to explain that inside the Gulf of Guinea during the colonial slaving regime, '*there were no neat divisions between predators and prey, between captor and source, the raided and the raiders*' (p. 94).

While the Portuguese had assumed control of the mainland, the first colonial settlers on the Bijagós Islands were British. They arrived in 1792 having been informed that the coastline around Bolama Island was rich and healthy, while land was available to cultivate and purchase from *peaceable* inhabitants (Beaver 1803). The British group, sent as part of a wider abolitionist movement were intending to ultimately monitor slaving. They began however, by deforesting and constructing a settlement, on a seemingly unoccupied island; behaviour they later described as "*acts of hostility on our part*" (Beaver 1803: 47). Following a violent contestation by Bijagó King

[24] Known as "almadias"

Belchore (of neighbouring Canhabaque Island) the British crew negotiated first with the Bijagós and later a Biafada King from the adjacent mainland; both laying claim to the same land[25] (Hair 1997). One year later the enterprise on Bolama lay abandoned. Disease had plagued the attempts of the British settlers, most of who had died. The surviving colonists fled to Sierra Leone. Confused Bijagós Chiefs from Canhabaque declared later (in 1856) that Bolama Island had never been knowingly sold by King Belchore but rather rented to the initial British expedition (Hair 1997). In 1828, the Portuguese made similar treaties of "*cession*" with both the Bijagós and the Biafada, again for the island of Bolama (Hair 1997).

By the 1840's, foreign traders (principally French, British, Portuguese and Cape Verdeans) were attempting to gain access to land all along the Gulf of Guinea by every possible means; leaving many issues, terms and conditions unexplained to indigenous rulers who suffered as a result (Hair 1997; Bowman 1987). Between 1837 and 1870, Portuguese and British flags were simultaneously rising and falling, indicative of the colonial rivalry in place (Hair 1997).

[25] (Extract from Beaver 1803*)* On June 29th 1792: Deed of Cession of the Island of Bulama, was signed by the Kings Jalorem and Bellchore (of Canhabaque) to the British Colonists, for the King of Great Britain: *"We the kings of Canabac, being fully convinced of the pacific and just disposition of the said persons, and of the great reciprocal benefits that will result from an European colony being established in our neighbourhood, and withal being desirous of manifesting our distinguished friendship and affection for the king of Great Britain and his subjects, do hereby, in consideration of the value of four hundred and seventy three barrs* of goods, by us this day received, for ever cede and relinquish to the said king of Britain, all sovereignty over the island of Bulama, which sovereignty our ancestors have acquired by conquest, and have ever since maintained disputed in peace" Paid-*£78 16 8d sterling; and £50 given to Captain Moore for agency (Beaver 1803:72)*
In the Appendix No. 8: A list of goods given to Niobana and Matchore (Biafada) for the purchase of the Island of Bulama: 10 Danish Guns (60 bars); 30 Flasks of Gun Powder (60 bars); 1x 18 Gallon cask of brandy (36 bars); 20 flasks of brandy (20 bars) – DRAM; 30 lbs of tobacco (15 bars); 15 knives (3 bars); (> total 194 bars). Also, 2 fathoms of scarlet cloth, 1 ditto of blue, 6 common hats, 3 large pewter basins, 3 smaller ditto, 2 bunches of Burdoe beads, 2 ditto of Harlequin ditto, 1 ditto of muffaties (total unkown value)- but altogether the cost was about 26 pounds sterling (Beaver 1803)

Control over the territory was eventually resolved in 1870, when an arbitration verdict from US President Ulysses Grant gave sovereign rights to Portugal (Mendy 2003). But by the late 1800's Portugal was suffering severe administrative instability. Despite these set-backs, Bolama Island had been restored and was declared the capital of Portuguese Guinea in 1879. But seven governors and five secretary-generals served in Portuguese office between 1879 and 1889; a turn-over rate that prevented any economic development (Bowman 1987). Initially uninterested in declaring any customary entitlements, Portugal proposed a mercantile and agricultural company (the *Companhia Agricola e Fabril da Guinee*). This, it was hoped would encourage trade (Hair 1997; Bowman 1987). Meanwhile Cape Verdean agricultural initiatives were appropriating land on a large-scale for the cultivation of groundnuts, using a work-force derived from the underlying slave trade (Bowman 1987). These plantations exported their commodities from customary small-holdings with minimal investments in technology (or production) and little disruption to population settlement or local institutions; such that general colonial developments, never actually shifted the region beyond a peasant economy (Mendy 2003).

2.2.2. The Rise of Independence

In 1892 and again in 1902, Portugal was declared bankrupt (Bowman 1987); in response to which the Crown imposed a "*Hut Tax*" (in 1903) upon the overseas territories. Imposition of this tax led to armed clashes with the Bijagós in 1907 (Mendy 2003)[26]. By 1915, the Portuguese King Carlos had been killed, Portugal had

[26] Portuguese campaign of pacifism described by Bordonaro (2006)

declared itself a Republic and mainland Guinea was under military control (Mendy 2003). By 1935, the Bijagó were required to pay both a flat-rate hut tax and a poll tax; higher monetary demands than most households on the mainland (Mendy 2003). Using financial investment from Germany and building upon the earlier enterprise of an Englishman named Hawkins, the Portuguese *Companhia Agricola* expanded and took over a palm oil enterprise on the Bijagós Island of Bubaque; increasing production from 1 to five tonnes of palm-oil per day (Galli 1995). The challenges of paying taxes were met as Bijagós men were forced, to migrate to the palm-oil production centre (Bubaque) where they formed a plantation "*labour force*". In opposition to these demands, other islanders either emigrated or burned their settlements and went into hiding, as a tax avoidance strategy (Mendy 2003).

In 1942, Portugal created a land registry to fight the land appropriation of Cape Verdeans who were securing plantations. This land registry preserved customary holdings and administered ownership rights while simultaneously prohibiting land-sales, producing a non-property owning basis of land entitlement (Galli 1995: 64).

On Canhabaque Island, where the Bijagós had long-defied paying taxes and where resistance to Portuguese colonial powers was greatest, an armed battle finally thwarted the Bijagó rebellion in 1936. The Canhabaque Islanders had obtained rifles and ammunition from southern Senegal (through a barter process using palm oil) but were unable to resist a Portuguese army movement of several hundred soldiers (Lyall 1938). The fall of Canhabaque Island in 1936 marked the final success of the colonialists in their campaign of pacification in Portuguese Guinea.

Back on the mainland in 1959, city workers organised a strike at the Bissau port of Pindjikiti protesting the continual "*tutelage of work*" demanded by the Portuguese in order to pay taxes. The Portuguese responded by killing some 50 strikers and injuring many more[27]. This event was highly significant. The brutality and controversy of the massacre inspired the formation of the Bissau liberation movement named the "Partido Africaine para Independencia de Guinea Bissau e Capo Verde" (PAIGC) by Amilcar Cabral (Mendy 2003).

The liberation struggle began with a PAIGC directed guerrilla movement from Guinea Conakry, through contact with Cuban embassies in Algeria, Guinea Conakry and Ghana (Gleijese 2002: 186). This resulted in what Gibert (2009) describes as "*the most threatening, best-organised and ultimately determining war of independence*" on the African continent. For Guinea Bissau the war of independence lasted more than ten years. Amidst turbulence and six months after founder Amilcar Cabral was murdered by inside members of the PAIGC, the new Republic of Guinea Bissau came into being (in 1974) heralding a one-party state (Gleijese 2002: 211; Scantamburlo 1991: 17).

2.2.3. Post-Colonial to Present-Day Politics

The first President of the new Republic of Guinea Bissau was Luis Cabral, half-brother of murdered Amilcar. After Luis had undertaken less than six years in office, Joao Bernardo (Nino) Vieira conducted his first successful *coup d'Etat* and

[27] Today, the annual day of remembrance of the massacre at Pindjikiti is a national holiday in Guinea Bissau

established himself as president. The history of post-independence Guinea Bissau is troubled and this short summary merely serves to highlight its complexity[28]. After losing power, Luis Cabral sought exile in Portugal, where he died from old-age in 2009. Ironically in 2009, Nino Vieira still clinging to power, also died, less peacefully; after being shot and mutilated in Bissau City in an assassination that rocked the ethnic foundations of the Republic.

Following his undemocratic seizure of power in 1980, many coups were undertaken by and against Nino Vieira. 'Nino' meanwhile opened up a two party electoral system which in theory at least, introduced the notion of political rivalry and opposition. However, by the end of the Cold War, emerging literature was documenting the frail and weak nature of developing states such as Guinea Bissau, judged in particular for its "deteriorating institutional quality" (Knack 2001; Gibert 2009).

Nino was re-elected in 1994; but overthrown during a successful army coup four years later. In 2000, Nino's main rival Kumba Yala of the Social Renovation Party (SRP) took power, in a transparent electoral poll. In 2003, another coup incited by Nino, replaced Kumba-Yala with interim President and business entrepreneur Henrique Rosa. In 2005 the next national election, saw Nino Vieira as head of the PAIGC reclaim his presidential status, as he pledged to "pursue economic

[28] Guinea Bissau holds a high 'corruption perception rank' of 150 (out of 176 countries) and a low score in terms of potential to control corruption. Source: Transparency International: how corrupt a country's public sector is perceived to be (from corruption related business surveys) http://www.nytimes.com/2012/11/02/world/africa/guinea-bissau-after-coup-is-drug-trafficking

development and national reconciliation"[29]. However under the power of Nino, the country only continued to deteriorate; such that due to a lack of transparency, weak governance, rent-seeking, corruption, management malpractices and inelastic demands for public services; government expenditures were always above the level consistent with short-term budget equilibrium (Carneiro 2005). The situation was described as a '*potentially explosive socio-political environmen*t' and a '*politically conscious population remaining calm in the face of rupture*' (Lundy 2006).

Following Nino's assassination in 2009, fellow PAIGC fighter-comrade Malam Bacai Sanha was elected; only to die less than three years later from a diabetes-related illness. This death is symbolic. Since gaining independence in 1974, no President in Guinea Bissau has ever completed a single term in office. When Bacai Sanha died in 2012, the second Presidential round was cancelled amidst turbulence between the army and parliament. Today, the country exists in transition, a tentative balance of compromise and silence between the army and a largely powerless interim government. The latest surge of cocaine trafficking through Guinea Bissau since the 2012 coup has motivated a degree of international action. Recent undercover operations confirm negotiations of higher army officials with the Revolutionary Armed Forces of Columbia (FARC). For Guineans, there is hope that this international pressure may eventually assist in bringing a democratically elected leader to a stable position of governance.

[29] www.cia.gov/library/publications/the-world-factbook/geos/pu.html

2.2.4. Political Legacy on the Bijagós Islands

Despite the colonial squabbles of the British and Portuguese to gain control of Bolama, today the town is a backwater, a relatively weak seat of 'administrative' importance. Rather, the urban and commercial centre of the Bijagós islands has shifted to Bubaque Island, which hosts a market-town centre district, served by an intermittent ferry service from Bissau City. Bubaque also boasts extensive mobile phone coverage[30], internet access; a hospital and secondary school. Investments in the infrastructure on Bubaque emerged during the early independence years of Luis Cabral, who built his own residential villa on the island. Cabral pledged a landing strip and local electricity grid to serve Bubaque Town. He also commissioned a 30 km stretch of tarmac road across the island, which was used to access a hotel resort for the purposes of hosting political guests. Today, these investments are largely in ruins; electricity is by generator only and Cabral's villa is visibly crumbling into the sea (Appendix 2, Photograph 4). Meanwhile, the landing strip has gained a reputation for use only by cocaine smugglers. Community investment projects do prevail however, powered by NGO's and the numerous Christian missions. There are two community radio stations operating out of Bubaque. The most popular (*Radio Djan Djan*[31]*)* transmits personal messages <*communicados*> across the Bijagó Islands for 200 CFA (or £0.40). It is through this means that the 25,000 Bijagós islanders living outside of Bubaque town, in villages scattered across the inhabited twenty islands communicate. Through these messages, they are informed of births, deaths,

[30] Three mobile phone transmitters stand as testament to the competition between telecommunications companies

[31] Named after the former Bijago King of Bubaque

funerals[32] and initiation ceremonies; meetings, public events; state functions and salary payments. Most islands are far away from Bubaque such that they lie outside the coverage of any mobile phone signal. The palm oil refinery of Bubaque, built by Hawkins and run by the German business prior to independence, is now closed. However, the building remains largely intact and the chimneys of the factory are today a feature of Julio's Bar. The warehouse formerly used for storage of the palm kernels has become the towns' indoor market-arena. Bubaque has become an activity hub, absorbing those Bijagós looking to step out from their birth villages, enrol in education or look for job opportunities in the commercial sector. Notions of 'development' for the islanders are largely confined to what is seen in Bubaque, rather than on the mainland. Given the islands magnificent coastal scenery, the tourism industry of Guinea Bissau is largely based in and around Bubaque. Resulting from an irregular influx of foreign tourists <*estrangeiros*> Bubaque town is considered by many migrant workers a more preferable place to live than Bissau. In a recent thesis exploring the cultural identities and aspirations of Bijagós Islanders inside the commercial district of Bubaque, Bordonnaro (2006) insists however, that islanders link aspirations of moving off the islands with leaving, getting out of <*sai fora*> the archipelago and out of Guinea Bissau altogether[33]

2.3. Guinea-Bissau and Fisheries

Human pressure on the marine environment has never been so intense, and the continental shelf of Guinea-Bissau is no exception (Amorim et al. 2004; Appendix 2,

[32] Known as "*chors*"
[33] The 2006 thesis of Bordonaro discusses the dreams and aspirations of the Bubaque youth

Photograph 5). Guinea Bissau lies inside the FAO southern coastal subarea of Fishing Area 34, which is known as the Eastern Central Atlantic (ECA)[34]. Inside this, the Committee for Eastern Central Atlantic Fisheries (CECAF) is responsible for co-ordinating regional representatives. The exclusive economic zone (EEZ) of Guinea Bissau covers 54,000 km^2 which includes more than 30,000 km^2 of highly productive continental shelf (Amorim et al. 2004). This includes the near-shore waters within the 12 mile zone (11,000km^2), beyond the 12 mile line where industrial boats operate (28,000km^2) and the remaining habitat of the finfish (15,000km^2).

Revenues from industrial and SSF efforts combined are predicted to generate between 30 and 40% of total government revenue (World Bank 2010, MRAG 2010). Others observe that aquatic resources could potentially provide a *much higher* standard of living for its population and help Guinea Bissau recover from the chronic status of poverty, unemployment and malnutrition" (Kaczynski and Looney 2010).

Broadly speaking, the main body responsible for fisheries governance in Guinea Bissau is a central Ministry of Fisheries (MoF). Within this, the Centre for Applied Fisheries Research (CIPA[35]) assumes responsibility for assessing and monitoring fish resources. The Fisheries Inspection Service (Inspection and Control of Fishing Activities) FISCAP is responsible for the control and protection of fisheries. A Directorate for Artisanal Fisheries (DGPA) within the MoF is responsible for coordinating projects to develop artisanal fisheries.

[34] Covering the coastal-line from Mauritania to the Congo River (www.fao.org/fishery/area/Area34/)
[35] Centro de Investigação Pesqueira Aplicada

2.3.1. Industrial (large-scale) Fishing

Cuba was the first to invest in Guinea Bissau's large-scale fishing effort, when Fidel Castro (in 1972) contributed four vessels during the PAIGC campaign for Independence. Castro had observed that while Guinea Bissau was rich in fish, there were no boats (Gleijese, 2002). Later into the 1980's, as the Soviet Union took charge as greatest arms-benefactor, a joint fishing venture (*Estrela do Mar*) became a convenient instrument through which the USSR paid in total between $3-5 million (US) for unlimited fishing operations **(**Goffinet 1992). During early post-independence, bilateral fishing agreements with the EU also started in both Guinea Bissau and Senegal. Rough estimates indicate that in 1979, foreign fishing vessels netted over 90,000 tonnes of fish in Bissaun waters, while the national fleet only produced 7,400 tonnes (Baekgaard and Overballe 1992: 181). Renewal of the Russian fishing venture was discontinued in 1985, but EU operations prevailed (Goffinet 1992).

During the post-independent period, several disputes over maritime boundaries were emerging. Amidst offshore oil negotiations in 1983, Guinea Bissau contested its maritime boundary with Guinea Conakry, on the grounds that an agreement signed in 1886 by the Portuguese and French had not demarcated a sea, but rather a land-based boundary. By 1985, Guinea Bissau and Senegal were contesting a similar 1960 agreement. Both cases were eventually resolved through the International Court of Justice in The Hague during the 1990's.

Today, all industrial scale fishing operations are expected to respect a 12 nautical mile boundary with the coast, inside which only SSF is authorised. Approximately 237 large-scale (industrial) licences were sold annually between 2004 and 2006; each licence granting access rights to fish for between 3 and 12 months (World Bank 2010). This practice of paying licences on the basis of effort or 'months' of fishing, rather than total allowable catches (TAC) has been criticised. So too has the resistance of many industrial-operations, to allow in-country observers on board. Reflecting the losses imposed by inadequate control of the large-scale fishing sector, Kaczynski and Fluharty (2002) calculate that EU fisheries license-revenues in Guinea Bissau have generated only around 11% of the estimated actual value of the coastal resources exploited; which falls to less than 0.5% in the case of the offshore tuna fisheries (Kaczynski 1998 cited in Béné 2008). Disparities are further hampered by the largely unregulated and insanitary conditions in Bissau City port. These render catch which is destined for export unlandeable. These practices all confound the transparency of industrial activities in and around the Bissau City area. According to a report from the Swedish Society for Nature Conservation (SSNC), fisheries partnership agreements with foreign industrial vessels wishing to fish the Bissau waters, must donate a quarter of the money paid on developing fisheries and monitoring. Instead, there is little evidence that this is ever done; instead the money is used to repay debts to foreign banks[36]. Other boats simply operate inside Bissau territorial waters without purchasing any licences, as IUU vessels.

[36] http://www.illegal-fishing.info/item_single.php?item=news&item_id=4216&approach_id=13

2.3.2. Small-Scale Fishing (SSF)

In comparison with industrial efforts, it is estimated that between 600 and 1200 boats associated with the SSF sector operate annually in Guinea Bissau. These are linked to estimates of between 3000 and 10,000 fishers [37] (González 2010). However, there are no '*precise data on the performance of the sector*' (World Bank 2010, MRAG 2010; Appendix 2, Photograph 6). Furthermore, although the Directorate for Artisanal Fisheries (DGPA)[38] is responsible for coordinating projects to develop artisanal fisheries; the development of SSF is described as '*totally outside government's control*' (World Bank 2010).

Inside the Bijagós Islands a noticeable absence of local Bijagó full-time SSF have been described since the early 1990's. Rather, the Bijagós have been observed to undertake largely subsistence-based operations, dictated by religion, the cultural circumstance of age-grades and the socio-economic conditions of the Bijagós group (Tvedten 1990; Haakonsen 1991). A Swedish artisanal fisheries development project commenced in Bubaque in 1978 and providing fishing equipment, pirogues and outboard motors on a credit scheme; in addition to installing an ice-plant and positioning vessels to transport preserved catch to the capital, Bissau. The project aimed to develop artisanal fisheries in the archipelago and increase production above subsistence. However, in terms of Bijagós participation, even the more modest goals of the enterprise were described as unachievable as '*a fishery beyond the immediate*

[37] Who support a "dependent population" of 24, 586; otherwise a ratio of approximately five dependents to one worker within the fishing sector
[38] Within the Ministry of Fisheries

needs of the individual, family and village was not on the Bijagós agenda' (Baekgaard and Overballe 1992: 186).

In contrast, the presence of regional but foreign SSF around the islands, had been documented for several decades; many of who were, the target of these structural adjustment and development initiatives during the 1990's (Haakonsen 1991). In particular, the Nhyominka fishers (of Senegal) were described as the earliest outsider group responsible for considerable catches inside the Bijagós Islands (Haakonsen 1991). And it was these Nhyominka fishers who landed most catch recorded by the Swedish project. Today it is estimated that up to 50% of SSF operating inside Guinea Bissau are foreign migrants from neighbouring states (Gacitua-Mario 2007). More recently, a growth in in-migrant participation in SSF around the Bijagós Archipelago has been linked with increased industrial-scale operations (including IUU activities), declining catches and even damming activities, in neighbouring countries (Binet et al. 2012; Campredon and Cuq 2001).

2.4. Biodiversity Conservation and SSF Management

The SSF management initiatives within the EEZ of Guinea Bissau have been largely influenced by recognition of the country's immense biological diversity. In 1989 the IUCN opened an in-country office in Bissau City; Guinea Bissau ratified the Convention on Biological Diversity (CBD) in 1995. One year later, in 1996, the Bijagós Islands were accredited as a UNESCO Biosphere Reserve, by the Man and Biosphere programme (MAB); "*to protect the unique natural resources, biodiversity and high natural productivity of the region*" (Fortes et al. 1998).

During the late 1990's a scientific study on the Bijagós Island of Poilão (an extended territory of Canhabaque Island) disclosed the presence of an extensive green sea turtle (*Chelonia mydas*) nesting area, the densest recognised to date on the West African coast (Godley et al. 2001). Estimates are that between 7000 and 29,000 green turtle nests are made on Poilão Island each year, a beach area covering only 4 km, of which less than 2.3 km is sandy nesting habitat (Barbosa et al. 1998; Catry et al. 2002; Godley et al. 2003). The uninhabited island of Poilão is not only a critical green turtle rookery, but also a sacred-site for villagers of Ambeno on Canhabaque Island (Godley et al. 2003). These traditional owners of Poilão have used the area for decades as a secret-site for animist male initiation ceremonies. Discovery of the Poilão rookery provided a catalyst, promoting interest in the Bijagós region from both biodiversity and conservation specialist groups. Resultantly a number of marine area spatial closures have now occurred across the islands. The Bijagó sacred site at Poilão is engulfed by the National Marine Park of Joao Vieira and Poilão (PNM-JVP) which covers 495 km^2. The larger Orango Island National Park (PNO) which covers 1582 km^2 of marine and terrestrial habitat was also established in the year 2000 (Henriques and Campredon online report[39]; Catry et al. 2009). These are both classified as Grade II IUCN listed areas, managed mainly for ecosystem protection and recreation. The PNM-JVP which includes Poilão turtle nesting beach was designated in order to present a '*conservation unit that allows sustainable development and use'* (Fortes 1998). The PNO was '*justifiably*' created because of the great importance of the area to biological diversity including five sea turtle species, hippos, manatees and crocodiles (CBD, Guinea Bissau). In 2004, the IUCN

[39] http://www.unesco.org/csi/smis/siv/Forum/BijagosArchipelago_Henriques-Campredon.pdf

and governmental agencies created an Institute for Biodiversity and Protected Areas (IBAP), which operates out of a head-office in Bissau and manages these protected areas inside the Bijagós Islands from a smaller office on Bubaque.

Reports produced from inside the protected areas frequently (and negatively) describe the presence of in-migrant SSF. For example, when the PNM-JVP and PNO were newly established, an additional justification was that '*considerable*' concern had arisen for the sustainability of SSF in the area and the conservation of target fished species, resulting from 'new' commercial activities (Tous et al. 1998). A later publication declared that 'significant progress' was being made in removing the presence of settlements, of foreign fishermen from the areas near sea turtle concentrations (Catry et al. 2009). Weak enforcement by national park authorities was also blamed for promoting a sense of freedom in park residents and in-migrant fishers (Catry et al. 2009). Other more recent reports, describe the increased permanency of in-migrant fishing settlements as problematic (Campredon and Cuq 2001). Yet it is simultaneously admitted that estimates of the exact number of fishing camps and their locations remain largely elusive (Campredon and Cuq 2001; Diop and Dossa 2011). Fisheries management in Western Africa is generally speaking, still controlled by governments; while user-groups are the 'recipients' not the 'initiators' of decisions; such that they are managed along with their resources (Sverdrup Jensen and Nielson 1998). Despite the '*problems*' and '*difficulties*' discussed in relation to non-national SSF, Diaw and Haakonsen (1992) observe that Guinea Bissau is the only country inside the West African region to distinguish between national (domestic) and in-migrant SSF when charging fees for boats and

fishing licence rights. All other countries in the region classify monetary charges, by gear-capacity, not nationality. This generates a very specific conundrum for Guinea Bissau, in that while ecologically speaking, resources may be '*threatened*' by high numbers of non-national fishers; economically speaking their presence is highly prized.

Chapter Three

Uno Island and A Research Methodology

Chapter Overview

The Island of Uno in the southwest of the Bijagós archipelago, lying to the north of the PNO boundary and east of Unhocom was purposefully selected for this study due to the presence of an occupied and functioning in-migrant fishing encampment. This chapter discusses the phases through which fieldwork on Uno was undertaken including a contextual description of Uno Island (3.1 - 3.3). The final section (3.4) focusses upon the specific data collection exercises which formed the core activities for this research. Examples of data-sheets used during data collection are presented in the Appendix (Part 1).

3.1. Fieldwork Phase I (April – June 2008) Cabuno Overview

3.1.1. Introduction

Uno Island covers approximately 100 square kilometres and comprises a forest and savannah-grassland patchwork-interior; with mangroves, inter-tidal mudflats, sandy bays and rocky outcrops around the coastal fringe. The island boasts some twenty-seven Bijagós villages <*tabancas*> (see Figure 3.1) although this number has fluctuated through time, as populations have converged or relocated in response to disaster, disease or vegetative encroachment. A headcount (in 2009) revealed the presence of more than 3300 inhabitants on the island[40]. The Bijagós of Uno speak a specific language, different from that of neighbouring Orango, Unhocom and Caravella. The dialect on Uno is also variable between villages[41].

3.1.2. An Entry into Cabuno Area

My fieldwork on the island commenced with a three month pilot trip to Cabuno Area between April and June 2008 (Appendix 2, Photograph 7). The intention of this visit was to investigate the presence of an in-migrant fishing camp, determine the extent of its occupancy and assess the potential for comparative research in this location.

[40] Pers. Comm. from co-ordinator of the census team for Uno sector (S. Balde, 2009) representing a 19% decrease from the 1999 head-count[40] (Biai, 2000)
[41] As reported by informants of Cabuno

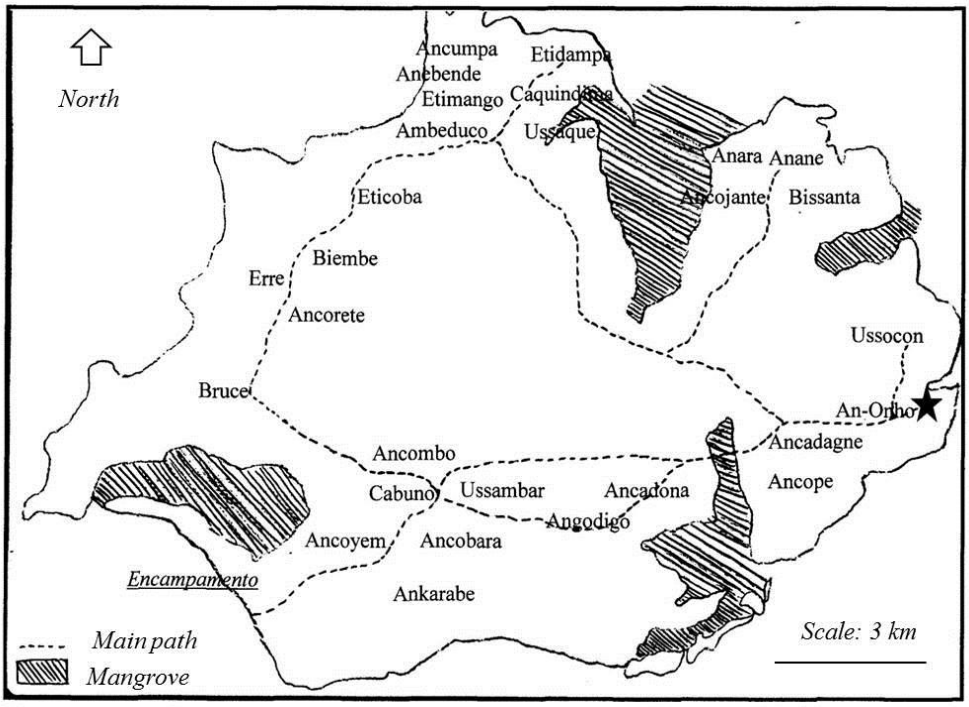

Figure 3.1: Village locations on Uno Island, with Cabuno Area in the south-western corner

Arriving in Cabuno village (in April 2008) I was welcomed and offered shelter in a house that had been reportedly constructed by peace-corp volunteers several decades earlier. The house had been empty by the time I arrived, for nearly two decades. I was asked to present myself to the village chief the following morning and told to acquire two chickens and five litres of palm wine for this purpose (to *<ronia>)*. Early next day I was welcomed into a darkened room at the side of this compound, the chief accompanied by his son and an elderly companion. I was invited to sit on a woven stool, facing a shrine which appeared to be littered with dozens of 'parcels' of what looked like earth, decorated with shells and ribbons. The chief began by addressing this shrine, talking in a calm and soft voice, surreptitiously dousing the decorations with palm-wine as he spoke. In time, I was asked to introduce myself

and explain the motivation behind my visit to the village[42]. After my intentions had been understood, the two chickens I had brought were promptly decapitated and for some minutes ran-headless around the room, before both falling in a heap at my feet. Their fate was met with much enthusiasm. I was asked to wait inside with the chief, now calmly drinking and offering the palm wine, while his son removed the chickens from the room. The son returned moments later offering his father the carcasses with their stomachs neatly sliced open. The chief inspected their contents. These were also discussed in a light-hearted manner and when I enquired whether all was well, it was explained that the stomachs were 'clean' and I was welcome to work in Cabuno.

Following my introduction, I began acquainting myself with life inside Cabuno village, its routine and geography. I began by visiting each household, introducing myself and my visit. My interpreter in those early days was a 49 year old father of three, who had been recommended by the village elders[43].

My initial interest had been to establish whether there were any in-migrant fishers in the area, with whom I could also explain my study. I was informed by one spokesperson that the fishing encampment was no longer occupied (Appendix 2, Photograph 8). Yet mysteriously another villager explained that it might be there, only I must go and see for myself. About ten days after arriving in Cabuno, I set out one morning to explore.

[42] Unable to speak Portuguese or Kriole at this point, I communicated slowly in Spanish
[43] See section 3.1.7 for a description of this individual

A single track leads out from Cabuno through wild scrubland for about 3 kilometres until eventually opening onto the sandy Cabuno bay. Here the beach stretches for more than six kilometres, backed in places by high sandy dunes. To either side lies a rocky headland point. The encampment, I discovered, lay to the north of the bay. The presence of fishers was immediately apparent as on that first day, a dozen canoes lay anchored in the shallows.

As I walked up into the camp, the occupants signalled my approach to each other and hastily began covering bundles of fish drying in the sun. I was asked to introduce myself to a Camp Council, which I was advised comprised three representatives; all of whom were Sierra Leonean. I was therefore able to communicate in English. The encampment, it transpired had been occupied for several years, and the impression I received was that this was a productive enclave. In that sense, the potential for a comparative study on Uno was realised. From that day on, I began also regularly visiting the encampment; becoming used to the occupants routines while introducing myself and my research to the residents.

3.1.3. Early Comparison of Bijagós Villages with the In-Migrant Encampment

I spent most of my three month pilot study outside, visible and in the open; hoping that everybody would see me in the area; and that they might gradually start to become familiar with or even forget my presence. Cabuno, it emerged comprised six Bijagós *tabancas* or hamlets (Figure 3.2) within which I counted 106 household units (Table 3.1). These were variable in terms of occupancy but typically hosted more

than four individuals. Households belonging to the four Bijagó matrilineal clans were later found to inhabit distinct areas (suburbs or <*bairros*>) within each village.

In contrast the in-migrant fishing camp hosted a dynamic population which (between 2008 and 2010) comprised just 62 households. These were typically occupied by only one or two individuals. I was informed that the encampment had in the past been much bigger in terms of occupancy; and many references were made to individuals and households that were expected back or were due to return to Uno.

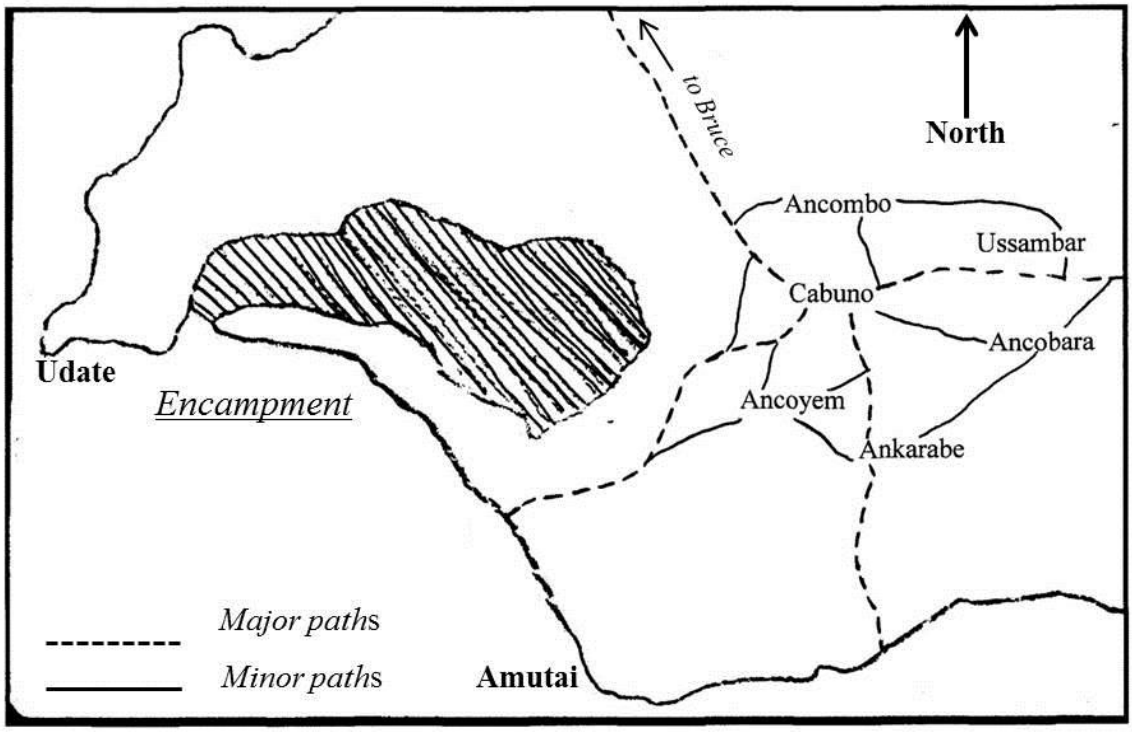

Figure 3.2: Cabuno Sector of Uno Island (located between the rocky headland points of Amutai and Udate) comprising six Bijagós villages and the in-migrant settlement

Table 3.1: Household Census of Cabuno Sector (2008)

Site	AMUTAI			ANCOMACA			IN-MIGRANT CAMP
	Ancoyem	Cabuno	Ancombo	Ancarabe	Ancobara	Ussambar	
No. of HH's	19	32	9	22	19	5	62

During the pilot study, I began to discern a split among the Bijagós villagers between those following Animist and Protestant religions. A festival atmosphere, excitement and evening-dancing suggested that the Animists at least, were celebrating (Appendix 2, Photograph 9). My interpreter had explained that this was a part of the male *fanado* which was, he explained 'a secret ceremony'. Three *tabancas* in Cabuno were taking part in this ceremony and each hosted a Bijagós shrine <*baloba*>.

I also came to realise a number of fundamental differences between the Bijagós villages and the fishing encampment (Table 3.2). The history of the latter relative to the Bijagós villages was shorter and the livelihood activity patterns of the two appeared to me as an outsider, markedly different. This was mainly due to the Bijagós islanders' propensity to engage in small-scale rice cultivation. Meanwhile, inside the fishing encampment there was a marked absence of agricultural activities and instead all residents were engaged in fishery related tasks. Furthermore, the camp was predominantly composed of Muslim residents, who practiced their religious activities in and around a Mosque, maintained and looked after by the residents.

Table 3.2: First Glances- Key differences between the Bijagós tabancas and the in-migrant encampment in Cabuno area

Attributes	Local Bijago Villages	In-Migrant Community
Settlement Type	Village <*tabanca*>	Fishing Camp, enclave, encampment, settlement
History of Settlement	Long	Short
Settlement Location	Inland savannah/ forest mosaic	Coastal
Population	Nationality (Bissauan), Ethnicity (Bijagós)	Mixed nationality; multi-ethnic
Leadership	Clan based, age-grade (by birth group, heritage and age)	Camp Council (voted)
Occupations	Farmer, Farmer-Fisher, Few off-farm activities; a noticeable absence of commercial SSF	Fisher (male), fish processor (female and male), Trader/ Buyer (male and female)
Cultural Traits	Animist and Protestant. Society differentiated by gender and age-grades.	Predominantly Muslim. Mosque inside the camp.
Water Supply	Many wells	One well

3.1.4. Bijagó Animism in Cabuno Area

In Cabuno, I was advised that Animism (which remains the dominant religion) is focussed around a typical Bijagós hierarchical age-grade system. Within this system on Uno Island, the male *fanado* occurs when a group of males reach an age of approximately 30 years (Table 3.3). However, it was also explained that a pre-initiate individual might be promoted to a higher age-grade, if considered of exceptional physical stature or strength, (relative to other members of their cohort) such that they

might take the *fanado* ceremony earlier in life[44]. Conversely, an individual might be held-back from joining his cohort if considered by the elders, small or weak in stature.

Table 3.3: Male age-grade system of cohorts (or *camadas)* for Uno Island

Age (years)	Age-Grade (nomenclature)	Description
Up to 5	onga	New Born (Baby)
Up to 13	g'onhocam	Child (Young)
Up to 23	canhocam	Pre-Initiate (Youth)
Up to 33	cabarro	Pre-Initiate (Warrior)
Ceremony of Initiation <*fanado*>		
Up to 43	camabé	Post-Initiate (Responsible)
Up to 53	lambé	Post-Initiate (Retired)
Up to 63+	oconto (odone)	Post-Initiate (Elder)

The male initiation cycle on Uno comprises numerous ceremonies. A brief outline of the pre-initiation ceremonies which the warrior class <*cabarros*> undertake during the three years prior to their ultimate *fanado* ceremony are given in Table 3.4. These ceremonies indicate a colourful, exciting and gregarious life, which the *cabarros* appear to enjoy. These are also the most exciting ceremonies for each initiation group, as they often include activities which are observed by a wider village audience.

[44] A cohort is defined as "persons born in the same time interval or entering a social system at the same time and aging together" (Foner and Kertzer 1978)

Table 3.4: Pre-initiate male warriors <*cabarro*> ceremonies en route to the larger initiation <*fanado*> (as described for <amutai> initiation group inside Cabuno Sector, Uno Island)

Temporality	Male Ceremony (nomenclature)	Description
Dry Season	i. EXONGNANE	Involving hunting (of wild meat) and pounding of harvested rice to offer the initiation group elders or leaders (last for one day)
Rainy Season	ii. PAGA CAJUR	A ceremonial ploughing event called "paying with the dog" in which a dog is sacrificed by an elder, following the ploughing of all rice paddies owned by post-initiate males and their families (this lasts several weeks)
Dry Season	iii. MUBUSCO	The initiated beat the pre-initiates with sticks (last for one day)
	iv. GUNU	The pre-initiates enter the bush for up to 30 days and celebrate upon returning to the village
	v. CANE	The pre-initiates tap palm wine for several weeks and store it; before offering to the whole island
Rainy Season	vi. NEGA SAL	The consumption of salt by pre-initiates is forbidden; the pre-initiates commence a period of withdrawal from village-life: eating/ dietary/ social restrictions (this lasts several weeks)[45]
Dry Season	vii. MAÑAKE	The pre-initiates make offerings to families/ teachers (lasts for one day)
	FANADO	The pre-initiates enter the bush for 40+ days - following this, they return to the village and remain in isolation within the balboa for a further 30 days (undertaking eating/ social restrictions)

[45] As one post-initiate <*camabé*> explained: " *You have to refuse to take, touch, eat or drink salt. Or else, you'll die. In that ceremony, you're going to ask your aunt, or call on a person who you trust completely- they're the ones who are going to cook for you".* "Bu na nega toma, toca, kume, bibi-sal. Si nao, bo na mouri. Na ke ceremonia, bo na punta bo tia o roga um pessoa ke bo fia completamente; elis kin na kuna pa bo"

Upon completion of the *fanado* the *cabarros* are transformed. Post initiation is a sombre time and each individual must pay their teachers and village elders retrospectively for the privilege of the skills and knowledge acquired (Appendix 2, Photograph 10). This interval of post-initiation payment is known as <*pagamento di garandesa*> or 'payment to the elders'. On Uno it can last for up to six months; although this may occur for a couple of months over several dry seasons due to the significance of particular seasonality of products (palm wine and fish) used in the offerings. In the past on Uno, the post initiate <*camabé*> were expected to work daily fishing and tapping wine, offering all produce to the elders. During that payment interval, sales of livestock or other assets (and general money handling) was forbidden. Today, it is explained that these rules are relaxed. Monetary transactions by the <*camabé*> are allowed, although dealings in fish and palm wine are still considered sacred and (at times of ceremony) for the elders alone. The period for which an individual remains a post-initiate <*camabé*> is ten years. The final duty for which they are responsible before an effective release from the initiation debt, is assistance in organising the *fanado* of the *cabarro* group below. To do so, the *camabé* are called upon to tap palm-wine for the elders <*fura garandesa*> as a cohort, for a month.

After leading a *fanado* ceremony the *camabé* retire into a class known as <*lambé*>. At this point they have completed the transition from youth (or worker) to elder (employer). Costs of retirement vary. Some villages on Uno undertake retirement ceremonies in private; others conduct the ceremony openly, a practice widely considered more expensive given that payments (of jewellery, clothes, food and palm

wine) will extend to female family members and non familial village representatives. As a *lambé*, an individual becomes an advisor on a council of elders and this council are also expected to also pay also their dues. For example, once a *camabé* age-grade have completed post-initiation payments, they are invited to take part in a ceremony known as <*kume coco*>. During this, the *camabé* eat cashew offerings made by their elder teachers.

3.1.5. Bijagós Animism in Transition

I was advised that the initiation process, had in the past, governed the Animist marriage system on Uno. However these rules were described as in a state of transition. Previously, for example, it was explained that inter-clan marriage was rare. Furthermore, Bijagós females had always, chosen their husbands by making offerings (pounded rice flour and fresh palm oil) to their selected in-laws. Years ago marriage was reportedly forbidden; until a male had completed the initiation ceremony[46]. Only after initiation would a male be entitled to start married life with a new wife- a woman with whom no previous relationship as a pre-initiate warrior *cabarro* had ever occurred. Uninitiated couples were previously allowed to take up residence in side-rooms and granaries and could raise children. But eventually, the male partner would be taken out into the bush for the initiation ritual and these relationships would, cease upon his return.

[46] As Helmholz (1972) describes, new initiates would instead have been found looking for land; to build a house and begin to farm; to start an "official" family. They would have presented themselves to the village land-chief, with an offering of a chicken or goat in order to conduct a sacred ceremony <*ronia*>; contacting and communicating their wish to the sacred spirits and ancestors <*iraan*> hoping for their approval in the proposal

Informants in Cabuno advised that these practices were no longer followed. And by all accounts, the practice of uniting with a '*new wife*' upon completion of the initiation ceremony had been discontinued for several generations. One older resident, a male villager from Cabuno initiated during the 1960's, explained for example that together with his one wife, had been borne six children, over the course of their union which commenced before and continued long after he completed his initiation training.

3.1.6. Bijagós Protestantism

In contrast, the Christianisation of Bijagós islanders began a few decades ago. One of the first missionary's to be described on Uno, was a Miss Isabelle from Dunfermline, Scotland. She reportedly arrived in the Bijagós during the early 1940's and translated the Bible into Bijagó while working on Orango Island. She then settled into Ankarabe village on Uno. Miss Isabelle died in Bissau City in 2010. Presently, Brazilian missionaries are resident on Uno. They have taken up residence in the east of the island (An-Onho) and from a modest house[47] they take charge of several chapels, a medical dispensary[48] and many primary schools which operate inside 'converted' villages across the island. It would seem that under this influence, the number of Bijagó Animists converting to Christianity on Uno is increasing (see 3.1.6.). Within the area of Cabuno, two *tabancas* known as Ancobara and Ankarabe describe themselves as 'converted'. Inside these villages, the majority of young individuals are not involved in initiation. There are, however in these villages a

[47] Although cement structured with a solar panelled electricity system and a back-up generator
[48] Providing medical care at a lower cost than the State and often as charity

cohort of initiated *camabé* males, a testament perhaps to the former strength of Animism among the populations. These *camabé* do declare however that they undertook their initiation outside of the converted villages.

Protestants in Cabuno area may still use the Animist age-grade nomenclature (outlined in Table 3.2) in informal reference to an individual or group; and ceremonial dances do often pass through the 'converted' villages. But in general within the Protestant villages on Uno no *fanado* is in process. This is a pre-requisite of the Protestant faith. Individuals on Uno are welcome to convert to Christianity at any age, but it was observed that Bijagó post-initiates were not normally converted and were instead, said to have already chosen their path. Rather, any decision to change religion would be made before entering the Animist initiation process. In Ankarabe a large Church has been constructed and here the Protestants from Ancobara and the wider Cabuno area congregate each Sunday. To these Bijagós Christians, the Animistic belief in another world which is the realm of sacred spirits, lies contrary to their contestation of both heaven and hell. As one Protestant described: "*We Christians, we say that the iraan is like Satan or a demon"*[49]. Rather in the Protestant villages, an individual who has received missionary training (normally in Bubaque[50]) is called upon to lead varying Christian ceremonies.

Despite the many evident divisions between Bijagó animists and Protestants, points of converging belief are also recognisable. For example, causes of ill health are

[49] <*anos crientes, no ta fal ke ira'an- i suma satanas o um demonia*>
[50] This individual would have been recommended by foreign missionaries on Uno as capable and dedicated enough to travel and undertake training

treated with suspicion by both; and considered an act of ill-intention. One Protestant individual remarked: "*There are plants here in the bush, that you can cut and in that same moment you can explain- that you want bad for somebody or for something*[51]". While another explained: "*You could take a stick and carve it into a form and say that this is an <iraan> and then using that stick, you can crack open an egg and at that same moment wish that somebody was to become ill*"[52].

3.2. Uno Island: An Overview

3.2.1. Wider Infra-Structure

On Uno general infrastructure appears a legacy of a recent Colonial past. During Portuguese colonial times an administrative out-post was established on the island close to the village of An-Onho, for the purposes of population control and tax collection. Today known as "*posto*" the administrators' house lies in ruins, but several state-services do function in the vicinity, albeit intermittently. There is a hospital offering a drop-in clinic[53]; a secondary school (constructed during the early 1990's the only one on the island) and a police-station where a resident officer is present. There is also a compound for the 'new' administration[54], re-established post-independence. Around these ruins stand the oldest cashew trees on the island dating back to the 1940's; before planting spread down into Cabuno. There are no tarmac-surface roads and no cars on the island. However, the administration does own a

[51] *<Tambem, i tene parantas, li proporio no matto, ke bo pudi corta i fala na ke momento; N'misti mal...pa ke talfalano o ke kusa>*
[52] *<Bo pudi toma um pau, labra na um forma i fala- ke es i ira'an. Bo pudi abri ovo di galinha e fala- "n'misti talfalano esta doente>*
[53] When salaries are received and staff are in residence
[54] A chief administrator is periodically present on the island; an assistant-chief-administrator is in full-time residence.

motorcycle and the missionaries a quad bike; both of which can travel on major pathways, even during the extensive rains of June through to September. Otherwise all transport is by foot.

A port landing area (or stone jetty) was assembled by the Uno Islanders (south-east of An-Onho) "under force" during the Portuguese era. All residents on Uno were asked to participate in restoration of this landing area during 2010, when newly-elected PAIGC President Bacai Sanha donated cement and gravel reinforcements, reportedly in return for receiving voter support. Despite efforts to repair the rather precarious landing site no individual or group owns or operates a motorised boat. Instead, private motorised transport canoes arrive each Monday at An-Onho, *en route* from Orango Island. These travel to Bubaque (approximately 4 hours) then on to Bissau the following day. A return passage leaves Bissau for Bubaque every Friday reaching Uno on Saturday. This circular service provides the only regular means of reaching and leaving the island. This is also severely limited during the rains by storms and general poor weather. Passing between Uno and Orango Island, in a motorised boat is a journey of less than an hour. Yet, historically, the Uno Islanders used paddle-boats to cross the Orango channel, to reach Bubaque, Bolama and even Bissau City. They did so in order to participate in communal, competitive and commercial activities. With its stone landing area and the administration buildings above, the port of An-Onho is today the seat of commercial activity on Uno Island and hosts a number of resident traders or merchants, mainly of the Fula ethnic group. Commerce is limited however, given that Uno has no electricity or running water and

very limited mobile phone coverage[55]. The administration did previously operate a VHS radio, but this is no longer in working order. Houses across the island are single-story mud-block structures, with grass thatch. The use of cement in construction is rare. Buildings (houses, granaries, food-stores) are not normally purchased, but rather built by an individual or family unit as required. Due to the precariousness of the materials[56] buildings are commonly infested by termites and re-built every 5-10 years; re-thatching events are once every two rains. The population survives through the use of communal (and occasionally private) wells for drawing water. Each household uses a three stone hearth for cooking food using fire-wood.

3.2.2 Bijagó Animism across Uno Island

The Animist *fanado* on Uno is measured not only in age-grades, but also in decadal time at a larger geographical scale. Uno Island is sub-divided into ten initiation groups (Figure 3.3) each composed of a single large or several small villages. One Bijagó clan claims the leadership role in each of the ten groups. In total, three initiation groups (*Ancadogo, Ancomaca and Ancoveno*) across the island are now defunct; the populations therein having converted to Christianity. For example, <*Ancomaca*> which formerly existed in Cabuno Area has been redundant for several decades and since then, animist individuals from the *tabancas* of Ussambar, Ancobara and Ankarabe protesting conversion to Christianity and wishing to undertake initiation, have been accepted into the <*Amutai*> group.

[55] As An-Onho is located on the boundary of the 25 km coverage zone serviced by Bubaque mobile phone transmitter masts

[56] With cement rarely used, the earth and water blocks are known as <*precaria*> or precarious

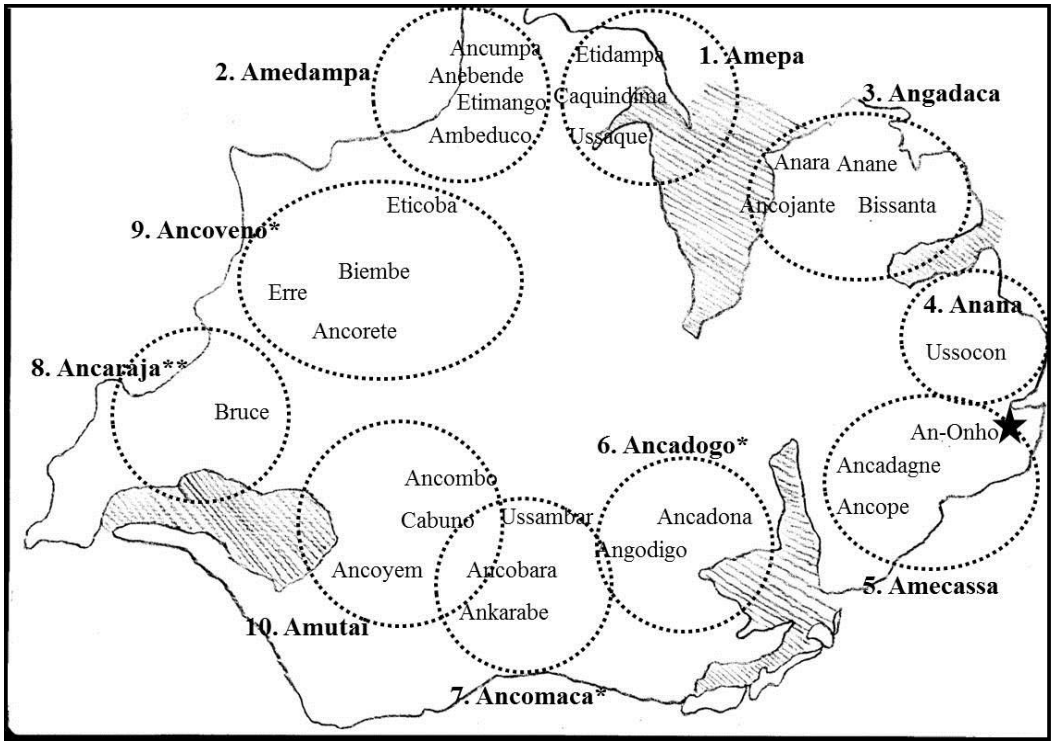

Figure 3.3: The ten initiation groups on Uno island (where * marks defunct/ converted groups and ** a group in which individuals from neighbouring Unhocom Island participate

In the past, when all ten initiation groups were functioning, one *fanado* ceremony for the *cabarros* of each initiation group was undertaken each year, for a decade. That way, within ten years, Uno island had produced an entire cohort of new initiates; one from each of the ten groups. As soon as one group had undertaken the ceremony, the new post initiates within the group would commence their payment of debts to their village elders. After ten years, the first initiation group would enter the ceremony again, this time those initiated during the previous ceremony would instruct the new initiates and simultaneously complete their duties. Each decadal group of cohorts across the island has a name (Table 3.5). For example, all individuals on Uno initiated during the interval 1990-2000 (from all of the island initiation groups) are

known as the "*Chinese*". All warriors initiated between the 1970's and 1980's are known as the "*Americans*".

Table 3.5: Generational (decadal) Initiation Group-Names on Uno

Decade of Initiation	Name of Group
2010+	Cubans <cubanos>
2000-2010	Japanese <japonaises
1990-2000	Chinese <chineses>
1980-1990	Russians <russos>
1970-1980	Americans <americanos>
1960-1970	Fouloupes <felupes>

As a result of this intricate system, on Uno Island an Animist individual will boast several identities; as a Bijagós clan member (through both matrilineal and patrilineal lines), a kin-group, a village resident, a member of a cohort (age-grade); after initiation as a member of an initiation group and finally as a member of an island-wide decadal initiation group. Protestant individuals share a few but not all of these identities.

3.2.3. Administrative Control of Law and Order

The twenty seven *tabancas* on the island are today grouped into seven administrative sectors (Figure 3.4). Each village is represented by an individual known as the State committee representative or <*committee d'Estado*>. This position, which extends across the archipelago, Bordonaro explains (2009) was born from the ideology of the PAIGC and intended as an instrument of political mobilisation. On Uno, the position is today secured through consensus voting, with re- election occurring every twelve

months. No cash salary is received in return of the role[57]. All individual 'committee members' are responsible to the Chief Island Administrator based in An-Onho; to whom difficulties in controlling law and order at the village level are, in theory, reported.

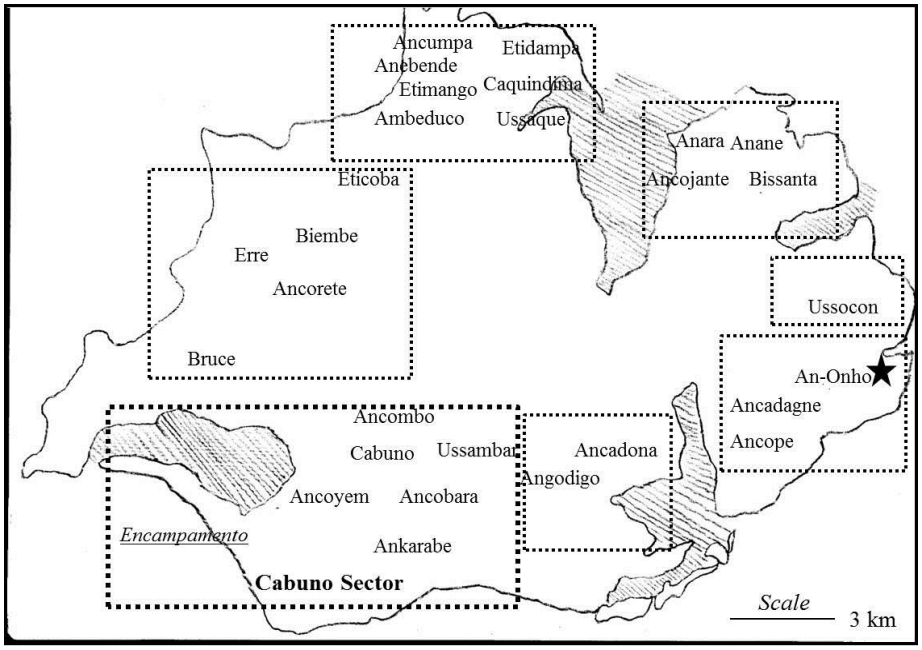

Figure 3.4: The seven administrative sector of Uno

3.2.4. Productive Land and Resource Use

Under customary law, Bijagós land chiefs <*chefi di chon*> in Cabuno Area are clan descendants of original settlers to the area. In Cabuno, the territory defined under this law, includes the beach area now occupied by the in-migrant fishing encampment. Other villages on Uno include land territories on adjacent islets, located off-shore. For example, the Islet of Enu belongs to the village of Ancamona, N'Rok to Anane, Edane and Akinka to An-Onho and Anongona to Ussocon. None of the villages in

[57] Although there are benefits to the appointment to the individual as the position is associated with status and a gatekeeper role

Cabuno Sector include offshore islet areas. The resulting island demography as 'clan lands' is illustrated in Santos-Lima (1947). Given the patri-local nature of kinship and residency, land inside each village territory used for the construction of homesteads, granaries and food-stores, vegetable gardens and planting of permanent fruit orchards (mainly cashew) is passed from father to male offspring. Sons then share the responsibility of inherited land with their wives after marriage. In the case that a female offspring (daughter, sister) returns to a natal homestead (for example after a divorce or if injured or widowed) use of a brothers' land can be negotiated. Individuals remarked that a father would divide his land and livestock assets equally amongst his sons because "*you could never know who would turn out to be the farmer, the herder; or the one who would follow his education and leave the land altogether*". Rice paddies are passed from father to son after the latter has undertaken the initiation (as an animist), or has undertaken a Christian marriage ceremony (as a Protestant). Only at this point does a son undertake rice cultivation work outside of (but in addition to) the paternal rice cultivation area and only then can he claim the harvest yields of this area as his own. Cashew orchards are shared and inherited by both sons and daughters. Recipients in use of that orchard often relocate closer to its locale during the period of the cashew harvest, to optimise upon collection of fruit and nuts. Access rules to other village resource areas are restricted by gender or by clan The reed bed of Cabuno village for example, is for female only use. A *ronia* is called and a harvest date agreed outside of which removal of reeds is prohibited. Access to other areas may be prohibited by religion. For example, Protestant Bijagó

villages on Uno are forbidden from tapping and drinking palm wine and thus from entering the palm groves for this purpose[58].

3.2.5. Sorcery and Social Control

Despite a degree of State influence over each village on Uno, in the form of the Island Administration, Bijagós Animists draw upon their own beliefs and hold great faith in the *iraan* of the other world. This belief guides the day-to-day Bijagós social system of order and peaceful control. Belief in the spirit-world is such that any wrong doing in the present, is considered evident to and punishable by the *iraan*. Village inhabitants (often including Protestants) behave accordingly with this belief.

Valuable possessions are typically protected using a powerful sorcery <*manji*>. *Manji* is instigated by organising a *ronia* with the village Spirit Priest <*oronho*>. During such a meeting, offerings of palm wine are made to the *iraan*. The *oronho,* on behalf of an individual will then ask of the *iraan* that a physical space or an object is protected; and anyone wishing harm or bad will meet misfortune. Fields, trees, animals, buildings; everything protected by *manji* is clearly marked, or adorned with decorations and handmade ornamental symbols. In this way, anyone thinking to commit wrong is warned of the consequences. *Manji* is used in particular for example, when individuals or larger groups are absent from a village; for example if travelling, working in another village or in ceremony. If whole villages are vacated, an entire area may be closed under protection. Similarly, in the event that a crime

[58] Cashew wine is produced and consumed by Protestants on Uno, although the extent to which this is 'allowed' was disputed

(theft or damage to property) is committed, a *ronia* is used to identify perpetrators. Again, offerings are made to the *iraan* and punishment of individuals (known or unknown) requested.

3.3. Fieldwork Phase II (January –August 2009)

The second (post-pilot) phase of fieldwork for this thesis was interrupted by the assassination of 'Nino' Vieira (described in Section 2.2.3) in March 2009. This was succeeded by a military take-over, hence the description of Fieldwork Phases II and Phase III (which follow).

3.3.1. General Activities

Following the pilot study, I returned to Guinea Bissau in January 2009. Before moving out to Cabuno, I spent three months (January – March) in Bissau City undertaking daily afternoon classes in Portuguese Kriole[59]. It was during this interval that Nino Vieira was assassinated. Once the curfews and associated problems eased I returned to Cabuno (April 2009). I found the situation on Uno to be stable and the study was able to resume.

I moved into a house in the Animist *tabanca* of Ancoyem (a member of the Amutai initiation group) just next to Cabuno village. I purposefully chose Ancoyem as a place to live due to its position next to the main through-fare to the in-migrant

[59] I did attempt to learn the Bijago dialect of Uno, but given time constraints and the nature of the study as a comparative cross-cultural analysis, I decided that pursuing Kriole language was the most efficient communication method

encampment. The house I resided in belonged to a female-widow and her family group. This household therefore lay adjacent to the widow's brother, who had offered the house as living space. I paid the widow a monthly fee to rent a small room. I also negotiated access to communal food and washing facilities and a share in household chores (mainly drawing water in the early morning, collecting fire-wood). I used the next three months (May - July) to practice Kriole, organise participatory wealth ranking exercises; continue understanding village life and plan out my data-collection activities. At this point I also began participating in largely female organised farm-based activities including thatching and collecting cashew fruits. I worked both for the household with whom I resided; but also inside the wider village.

Referring back to my earlier notes and census (made in 2008) it became apparent that few changes in occupancy were occurring inside Cabuno area for the Bijagós. This was perhaps largely explained by the low-level tensions in the capital, which did not encourage people to travel off the island. The situation in Bissau City however was not so bad, that any exodus of city dwellers had occurred. I also resumed my visits to the in-migrant fishing encampment. Here, it became apparent that residency was more dynamic. Some shelters had been vacated by 2009. Others were occupied by new arrivals. There were however, some residents that had been recorded during the 2008 census that were still present. Inside the encampment, I started going to sea and began to learn the fishing techniques of using fine monofilament nets, the larger heavier gill nets and long-lines. With work in the encampment taking more time and the path between the camp and Ancoyem frequented by hippos, I decided to

construct a temporary house inside the encampment, just like the other settlers. I purchased the wood for the frame from a wood-cutter inside the camp. Both the woven reed mats (to make the walls) and the grass thatch for the roof I bought from women in Ancoyem. Finally, my Bijagó assistant and interpreter from the preliminary pilot-visit came to help me build the house. Unfortunately, villagers in Cabuno Area, seeing the encampment as a "dangerous" place for me, advised the house to be built far away from all the others, on the fringe of the encampment. Within weeks the house (which was not very secure) was broken into, in a seemingly opportunistic manner and several possessions (shoes, clothes, kitchen utensils) looted subtly while I was undertaking work in Ancoyem. Given that the magnitude of these losses was rather small, and not wishing to make a fuss, I left the encampment house practically empty while working inside the Bijagós villages from then on.

3.3.2. Participatory Wealth Ranking

Participatory wealth ranking was adopted during this earlier phase of fieldwork as a means of qualifying local attributes associated with wealth[60]. The main objective was that certain 'wealth attributes' could be realised and then translated into a tangible list of assets (natural, physical, human, social and financial) that could be quantified in a household survey. The wealth ranking exercises therefore acted as a precursor to sampling focal households. They also played a critical role in informing my understanding (as an outsider) of the finely tuned differences between wealth and poverty in an unfamiliar landscape. By nature, wealth ranking activities provide a

[60] Or an absence of which was associated with poverty

means of involving local participants in the appraisal of their own community, through the categorisation of households (within that community) into locally defined groups (Grandin 1983; Scoones 1995). This generates a relative measure, a scale in which each household exists relative to others, inside the same locale; based upon local perceptions rather than arbitrary survey indicators (Scoones 1995). A triangulation procedure (or else repetition of the ranking exercise with different groups within the same community) provides a means of exploring potential variation in perceived wealth, as defined by different participants.

(i) Wealth Ranking Method

Wealth ranking activities were undertaken separately inside Ancoyem and Ankarabe; and inside the in-migrant fishing encampment. In the Bijagós villages, activity groups were small, comprising between two and three, same-sex individuals; members of an age-grade (or the same age cohort). This procedure was adopted after several trials during which it was commented that: "*everybody here has the same*"[61] and that it is "*bad luck*" to discuss other peoples' fortunes or misfortunes. In response to these concerns, I explained that a participatory approach to understanding wealth (and in contrast, poverty) was a way in which participants might feel able to emphasise their experiences of these concepts. I explained there was no need to quantify the attributes of others (which would be considered bad luck) but rather, if possible to reflect upon which household characteristics might be beneficial in attaining wealth. I emphasised that this activity was proposed as a means of

[61] <*anos tudu mismo ali*>

empowering a Bijagó voice (Baulch 1996) and I hoped a means through which local concepts of poverty and deprivation might be brought to a wider audience.

Working in smaller groups reflected a compromise as it gave the participants increased privacy. Participants were most at ease with their own age-grade colleagues and welcomed the knowledge that the exercises were being repeated across the village with different groups of young and old alike. Participants were only ever asked to rank the households identified within their own village. Inside the in-migrant encampment wealth ranking activity-groups were again small. However, unlike in the Bijagós villages there was little hesitancy to ranking. This led to open discussions surrounding the variable circumstances which defined the different in-migrant households.

In both Ancoyem and Ankarabe villages; and again inside the in-migrant encampment; all names of household heads (as recorded during the initial pilot visit and updated following my return in 2009) were written onto cards. These cards acted as prompts to encourage participants to include all the homesteads that had been formerly identified inside each settlement[62].Characteristics of wealth and poverty emerged through discussion during each activity. Participants were asked to allocate each household within their village[63] (or inside the encampment) into three groups of similar "wealth circumstance" and to define the characteristic attributes that these households shared. Initial discussions of the group as a whole revealed wealth attributes associated with each group. These characteristics were supplemented with

[62] In the case of the in-migrant camp residents no longer present were omitted from the activity
[63] Physically with the use of the cards

further descriptions as each household within the group was discussed in turn. The groups (and each household associated with that group) were then given a score (1= the very poor, 2 = the middle poor and 3 = the least poor). As wealth ranking activities were completed with groups of older and younger, male and female participants, each household accumulated a score. Eventually, after all repetitions of the exercise were completed, a final score, based upon the average of all exercises, was given to each household.

(ii) Key Differences in Wealth

Characteristics of wealth differed strongly between the Bijagós villages and the in-migrant encampment, although less so between the two villages of Ancoyem and Ankarabe (Table 3.6). For the Bijagós, wealth emerged as multi-faceted; comprising natural (ownership of rice paddies[64]and cashew orchards), human (individual household member age and health status), social (origins inside the village, diaspora in the city) and financial asset (ownership of livestock or animals) dimensions. Less emphasis was placed by the Bijagós upon physical asset ownership.

In contrast, definitions of wealth inside the in-migrant encampment were principally associated with physical and financial elements (motor, boat, gear ownership) on the one hand linked[65] and on the other distinct. The "*really wealthy*" it was said, do not have to bother with ownership of fishing material, for they have "*cash*" with which to buy fish. The difficulty with applying this wealth ranking method to the in-migrant

[64] Known as kriole as <*bolanha*>
[65] Ownership of these assets is an indicator of improved wealth

encampment residents was that only a narrow window of existence was visible, that within which individuals and households appeared on the Island of Uno. This window revealed nothing about assets held and wealth accumulated by the in-migrants outside of the Uno encampment. It is possible that when individuals ranked others, they were aware of outside circumstances off the island and this knowedge influenced their ranking, but it is also possible they were not aware. The wealth ranking exercises did however make all attempts to focus upon this wealth held and visible on Uno, for the purposes of simplicity and comparability.

3.3.3. End of Phase II

By July 2009, the presidential take-over campaign was in full motion. During August I travelled back to Bubaque and using a desk-space inside the IBAP office was able to type up my field-notes (and upgrade report) using their solar panel charged electricity supply. In September, I returned briefly to London.

Table 3.6: Attributes of the least poor, middle poor and very poor, in Ancoyem, Ankarabe and the in-migrant encampment (2009)on

Wealth Group	*Bijago Ethnicity*		*Multi-Ethnicity*
	(i) Ancoyem	*(ii) Ankarabe*	*In-Migrant Encampment*
Least-Poor	*Health/ Men-Workforce* *Plenty bolanhas.* *People that have health and can use it (if they are not lazy).* *Have means/ force* *Have force* *Have origins here* *Have everything (land, animals, work power-men/youth)* *Have relatives in Bissau*	*Many animals* *Family (close) in Bissau* *Health* *Education* *Bolanhas (on good soil)* *Zinc roofing* *Have money* *Have family in Bissau.* *Many animals, family in Bissau* *Fertile rice paddies*	*These people do not go to sea: they either (i)have a motor and a boat to use it with and plenty of gear to catch the fish or (ii) they are a trader with money to buy fish*
Middle-Poor	*Moderate health* *Little strength* *Fewer men* *Moderate bolanhas* *Many children.* *People that have moderate health and are moderately able and willing to work.* *Moderate means* *Moderate strength* *Have origins* *Have small land, animals, work power- men/youth*	*Moderate animals* *Some family (distant) in Bissau* *Moderate health* *Little education (may have professional skills/training)* *Moderate bolanhas.* *Have animals* *Have bolanhas on good land*	*People going to sea-* *Have a paddle boat and plenty of gear*
Very-Poor	*Sickness.* *No strength/ No men* *No land.* *People that are sick/ lazy and do not / cannot use their strength.* *Have no means/ no force* *Foreigners* *Have nothing (no land, animals, no work power-men/youth)* *Have no family off island*	*No animals* *Have small number/no animals* *Have bolanhas which don't produce* *No family in Bissau* *Poor health* *No education* *No bolanhas* *Sick and Old People; few men to work*	*People going to sea-* *Have nothing. No boat, no gear. Only strength to work for others.*

3.4. Fieldwork Phase III: (September 2009 – September 2010)

3.4.1. General Organisation

Within two weeks, I was back on Uno and embarking upon a rigorous routine of data collection. This I had decided would involve working inside Ancoyem (Ankarabe and the wider Bijagós population in Cabuno) for two weeks. Following this, I would transfer to the in-migrant encampment where I would stay for a further two weeks. This time, I rented a room inside the in-migrant encampment.

For the next twelve months, I rarely left the island, working with focal households as well as participating in activities within each wider community. I had decided to focus specifically upon Ancoyem and Ankarabe as representative examples of rural Bijagós villages. These two sites were similar in terms of size (occupancy), they were relatively close and yet they were marked by differences in religious affiliation. Ancoyem is an Animist member of the initiation group (*Amutai)* while Ankarabe was converted by Protestant missionaries during the 1960's.

Data collection involved five core-activities. These included (i) a focal household survey characterised by the attributes of the wealth-ranking activities (ii) individual semi-structured life-history interviews (iii) time allocation spot-checks corresponding to individuals within key focal households; (iv) fish catch landing surveys and (v) a repeat-round focal household economic survey. The household survey and the individual (non-focal) semi-structured life-history interviews were completed within

one session at a pre-arranged time[66]. In contrast, the time allocation, fish catch landing and household economic surveys each formed a continual exercise. This involved repeatedly meeting with individuals, fishing crews and households during the 12 month period. In addition to these core methods, notes and observations were recorded in a fieldwork diary. This acted as a log of key informant (KI) conversations and observations made during participation in agricultural tasks and fishing excursions.

3.4.2. Focal Households

Inside the *tabancas* of Ancoyem, Ankarabe and within the in-migrant encampment I focussed upon key or focal households. For the Bijagós, only households inside Ancoyem and Ankarabe, that hosted a male individual who could potentially fish, were included. As a result female only households were not. This decision emerged out of my intention that the study should investigate the relative importance of fishing inside the household economy. With this in mind, I decided to not focus upon households without an individual capable of fishing, although I remained close to and did visit often the female only households in the focal villages, of which there were three (in Ancoyem and Ankarabe) collectively.

Given the importance of gear ownership inside the in-migrant encampment, focal 'fisher' households included those headed by (i) fish labourers /workers, (ii) fishing gear (net/ line) owners and (iii) fishing boat owners. The number of households

[66] Although there were instances when the exercises were interrupted and resumed at a later stage

sampled in each group, was representative of the wider camp, as identified during the population census of July 2009. Research inside the in-migrant encampment also included non-fishing 'trader' households (Table 3.7) identified as such, by their lacking an individual who went to sea.

Table 3.7: Focal households of Ancoyem and Ankarabe and the Encampment

Site	Ancoyem Village	Ankarabe Village	In-Migrant Encampment	
			Fishers	Traders
No. of Households	13	16	21*	17

* Of which: Fish Labourer Households (n = 10), Gear-Owning Households (n = 3), Boat-Owning Households (n = 8)

3.4.3. Research Assistants (RA's)

(i) An Introduction

As a participant, the anthropologist uses fieldwork to gain information about the other, knowledge often gained by close and repeated interaction with specific individuals (Freidenberg, 1998). As with other studies involving a mixed-methodology practiced in a cross-cultural setting, the help of research assistants (RA's) was enlisted on Uno to help with data collection for the time-allocation spot-check observations, repeat-round household economic surveys and the semi-structured life history interviews.

Assistant (A) had been initiated during 1993 and was therefore a member of the <Chinese> group. He was born and had always lived in Ankarabe, but his father was an Animist. So, resisting Protestant conversion (A) had joined the initiation cohort of

Amutai (led by Cabuno, Ancoyem and Ancombo villages). In this way, (A) confided that although he lived in Ankarabe, he knew all about 'those people' in neighbouring Ancoyem. He also advised that many of his friends (colleagues) had been initiated during the 1980's and they were <Russians>. Because of his small-stature, (A) had been kept back and as a result, was one of the oldest in his initiation group. I was introduced to his retired *lambé* teacher (the Baloberro of Ussambar: Appendix Part 2: Photo 1) during whose funeral ceremony, (A) had paraded a flag mounted on a 10 foot pole, a mark of his own respect. (A) had started school in Cabuno aged nine (in 1973). Five years later, he travelled to Bissau in order to claim his identity papers. 'At that time' he explains 'you couldn't graduate from primary school without papers, there were too many people wanting to study'. He paid for the documents by selling a small-cow that had been donated for this purpose. Two years later, (A) failed an exam and was then forced to drop-out of school as the building closed for re-furbishment. He started to fish using a handnet, and learned to cut the palm-kernels (<cheben>) from which oil is extracted. 'At that time' he explains 'we (Bijagós) didn't have any great need for money'. In 1983, (A) returned to school and aged 19 completed his final primary year. The following September, carrying a pig to sell for school-fee payments, he crossed over to Bubaque Island and entered secondary level. But after completing the year, he returned home to find his father was sick. Soon afterwards, (A) also fell ill and travelled to Bissau where he received a hernia operation. After returning to Ankarabe in 1985, (A) spent the next few years working his father's rice paddies; he was also handnet fishing and cutting cheben. He even travelled to the south of mainland Guinea Bissau (known as Sul) where he passed a few months with his Aunt. But by 1990, (A) was back on Uno and having

joined the initiation group Amutai, he entered the <cabarro> ceremony known as <exongnane> (see Table 3.4). In 1992, he sent a cow for sale in Senegal with his friend, where cloths were then bought for the ceremony <mañake>. 'In that time' he says, 'we (Bijagós) were always covering ourselves in palm oil; we were always in ceremony'. (A) received 43 lengths of cloth from Senegal, which he offered to his paternal grandfather and maternal grandmother. Before the <fanado> began, his group (numbering more than fifty individuals) had then to visit all the shrines <balobas> around Cabuno area. This took several days. Afterwards they ventured out to the bush and stayed for 45 days in ceremony. Following this, they were brought to Ancoyem where they were made to stay inside the <baloba>. Tragically, during this isolation period, news was brought to (A) that his father was gravely ill and pleading permission to leave, (A) was present with his father in Ankarabe when he died. Between October 1994 and December 1995, (A) made his <camabé> payment known as the <garandesa>, to the initiation teachers. He also married and later his first child was born. Following his payment period, he continued to farm, cut <cheben> and fish. In 1998, his second child was born. He was able to earn a little money by travelling to Orango for a few months, working as a labourer on a construction project. Then in 2003, (A) joined a Bijagó mullet-fishing crew, comprising a number of villagers from Ankarabe. They worked in a motorised vessel which made overnight trips to Orango and Unhocom Islands. The catch was kept on ice and after three days transported over to Bissau. (A) stopped fishing however, in 2003, to lead the next cohort through their initiation process for the <Amutai> group. With the <Japanese> group initiated, in 2004, (A) was able to retire into the class known as <lambé>, His third child was born. Then, in 2007, (A's) house was

destroyed by the fire and his belongings lost. In 2008, he assisted as a translator in this study.

Assistant (B) was his mother's second child. He was born in 1979 in the village of Ancoyem shortly after his mother had completed her <fanado>; as a member of the American group in 1973. In 1987, aged 8, (B) started school in Cabuno village and four years later had completed all Primary Levels. He transferred to An-Onho, where he entered Secondary School and after two years moved on to the Elementary School in Bubaque with his peers. He stayed for three years in Bubaque with an Uncle and was able save a little money by walking out from the town at weekends, to cut palm-kernels <cheben> in the bush. These he brought back into the commercial market and sold to those involved in palm-oil production. During this time he completed his 8th Grade. In 1996, aged 17 he was called back to Ancoyem as his father was ill. Weeks later his father died. After staying in Ancoyem for several months he returned to Bubaque. In 1998 he re-entered Secondary School. He also joined the Uno Island working party, a group of pre-initiate <cabarro> boys from Cabuno area, who would offer their services as labourers around Bubaque town at the weekends for a small profit. In 1999, his mother re-married in Ancoyem. In 2000, (B) returned to Uno. He had been brought forward into the <Japanese> initiation group and was required to enter the ceremonial proceedings with other members of Amutai. In 2003, (B) undertook the <fanado> ceremony. Between 2003 and 2004 he made his payments <garandesa> to the elders. He married a girl from Cabuno village and his first son was born in 2005. (B) then worked in rice production for his new family, while

helping his Uncle with herding. (B) assisted with data collection between 2009 and 2010.

Assistant (C) was born in 1982, in the village of Eticoga on Orango Island. Two years later his parents separated and his mother brought (C) to live in Ancoyem. They stayed with an Aunt, also from Eticoga. Three years later, his mother (an <*ogubane*> clan member) re-married, to a member of the <*ominca*> clan in Ancoyem village. At 8 years of age, (C) joined the Primary School in Cabuno and within six years had moved on to the Secondary School in An-Onho. In 2003, (C) made a traditional marriage with Quinta, also an <*ogubane*> clan member from Cabuno village. In 2004, their first child was born while they were all still living in the family home. In 2006, a second child followed. Between 2009 and 2010 (C) assisted Kaiser with data collection in Anocyem village. (C) was due to undertake the fanado with Amutai in 2013. In late 2010 (as this research was drawing to a close) (C) was called up to undertake the ceremony <*exongnane*> as a member of the <*Cuban*> initiation group.

Assistant (D) was born in 1982 in the village of Ankarabe. Aged 8, he was sent to live with his Uncle's family in Bandim, Bissau City. This is known as the land of the Papel. Three years later his Aunt was injured in an accident, so (D) returned to Uno. At 12 years old, he started school in Cabuno and by 1998 had completed his primary level. By then, another Uncle also living in Ankarabe was renting a transport canoe to carry passengers across the Archipelago (between Bissau, Formosa, Uracane and Uno). (D) joined the boat workers as a ticket-collector and baggage handler. They

were paid 15,000 CFA/ month (or £30) and were also fed as a team. Having saved money, (D) joined the Secondary School in An-Onho, in 2002; but then fell sick and never finished his exam. In 2003, he repeated the year, but later dropped out, when his first child was born in the village of Ancobara. Although both his parents were initiated Animists, (D) joined the Protestant youth of Ankarabe and Ancobara and never aspired to undertake the <fanado>. He continued to earn money cutting palm-kernels <cheben> and by 2006 had completed 8th class. During the school holidays, he travelled to Uracane Island and staying with an Uncle, started to work in the small store of a Mauritanian trader. After one year, he was called back to Ankarabe, to help his father farm rice. In 2009 he started working for this research in Ankarabe village.

Assistant (E) was also born in 1982, in Cabuno village. By 12 years of age, (E) had completed Primary School in Cabuno and was enrolled in the Secondary School in An-Onho. Unlike many peers, (E) stayed in Posto during the week with the second husband of his Aunt. In 1997, he travelled to Bissau where he enrolled in Secondary School while staying with a cousin. In 1998, however the civil war started and (E) was forced to return to Uno. In 1999, (E) returned to Bissau and completed 6th grade, but the next year transferred to school on Bubaque Island. His cousin had left Bissau, having moved to Senegal and there was no place for him to stay in the capital. He also made money by cutting palm kernels <cheben> in the scrublands around Bubaque town and that way was able to pay his way through the year. By 2002, (E's) older sister had married and settled in Bissau. By staying with her, one year later (E) was able to enrol in 9th Grade. Unfortunately, in 2003 a national teachers' strike took place as SRP leader Kumba Yala withheld salary payments. All schools in the capital

closed. Unwilling to return to Uno, (E) joined a Nhyominka fishing crew on Nago (part of the Formosa complex in the north of the Bijagós archipelago) where he learned to fish with the gill net. In 2004, he returned to Bissau and enrolled in the 9th Grade. In 2005, he completed Secondary School, only to learn that on Uno, his mother had died. He returned to Uno in 2007, working for his sisters' husband (of the Fula ethnic group) a trader who was buying up cashews, cockles and palm oil. Having saved a little money, (E) moved to Bissora in 2004, where staying with his oldest sister he joined a technical school studying business. By 2008 he was back in Bissau and his first child was born, with his partner, a girl also from Cabuno, known as Keta. (E) and Keta returned to Cabuno in 2009. (E) assisted in the collection of life-history interviews in Cabuno, Ancombo, Ancobara and Ussambar.

Inside the in-migrant encampment, only one RA participated in data collection. The RA was fluent in Temne, Sousou, Fula, Mandingo, English and Portuguese-Kriole languages. On account of his status as an in-migrant, his experiences on Uno were also very different to the other assistants. Assistant (F) was born in Kabala, Sierra Leone in 1970. His parents, both of Mandingo origin, were small-scale traders in the town. (F) was enrolled in Koranic and then English School education. (F) was 22 when the war broke out in Sierra Leone and his family quickly relocated over the border to Guinea Conakry. In the year 2000 in Bissau City, (F) fell in love with a national citizen from the south, of the Nalu ethnic group. Together, the couple travelled from Bissau, via Bubaque to Uno, where he had heard there were many settled Sierra Leoneans. They arrived into the in-migrant encampment in Cabuno with a selection of medicines to sell. Any profits made from selling the medicine

were to be used for the purposes of buying fish, which would be smoked by his wife. The couple worked for many months, buying and smoking catfish, before selling their produce in Kamsar. By 2002, (F) had become acquainted with Bijagós villagers from Bruce, a village to the north of Cabuno sector. These villagers were frequently inside the camp looking for medicine. (F) decided to relocate to live inside the village of Bruce and sell his medicines there. (F) and his wife were first of all offered a room in a house of the village leader. As their business became established however, they were able to move into their own house which they rented. (F) decided to branch out, not only selling medicines but also beads and bracelets which the Bijagós villagers were accustomed to wearing during their ceremonies. In the village of Bruce, their first child, Abdullihi was born. (F) and his family stayed for four years in Bruce, before moving back to the fishing encampment on the beachfront in Cabuno area. (F) described the move as motivated by the price of fish, which was increasing and merited a return to the trade. In 2006, their second child was born. But in 2007, while (F) was travelling to Kamsar in order to make a sale, his wife left the Uno encampment accompanying a trader who worked on neighbouring Caravella Island. (F) returned to find his family gone. He travelled to Caravella, but was unable to persuade his wife to return. Instead he arrived back on Uno, with only his son. (F) assisted with data collection in the in-migrant encampment between 2009 and 2010. The surveys were undertaken in multiple languages and then translated, by (F) into English.

(ii) Possible Influence of RA's on Data Collection and Interpretation

My major insights into Bijagó Animism on Uno Island were derived from working alongside initiated-Animist research assistants. This was not however, a preconceived ideal. I was not aware of the importance initiation held on Uno, prior to this research. In retrospect, my time in Cabuno was transformed by attempting to understand the initiation experience. My first translator in Cabuno, (A) was a retired post-initiate and member of the *lambé* group. A second (B) was (employed between 2009 and 2010) also an initiated individual, nominated to participate in this study by elders of Ancoyem village. This, they explained was firstly on account of his schooling and secondly because he had completed both the initiation process and repayment to the elders. As a result, his workload and official responsibilities were considerably less than that of the younger village *cabarros*. The attitudes of post-initiates resound with confidence in terms of information that may and may not be relayed to outsiders. They are both familiar and assured by the customary rules of secrecy. They simply and politely excuse any enquiry considered too specific. A third assistant (E) was also recommended by older village members in Cabuno to work with this study, on account of his extensive school record. Due to numerous factors, including his family connection with non-Bijagó faith and his girlfriend's religion, (E) was a practicing Protestant holding no desire to enter the *fanado*. His younger brothers however, were both Animists and this gave (E) a unique insight into the initiation ritual.

Unlike other foreign researchers, I was fortunately never required to employ 'official' assistants (Turner 2010). (A) explained that he had been chosen by village elders to accompany me (during my first visit in 2008) because the Chief of Cabuno was fond of him. Others quickly explained that many people in Cabuno pitied (A) because his house had been burned accidentally during the 2007 dry season. When I first visited, (A) was living in a temporary lodging; a side-room of his friends' house with his wife and three children. In contrast, other assistants were related to those holding positions of power within each village. (B's) was the head elder for Ancoyem at the time of this research. The step-father of (C) was the *ominca* clan chief in Ancoyem, a descendent of a former, well-respected (now deceased) <*baloberro*>. Assistant (D working in Ankarabe) was nominated by the village council because of his educational background, but also because he was seen as having a desire to work. In the encampment, Assistant (F) was recommended by the Islamic spiritual leader, the <*immam*>. Despite personal difficulties with his marriage, assistant (F) was a popular individual in the encampment, with a bright reputation as a devout Muslim, who was continuing to work and rebuild his life.

While interpreting the interviewer's role in the production of social knowledge (Freidenberg, 1998) it emerges that the fieldworker (or RA) is the knowing and measuring instrument (Salamone 1979). The research assistants employed in this study therefore, are located at its very core. Each of their individual 'positions' within the social world of Uno, influence their portrayal of society (Temple and Young 2004). This position is considered complex rather than unmediated and straightforward (Temple et al. 2006). Each assistant will certainly have had different

strengths in different interview contexts, according to their training and experience, positionality and personal biography (Bonnin 2010). Furthermore, the position of each RA relative to the researcher is in flux, mediated by continual shifts in power associated in particular with situations involving land=guage barriers (Bonnin 2010).

The decision to employ local assistants had been reached following the initial pilot study of 2008. Inside the Bijagós villages of Ancoyem and Ankarabe, the RA's employed were natal residents of each village. This emerged after participants explained that they did not feel comfortable discussing with outsiders, or individuals from neighbouring villages within the wider Cabuno area. The RA's working with Bijagós households spoke in either Bijagós or Kriole with respondents and recorded written responses in either Portuguese or Kriole. None of the RA's were purely engaged in this research, and all remained closely tied to the positions they held (for example in agriculture or fish processing) prior to my arrival on the island. As a result of employing RA's, the information analysed in this thesis, is secondary rather than primary data (Temple et al. 2006). Information may also have been translated by the assistant prior to or during the course of transcription. These sources of potential bias are acknowledged. Meanwhile, living inside these communities for extended periods of time, meeting regularly with the RA's and trying to interpret their social positions are ways in which attempts have been made to foster not only a sound understanding of what the data comprise but also the context in they were collected.

3.4.4. The Household Survey

This survey was conducted inside focal households and used to quantitatively assess each individual within this sample and subsequently each focal household as a whole. Assessment was in terms of the "wealth characteristics" identified during the participatory wealth ranking exercises. Two household survey data-sheets were designed accordingly (see Appendix 1). One, for the Bijagós households, included references to land and livestock assets. A second, for the in-migrant fishing households, referred only to assets held inside the destination area (Uno Island) given that information regarding assets (such as land or livestock) held in the place from which in-migrants originated could never by confirmed or contextualised. All focal Bijagós households in Ancoyem and Ankarabe were assigned an identity code. Every individual occupant of the household was interviewed and described in terms of: Gender, nationality, ethnicity, Bijagó clan membership (maternal and paternal), religion, age, age-grade, initiation group (animists only), birth place, years living on-site and education level. Individuals were defined as either the household head or a non-head resident. Individuals were further categorised as either a 'dependent' or 'independent' members. Dependents were considered to be both the very young (below *canhocam* and *campuni* age) and the extremely old, which respondents defined as post *odone* status (from 60+ years, as outlined in Table 3.3). Bijagós households were summarised in terms of ownership of natural (land) and livestock resources[67]. Each household member was asked to describe lowland rice paddy ownership, in terms of number of paddies owned and the mechanism behind that

[67] Given that the in-migrant residents did not own agricultural land plots on the island and ownership of animals rarely extended beyond a few chickens, this section was not applied to the encampment.

ownership[68]. Individuals were asked to describe the rice-variety planted during 2009 and finally the rice yield from the 2009 harvest[69]. Similarly, individuals were asked to describe ownership of upland (elevated) rice production areas (or swiddens); field locations, attainment mechanisms, the rice varieties planted and yield (also for 2009). Ownership of cashew orchards was approached in a similar manner. In terms of livestock and small-animals, individual household residents were asked to quantify the number of cows, pigs and goats, under their ownership. Finally, Bijagós households were questioned regarding ownership of fishing materials. Very few dug-out fishing boats[70] were present inside the Bijagós villages. Instead fishery assets were dominated by hand-net and gill net ownership.

Information regarding the in-migrant encampment households was documented in a similar way. However, rather than clan, in-migrant individuals were defined in terms of nationality and ethnicity. Individual household members were also asked about their residency time on Uno Island. In-migrant education status was difficult to discern. Schooling had been undertaken in various countries and therefore in both different languages and under various post-colonial regimes. Given the difficulties in translating education classes or grades across national borders only the language of educational training was recorded. Individual ownership of physical (fishery-related) assets was recorded for all focal household members. These included monofilament nets, gill-nets and long-lines; canoes made with boards, both smaller paddle-powered and larger vessels with fitted outboard engines.

[68] As belonging to self or borrowed; or belonging to an extended family member
[69] Data collection ceased before the harvest of 2010 and so rice paddy yields refer to 2009 only
[70] Only two boats were observed during this study

A number of Bijagós household attributes, recorded during the Household Survey correlated significantly with wealth rank[71] (Table 3.8). These included proportions of 'independent adults' and 'dependent children' and ownership of 'gill-nets', 'rice paddies', 'cashew orchards' and 'heads of cattle'. Values for all these attributes, with the exception of 'proportion of dependent children' were found to increase with wealth status. For the in-migrant households, 'household size or capita', the 'proportion of independent adults', 'proportion of independent adult males', the 'number of independent adult females' and the 'proportion of dependent children' all varied with wealth status (Table 3.9). The 'age of the household head' and the 'number of years household head had resided on Uno' were also found to vary significantly with wealth status. All attributes, except 'proportion of independent adults' and 'proportion of independent adult males' were found to decline with wealth status.

[71] Here using the average "wealth rank" score calculated for each household after the participatory exercises

Table 3.8: Bijagós household attributes correlating with wealth rank status; quantifying the differences in Bijagós household attributes between wealth groups

Attribute	Variable	Variable Description	Pearson's R	*p*	Very Poor	Middle-Poor	Least Poor
Demographic	PIA	HH Independent Adults (prop)	0.35	*0.03*	0.47	0.5	0.8
	PDEPCH	HH Dependent Children (prop)	- 0.31	*0.05*	0.40	0.35	0.06
Fishery Assets	GN	HH Assets: Gill-Net	0.43	*0.01*	0	0.16	0.5
Natural (land) Assets	BOLWKD09	HH Assets: Rice Paddies Worked 2009 (number)	0.39	*0.02*	1.3	2.7	4.5
	BOLWKD10	HH Assets: Rice Paddies Worked 2010 (number)	0.61	*<0.01*	2.1	3.75	12.5
	BOLYD09	HH Assets: Rice Paddy Yield 2009 (kg)	0.34	*0.03*	98	207.9	285
	CASH09	HH Assets: Cashew Yield 2009 (kg)	0.35	*0.03*	121.6	183.3	325
Livestock	COWS	HH Assets: Cows	0.33	*0.04*	2.4	8.5	17

Table 3.9: In-migrant household attributes correlating with wealth rank status; quantifying the differences in in-migrant household attributes with wealth status. Here the "traders" are included as a point of reference

Attribute	Variable	Variable Description	Pearson's R	*p*	Very Poor	Middle-Poor	Least Poor	-
					Labourers	Gear-Owners	Boat-owners	Traders
Demographic	CAPITA	HH Size (capita)	0.438	*0.003*	1.41	2.00	4.00	2.60
	IA	HH Independent Adults (number)	0.454	*0.002*	1.23	1.75	2.50	2.00
	PIA	HH Independent Adults (proportion)	- 0.350	*0.017*	0.96	0.94	0.75	0.79
	PIAM	HH Independent Adult Males (proportion)	- 0.382	*0.010*	0.84	0.79	0.34	0.55
	IAF	HH Independent Adult Females (number)	0.360	*0.014*	0.36	0.50	1.50	0.80
	DEPCH	HH Dependent Children (number)	0.277	*0.048*	0.18	0.25	1.50	0.60
	PDEPCH	HH Dependent Children (proportion)	0.350	*0.017*	0.04	0.06	0.25	0.21
	AGE	Household Head: Age (years)	0.430	*0.004*	35.45	48.13	51.50	45.60
	YRSUNO	Household Head: Total years passed on Uno	0.337	*0.021*	2.33	2.50	4.89	1.77

3.4.5. Individual Semi-Structured Life-History Interviews

Life-histories were considered an appropriate method to examine the occupational significance of SSF relative to other occupations with which individuals in the study area had engaged. The intention was to use the life-history method to understand how livelihood pathways and strategies had developed by investigating individual beliefs, needs, aspirations and limitations which had shaped entry in the commercial SSF sector (Murray 2001; de Haan and Zoomers 2005; Scoones 2009). This qualitative information was considered a back-drop upon which current livelihood patterns had emerged and the focus was on collecting as many histories as possible from inhabitants of Cabuno area (Bijagós and in-migrant[72]) to provide as rich a background as possible to the current context in which people were living. Adoption of this method was inspired by a desire to understand (i) whether Bijagós individuals (clearly lacking elaborate fishing equipment in 2009) had ever owned fishing equipment and therefore been involved in fishing in the past and (ii) what had led in-migrant camp residents into fishing.

All interviews were recorded in longhand (for an example, see Appendix 1). Following collection, translation[73] and transcription of the original interviews, responses were coded in-line with the themes of enquiry, in order that analysis at the individual level could be aggregated to explain complex livelihood strategies at the higher population level (Scoones 2009).

[72] Including in-migrant male fishers; and male and female fish-traders
[73] From Portuguese and Kriole

Before commencing two informal participatory workshops were held with RA's inside the Bijagós village and with the RA of the in-migrant encampment. There were two aims to these workshops. Firstly, to discuss, practice and standardise the method through which the life histories were to be recorded. Secondly, to identify key events, in the history of Uno Island, Guinea Bissau and the wider region; which could be used as "bench-marks" or "prompts" in the time-frame of an individuals' history. These events were principally social, economic and political cornerstones in the histories of the participants' places of origin. Collection of life-history material was on-going between September 2009 and September 2010. Follow-up meetings with the RA's were held regularly during this interval. These meetings provided an opportunity to read-through and discuss each history; confirming the content of the interview, translating any unknown language discrepancies and discussing any problems encountered with the methodology.

The structure of the interview comprised three main sections. These included (i) the respondent principal characteristics (ii) respondent entry into and (iii) respondent experience inside commercial SSF. In terms of the principal characteristics, questions to Bijagós and in-migrant respondents varied most significantly with respect to (i) clan, nationality and ethnicity, (ii) status as a fisher or fish-trader (in-migrants only) (iii) age-grade and year of initiation and (iii) education type.

In order to determine entry strategies into fishing, respondents were asked to "locate in time" and describe their first working occupation[74]. This occupation was defined in terms of the respondents' age[75] and education-status at entry. The occupation was also framed in terms of a contact (who offered the employment); place (location in which job occurred) and whether the employment outcome was paid or unpaid. This process was repeated when a respondent indicated or identified a change in occupation (or vocational status). The respondent was then asked to describe the circumstances surrounding or leading to this change. Subsequent occupations were "located" in an identical manner (in terms of year, individual age, education-status, contact, place and payment) until a point at which the individual described their "entry into fishing"[76].

Once an individual had described their occupation as related to fishing, they were asked to describe the fishery[77] in which they worked; their status[78] and the payment arrangement. Again, when individuals described a change in status or contract within the sector[79] these changes were located in terms of year, age, contact, place and payment. All in-migrants by nature of their presence inside the fishing encampment were associated with the fishing sector at the point of interview. In contrast, many Bijagós individuals were no longer involved in commercial SSF operations; instead fishing only for subsistence. These participants were asked to describe their exit from

[74] And here the terms 'employment' and 'occupation'; 'vocation' and 'working experience' are all used interchangeably
[75] And for the Bijagós respondents, age-grade
[76] Occupations included fishery-related as well as actual work "at sea"
[77] The principal gear-type or target catch of the operation
[78] As a worker/ labourer or gear/ boat owner/ fish processor/ fish trader
[79] Working for a different crew, different fishery operation (defined by gear or target catch), or changing status in terms of worker/ labourer or gear/ boat owner/ fish processor/ fish trader

fishing, locating this event in terms of personal time frames; the age, age-grade and the circumstances within which they stopped commercial fishing activities.

Life history interviews can provide detailed contextual information, however a number of limits to the method as applied to this study on Uno are accepted. For example, this study did not account for personal differences in accuracies or time perception. Further triangulation of occupational histories was largely impossible, given the multitude of places from which respondents originated.

3.4.6. Focal Individual Time Allocation (TA) Spot-Check Observations

The time-allocation (TA) method was adopted on Uno to investigate the significance of time allocated to fishing, relative to other activities undertaken, for both the Bijagós and in-migrant settlers. In addition, TA offers an opportunity to document and investigate the activity portfolio of participants, creating a comprehensive list of all the activities with which they are engaged. As a methodological tool, TA was developed in animal behavioural sciences (Altmann, 1974) then applied to ethnographic research in the work of Johnson (1975) studying the Machiguenga of Peru. The original technique involved 'continuous follows' of individuals. However, this procedure was viewed as time-consuming, intrusive and limiting in terms of sample size. This research on Uno adapts the TA method to include an element of time-recall.

Showing how people use time has been recognised as useful in identifying how households meet their subsistence and economic needs, particularly, in cross-cultural situations (Gross 1984). Aswani (2011) adds that time allocation measurements can specifically be applied to examine the different activities associated with commercial SSF.

The TA methodology adapted, was identical across the Bijagós village and in-migrant encampment sites (see Appendix 1). This focussed upon individual males residing inside the focal households (of Ancoyem, Ankarabe and the in-migrant encampment) as outlined in Table 3.7. Males were purposely the focus of the activity, given that fishing was identified as a male-only activity in both the Bijagós and in-migrant locales. The TA activity also excluded focal traders, but rather concentrated exclusively upon individuals inside the in-migrant camp, that did go to sea.

A recall period of three days was used. This was developed following extensive trials of the technique, during which it became apparent that individuals were comfortable in recalling activities with three days as an upper threshold. Each day of the recall was divided into morning (am) and afternoon (pm) intervals. Focal individuals were asked to describe the principal activity with which they had been involved; the location of that activity, other individuals accompanying them in the activity and for whom the activity was undertaken. Details were written in longhand and later coded.

As with the life history interviews a number of caveats are recognised in terms of the TA data. Personal respondent differences in accuracies and time perception are not quantified. Further, it is acknowledged that respondents were sometimes involved in multiple activities within the relevant am/ pm recall time frame. In this event, individuals were asked to recall the event for which they had been engaged for the longest time.

3.4.7. Catch Landing Surveys

Catch composition of the Bijagós and in-migrant fishers was initially intended to be recorded using an identical catch landing survey. However, certain difficulties were identified while developing this approach. For the Bijagós acting as hand-net fishers in particular, fishing occurred while walking the beaches and no specific landing sites existed other than the village to which a fisher could return at any time. A further problem posed by analysing the Bijagós catch, was a means of standardising 'catch per unit of effort' (CPUE) for hand-net fishing; which varies with the number of times a hand net is thrown and even the agility of the individual throwing the net.

Given that the extent of fishing by the Bijagós villagers was considerably less than that of the in-migrant encampment fishers, it was decided that Bijagós fishing effort would be quantified in terms of 'kilos' of fish captured per excursion to catch fish. Information regarding Bijagós male fishing activity therefore emerges in this study as a largely qualitative rather than quantitative accompaniment to the in- migrant analysis.

In contrast, all fish caught by the in-migrant fishing fleet was landed in one place; on the beach, in-front of the encampment settlement. This situation was ideal for the purpose of a landing survey and the resultant data sheet was developed during several weeks of trialling. Five distinct gears were recognised inside the in-migrant encampment. Fine mesh monofilament nets were used in both motorised and paddle-powered vessels and the variable strategy, with which they were operated in each vessel type, merited their nomenclature as distinct gears[80]. Gill nets were also used. Finally two long-lines were differentiated by the size of the J Hook used, as classified by Piovano et al (2010)[81].

The resultant in-migrant landing survey (see Appendix 1) documented the time of landing (date, season and lunar phase), the gear type used and the duration of time the gear had passed inside the water prior to haul. The habitat type and the name of the fishing ground in which the gear had been used were also recorded. Members of the in-migrant encampment were observed to differentiate five main categories of fish catch; bonga shad (*Ethmalosa fimbriata*), catfish (*Arius spp*), croaker (*Psedutolithus spp*), elasmobranchs (*sharks, skates, rays and guitarfishes*) and 'mixed fish' (which included various species including those of *mackerel, snapper, jack and grunt*).

The weight of fish landed was recorded according to these five main-groups. The definition of catch per unit effort (CPUE) varied between gears. For the monofilament and gill nets, CPUE was defined in terms of 'kilograms of fish

[80] Known as motorised monofilament nets (MN-M) and paddle-powered monofilament nets (MN-P)
[81] On Uno, these were referred to as large hook (LL-LH) and small-hook (LL-SH) long-lines

captured per 1000 m^2 (of net area) per tide'. For the long-lines (both small and large hooks) CPUE was defined as 'kilos of fish captured per 1000 hooks per tide'. The kilogram measures of catch at landing were defined in as much detail as possible. However given the commercial and essentially competitive nature of the fishing operations, compromises did have to be made such that this activity did not invade or intrude upon the time of individuals or spoil commercial produce. Collection of the landing data therefore involved several caveats.

The first limitation of the data concerns the landed weight of bonga, catfish and mixed fish. At landing, all catch belonging to these three groups were separated and loaded into metal bowls known as *pans*. These *pans* were carried from the fishing boat, across the beach into the encampment and straight into the processing area of the fish-smoker responsible for that catch. It was not possible to weigh every pan and rather, one pan of bonga or mixed fish was said to hold 10 kg. And as a result of this understanding, inside the encampment, every *pan* was valued and sold in the same way accordingly. Weighing a sample of *pans* confirmed this approximate estimate. *Pans* of catfish meanwhile were widely accepted to weigh slightly more, at 12kg. Landings of these two groups therefore, were summarised in terms of the number of *pans* rather than the actual weight of fish captured. The number of *pans* landed after a fishing excursion was converted to kilograms using the weights assumed by in-migrant encampment members. In contrast, croaker and elasmobranch catch was not measured by the *pan*. Instead each individual fish was weighed routinely at landing by the buyer and fisher collectively, using spring balances. Weight measures of these fish were therefore not an approximation but an actual measure.

The second major compromise involved identification of sharks to the species level. Sharks in general, and particularly sub-adult individuals are notoriously difficult to identify (Beerkircher et al. 2002). Accurate identification usually necessitates dissection, particularly of the head or jaw region as assessment of the dental arrangement is often the only way of complete differentiation (Seret pers. comm[82]). Given the commercial nature of the fishing operations, dissection was not possible. All shark specimens in this study are therefore simply referred to by a generic term 'ground shark'. Similar identification problems were faced with the skates, rays and guitarfishes. The busy nature of the landing episodes, the hustle, the swiftness with which fish were gutted, cut up and carried away from the landing area to huts, stores and smoking ovens; placed limits on the degree to which identification could occur and accurate measurements taken. In a few instances specimens of elasmobranch were measured. A total length measure (TL) was captured for the ground sharks and disc width (DW) for the skates and rays. Disc Width (DW) was measured as the linear distance across the widest portion of the disc and total length (TL) as the linear distance from the tip of the snout to the distal edge of the longer pelvic fin as defined in Bizzarro et al. (2007). However again, given the time limitations this was not possible for every landed elasmobranch specimen.

The third major caveat involved multiple fishing days (known as *campaigns)* or else landings that were made by a boat that had passed several days at sea catching fish. Landings from these excursions were omitted from the exercise completely, given that the fishers described multiple sets of gear during that time and visits to

[82] As explained in person by Bernard Seret, West African shark specialist during a visit to Paris in December 2008

numerous fishing grounds. Multiple day-trips were only undertaken by motorised gill net fishers[83].

A fourth limit, involved boat inspections for fish stowed away or hidden at landing and therefore omitted from the data. Whilst this was not considered a problem for most of the boats and their crews (as many had been involved in participant observation exercises at sea), this was a possible issue during some landings, particularly those that had involved 'illegal' fishing. This concept is discussed further inside Chapter 6, for now it seems appropriate to explain that recorded landings that were made after 'illegal' fishing trips, most likely represent a minimum rather than absolute catch.

3.4.8. Focal Household Repeat Round Economic Survey

A focal household gross income and expenditure survey was designed to assess the significance of fish trade to the household economy. However, the survey also served as a means to understand the totality of products (their diversity and quantity) imported and exported from households inside Bijagós villages and the in-migrant encampment. Each focal household (as illustrated in Table 3.7) was visited approximately every six weeks at a pre-arranged time and all individuals questioned in turn. Where individual members were absent[84] repeat visits were made over successive days in order to ensure comprehensive coverage of the household

[83] Paddle-powered vessels never undertook multiple day trips, except overnight excursions, due to fatigue. Further, motorised bonga fishing trips could not occur as the catch would spoil.

[84] Dependents were defined using the Bijagós age grade classification. In this study, any individual below the class <*canhocam*> (approximately 13 years) and above the class <*odone*> approximately over 65 years were considered 'dependent young' and 'dependent elderly' respectively

economy. In the case that a household, or key independent members, were travelling[85] the visit was postponed until their return.

The Household Economic Survey comprised four main components; goods sold, purchased, exchanged by the household and cash borrowed (see Appendix 1). Recall intervals were incorporated into the household income and expenditure assessment. Firstly, a 'three day' recall-period was used to document all goods sold (income) and all goods purchased (expenditures) by all members of each focal household during the previous 72 hours. Secondly, individuals were asked to recall goods sold and goods purchased (again assessing gross income and gross expenditure levels) during the last month, over and above a fixed price which stood at 2,500 CFA (or £5).

For all transactions, respondents were asked to recall the quantities of products traded and the relevant unit of measure. The location of the transaction was recorded and the identity of the individual with whom the transaction was conducted. In cases where transactions occurred with other focal household, identifying those transactions in particular provided a means of cross-checking (triangulation). Finally a seven day recall period was used when individuals were asked about cash borrowing. All product transactions, the measures, units of measure and locations were recorded in longhand, in order to compile a complete list of goods involved. Prior to analysis, goods lists were collated and categorised. The conomic survey data were split into three focal groups: Bijagós village households, in-migrant fisher and

[85] As occurred in both Bijagós and in-migrant cases

in-migrant trader households. Within each focal group, income and expenditure, three day and one month recall data were separated.

For the 'three day' recall data, the total amount (in CFA) that had been earned and spent by each focal household during all surveys was summarised. This total was then divided by the total number of days to which the transactions referred[86]. This produced an average value of daily gross income and daily expenditure for each household, based upon the three day recall data alone. One month data were treated similarly, only this time the total was divided by the number of months to which data referred[87]. The amount in CFA earned or paid out by each household on a monthly basis was divided by 30 days and added to the average daily household gross income and expenditure. This resulted in a single figure (compiled from both smaller day-to-day and from larger monthly transactions) which described an average day across the year (in gross income and expenditure terms) for each particular household. This technique was used inside the in-migrant encampment on both the fisher and trader survey data.

Exchange (or barter) of cashew nuts for rice was significant inside the Bijagós villages, corresponding with the West African cashew harvest, which occurs between June and August. It became apparent during the course of the study that the Bijagó exchange of cashews was not accurately captured by the Household Economic Survey. The recall time frame which had been posed for household exchanges was

[86] The number of days of transactions being three times the number of survey days given that each survey included one 'three day recall' question

[87] This time the number of months of transactions is equal to the number of surveys as each survey included one '1 month' recall question

one week, but given that the harvest occurred within 1-2 repeats of the survey (approximately every three months), the intricacies of the exchange were void. Two options emerged. Either, to use the one-week recall data for exchanges of cashews to rice as a 'typical household week' and then multiply this exchange value by the number of weeks during which the harvest occurred. However, it was thought that this option would over-estimate cashew production; as households had typically described one bulk transaction when possible, at the end of the harvest to ensure the best price. So, instead at the close of the harvest[88] each focal household was asked approximately how many kilos of cashew kernels had been exchanged.

The number of cashew kilos (for each household) was multiplied by the average price the cashew traders paid for kernels over the course of the 2010 season, which on Uno was 150 CFA (or £0.30 per kilo). This resulted in a total amount of 'cashew equivalent cash expenditure', paid out by each household during the rainy season. This total was integrated into the rainy season monthly expenditure recall data. Adjusted gross income levels were calculated in a similar manner. This time, the kilograms of cashews exchanged by each household was divided by 2; as the exchange rate between cashew kernels and rice was 2:1 across most of the 2010 harvest. This produced a cashew equivalent of rice (in kilograms) which was received into each household by means of exchange during the cashew harvest. This value of rice (kg) was multiplied by 300 CFA, the average value of a kilo of rice on Uno. And this produced a monetary value received into the household in exchange for the cashew kernels paid out. This 'rice equivalent cash income' was integrated

[88] When visiting commercial traders had left the island

into the rainy season monthly recall data. Household gross income and expenditure outcomes (and adjusted outcomes for the Bijagós) were expressed in per capita terms.

Products sold and purchased by the Bijagós households were categorised. Income categories included: Agricultural produce, animals/ livestock, fish/ aquatic resources (including shellfish), island-derived building materials, equipment (for farming and fishing) and income derived from wages or paid labour. Expenditures included: Food, non-food commercial items, equipment (for fishing and farming) and school fees or education. For the in-migrant households, income categories included: Fish, wood and fishing equipment. The category 'fish' was subdivided into catch groups: Bonga shad, catfish, croakers, elasmobranchs and mixed small-pelagics; and into fish states: Fresh, smoked, salted and body parts. The term 'body part' was deployed to include fins (of the elasmobranchs) and swim bladders also known as maws (of the croakers). Expenditures of the in-migrant residents included: Agricultural produce, fish (as categorised above), fishing gear or equipment, food imports, non-food consumer goods and fishing fees or licences. Income and expenditure for the Bijagós and the in-migrant households were defined in terms of the proportion of total household income or expenditure attribute to each of these categories.

3.4.9. A Code of Ethical Conduct

From the outset of work in Cabuno, all attempts were made to conduct this research in as transparent a manner as possible. The purpose, the potential impacts and the institutions from which the research originated were explained to all individuals,

their households, wider village organisations (such as the elders <garandis> and the in-migrant encampment council), village State representatives and the Island Administration in Posto. Explanations were also offered to non-resident officials, traders and visitors who entered the Cabuno area and sought answers to the presence of a European researcher. Furthermore, this openness was extended to offices in the capital city Bissau (notably IBAP, hosting individuals working inside the adjacent Orango National Park). Informed consent was continuously sought from all individuals, throughout the study period, prior to any data collection exercise (including SSI's and informal interviews). Furthermore, all information was regarded as confidential and private to each individual and household. By adopting this transparent approach, the research always aimed to both establish and maintain positive working relationships with the host villages of Cabuno area, including the in-migrant encampment. All attempts were also made to "*be alert to proper demands of good citizenship or host-guest relations*" (AAA, 1996). In this respect, it was agreed with all participants; that on account of certain data collection exercises (notably the household survey, the time allocation spot check records, life history interviews, repeat-round household surveys) taking time, a contribution might be made by the study in recompense. It was agreed the 1kg of rice (with an equivalent value of 500 CFA or £1) would therefore be offered upon completion of each data-sheet. This offering was a standard measure made to all households (Bijagós and in-migrant) irrespective of size. Rice was considered preferable given the apparent difficulties (as explained) in securing food and that data collection involved discussions of cash income and expenditure.

3.4.10. Post Fieldwork Reflections

During the 1960's fieldwork techniques came under intense scrutiny (Salamone 1979). More recently, debates specifically addressing bias and rigour have fostered a need for reflection (Turner 2010). This section reflects explicitly upon two aspects of the study; firstly, my decision to compare two different communities and secondly the difficulties of working inside (or across) a situation of conflict.

(i) Multi-Sited Research

Multi-local (multi-sited) or comparative research projects commonly draw upon a problem or topic which is trans-local, rather than confined to a single place (Hannerz 2003). The topic of SSF in the Bijagós Islands fits this description. As a result, the study focuses upon two sites on Uno Island purposefully selected from numerous alternative locations across the archipelago where SSF activities are being undertaken by in-migrant workers. The merits of choosing Uno were mainly the public transport links held with Bubaque and Bissau, the small distance between the fishing camp and Bijagós dwellings and the relative proximity of the Orango National Park, where fishing by non- islanders is currently forbidden.

This study was therefore always intended to be comparative, to reflect upon a particular problem described within the emerging literature on the Bijagós, namely an opportunistic and undesirable in-migrant SSF industry. From the outset, I was aware of a sacrifice. Rather than total immersion in either Bijagos village life or that found inside a fishing camp, I was about to spread my methodology thinly across two

very different but comparable locales. With multi-sited work, there is a risk of oversight, shallow and non-immersive hit and run ethnography (Geertz 1998). In retrospect, I was certainly never completely trusted by either group. Yet, by virtue of persevering on Uno for two years, the study reveals how SSF in the Bijagós Islands is now critical within a wider West African regional setting.

In defending this methodological decision, I realise that I did find the comparative or multi-sited element of this research incredibly challenging. Beyond the practicalities of organising two living and working spaces; I found keeping up with the social, cultural and linguistic differences between these two groups often overwhelming. In 'explicitly demystifying' this challenge (Van Maanen 1988; cited in Magolda 2000) I confess to my reliance upon an imaginary sliding glass door which I envisioned I passed through, each time I made the three mile walk across the scrubland between the encampment beach and the villages of Cabuno. This helped on some level, to distinguish between the two locations.

In considering what helped residents of the study area to accept my comparative approach, several factors spring to mind. Renting a room in the village of Ancoyem was of huge significance. Furthermore, renting a room that did not belong to either the village elder or clan leader but instead to a widow was seemingly approved. The household group itself comprised four generations and was therefore a highly dynamic place. The youngest individual was born during this study. The 'youth' of the household were Animists and involved in numerous pre-initiation tasks and duties. The brother of the widow was a post-initiate *camabé* who was involved in

leading the pre-initiate activities. Residing alongside this group not only helped the village to accept my presence but also proved to be a rich source of insight. A commitment to participant observation throughout the study period was also hugely significant in encouraging my acceptance. Engagement in agricultural tasks with minimal technology is labour-intensive and by volunteering to work with numerous female work parties, my willingness to gain insight into the meaning of 'suffering' was also seemingly valued. In the domain of the fishing camp, I participated in going to sea, which is considered not only exhausting but also highly dangerous. My first expedition to fish was an all-night venture by paddle boat with long-line equipment in pursuit of catfish. My job was to bail the water from the bottom of a very leaky canoe. The work was relentless although the night was beautiful clear and fortunately very calm. The Captain and crew (all Sierra Leonean) were desperate that I should return to shore without even one scratch. I wondered why they were fussing; until we returned to the camp beachfront where more than one hundred residents had gathered to witness our landing. Fortunately still, our catch was considered substantial, such that my presence on a boat was not considered a potential curse. Finally, a commitment to staying in either locale (the Bijagós villages of Cabuno or the in-migrant encampment) for two weeks, and not moving between the sites helped to build trust with participants and also to focus intently upon the dynamics inherent within each specific locale.

(ii) Research in a Situation of Conflict

At the time of this study, most notably with the assassination of President Nino Vieira, Guinea Bissau harboured huge potential to explode into a period of serious

and violent conflict. By July 2009 a Presidential Campaign was running; more than a dozen candidates were taking part. These were dark days, in Guinean politics. One candidate was brutally murdered and many suggested that this required a period of rest in the political schedule. The campaign continued and when the election finally dawned, Guinea Bissau had lacked any official government for five months. This research meanwhile was entering its eighth month. As other studies have also realised this research therefore challenges the conventional argument that insecurity makes it impossible to secure valid data (Goodhand 2000). Rather, conditions which did affect data collection were here of a more practical nature associated with a stagnant economy and little foreign investment; namely insecure fuel (for transport) and food supplies reaching Uno Island.

During the course of my stay on Uno I gradually realised that not only was my study affected by wider political instability in the capital Bissau; but critically a rather tenuous stability that existed between my two focal study groups. Relations between these two it emerged had previously involved episodes of violent conflict. In all honesty I feel extremely lucky that there were no instances of violence between the Bijagós and in-migrants while I was present. Yet despite the relative calm, I reflect that I did feel on edge; never sure whether an incident was brewing, wondering if I would be warned or told to take care. My fieldwork occurred after the most serious incidence to date (which occurred in 2003) had been reported. By the time I arrived, the Bijagós were increasingly under pressure to 'accept' more formal channels of State control over the camp, powered by members of the administration located in An-Onho on the far side of the island. Despite this apparent shift in power, the

Bijagós villagers clearly felt disgruntled by the presence of the in-migrants. My greatest aide to combatting the emotional challenges of working under such charged conditions, was a satellite telephone which could be used anywhere on the island. Once a fortnight or so, I would make a family phone-call and for just a couple of minutes escape from the complications of this research.

That I was a 'white' female and a complete outsider encouraged that I be allowed access to negotiate a way inside the conflict. I responded by approaching discussions with openness and tact, speaking to all parties concerned, whether victims, perpetrators or bystanders (Buckley-Zistel 2007). In retrospect, the wider themes of my enquiry (the importance of SSF) which included an economic survey looking beyond the importance of fish, to food availability and general opportunity opened a door. This led not only to wider discussions of wealth and poverty; but illustrated willingness and in some cases a need, for some residents to discuss with an outsider their own history and that of their families and communities.

Chapter Four

Dynamics of Commercial SSF

Chapter Overview

This fourth chapter investigates entry strategies into the commercial SSF sector using information derived from life-history interviews with Bijagós islanders and in-migrant fishing encampment residents. The ultimate objective is to investigate the role of commercial SSF in providing an occupational safety net which simultaneously protects the unskilled, unemployed and the unfortunate as defined and discussed in Section 1.3.i (Jul-Larsen et al. 2002; Béné 2006; Béné et al. 2010a, Njock and Westlund 2010).

The historic fishing practices and financial rewards associated with SSF are explored. For the Bijagós, two clusters of entrants are identified who formerly shared common work-ethics within SSF but who participated for variable periods of time. By means of comparison, the contemporary importance of SSF to in-migrant fishing camp residents is highlighted, for both early starters (with considerable histories of working in the sector) and for new-comers (many of whom arrived into fishing after having experienced political and economic hardship). The decline of Bijagós fishing

effort is contextualised in relation to declining rice-crop yields and reduced catches. Apparent growth of in-migrant fishing presence inside the Bijagós region is inferred.

4.1. Literature Review

4.1.1. Livelihood Diversification

There are varied motivations for moving into any employment which is associated with resource extraction. Reasons might include climatic or environmental change (Crona and Rosendo 2011), land control reforms (Peluso and Lund, 2011), avoidance of conflict or political disturbance (Hugo 1996) and widespread unemployment. Livelihood diversification is defined as comprising occupational and locational flexibility associated with a change in the realised potential of assets, capabilities and activities (Ellis 1998; Barrett et al. 2001: 35; Brugére et al. 2008; Evans 2009). As such, if a livelihood is diversified in a way that includes natural resource production; alternative activities (not associated with natural resources) might be given up or practised alongside the new regime. Diversification provides opportunities to enhance income, and generally offers opportunities for risk spreading (Lucas 1997; cited in Jagger et al. 2012).

In contrast, 'adaptation' is defined as a more reasoned response to changing circumstances of vulnerability and income-earning (Ellis, 1998). Ellis (1998) describes adaptation as a "*continuous process of changes to livelihoods which either enhance existing security and wealth or try to reduce vulnerability and poverty*". Short term adaptive responses have been associated with crisis management (Davies

1993). Coping strategies, on the other hand, are defined as an "involuntary response to disaster or unanticipated failure in major sources of survival'' (Ellis, 1998: 13).

4.1.2. Livelihood Diversification and SSF

Entry into and out of SSF is highly dynamic (Allison and Horemans 2004). In the marine realm, growth of SSF is commonly associated with movement (or migration) to the coast. However, underlying changes to the livelihood strategies of coastal communities are also crucial in determining growth of the marine SSF sector (McClanahan 2009). The importance of SSF as both a displacement activity and an activity for the displaced, has been acknowledged; with the resultant commercial sector described as a 'safety net' or 'labour buffer' that millions move into and through which they are prevented from further, complete or total destitution (Jul Larsen and van Zweiten 2004; Béné et al. 2010a; Béné 2011). For example, the SSF sector in West Africa absorbs both unemployed and qualified people from other professions in search for work, who through the opportunity for temporary engagement rather than long-term commitment, manage to find a way a make a living from fishing or fishery related activities (Solie 2006 cited in Njock and Westlund; Nunan 2013). Ease of entry into SSF is enhanced by the porosity of the sector, which boasts few or low barriers to entry including low financial investments (Jul Larsen et al. 2002; Béné 2006).

4.1.3. Chapter Objectives

This chapter addresses the role that small scale fisheries play, for individuals who choose to participate. The approach used is one that considers individual decisions that have shaped entry into fishing. Analyses at the individual level are then aggregated to reveal higher pathways at the community level (Scoones 2009). The analysis of this chapter comprises three research questions. The first section asks whether residents of the Bijagós study villages had ever fished commercially in the past and what parameters defined their entry into the activity. The second section considers residents of the in-migrant fishing encampment and asks what characteristics define individual entry-strategies for this group which have led individuals to adopt commercial SSF. The final section asks what factors led Bijagós villagers to exit from commercial SSF operations and have shaped the relative redundancy of this sector for the population.

4.2. Method

The individual respondents described in this chapter are therefore both local and in-migrant residents living in Cabuno Sector on Uno Island, in the south-western corner of the Bijagós archipelago, Guinea Bissau. A map of the location and detailed descriptions of the area are provided in Chapter Three. The data-set used in this chapter is derived from qualitative semi-structured individual life-history interviews. Details regarding the structure and process of data-collection are outlined in Section 3.4.5. The next section describes the process of coding key information components from the longhand interview texts prior to data analysis.

4.2.1. Coding Individual Respondent Attributes

In total 157 life history interviews were conducted; sixty-eight with male Bijagós villagers and fifty-nine inside the in-migrant fishing encampment with male fishers, male and female traders. Table 4.1 summarises the individual respondent characteristics retrieved from the interview text from each Bijagós and in-migrant participant. The focal individual attributes vary slightly between the two groups. For example, only male Bijagós villagers were interviewed; as females on Uno have never been involved in commercial SSF. Bijagós respondents were resident (at the point of interview) inside one of six *tabancas* located inside Cabuno area on Uno Island. *Tabanca* membership is therefore differentiated in this analysis. Bijago respondents described either a (i) non-fishing, (ii) subsistence SSF or (iii) commercial SSF history.

In contrast both male and female in-migrants were interviewed. In-migrant respondent attributes did not include either age-grade or clan membership. Instead individuals were distinguished by age (in years), ethnicity and nationality. In-migrants were classified as either practicing fishers or traders. This was because few male fish traders went to sea to catch fish and similarly to the Bijagós, female in-migrants did not go to sea to catch fish. They were instead extensively involved in processing and trading fish.

Table 4.1: Comparative individual attributes for Bijagós and In-Migrant respondents coded prior to data analysis

RESPONDENT ATTRIBUTE	Bijagós	In-Migrant
Name	X	X
Household ID	X	X
Gender		X
Age	X	X
Age-Grade	X	
Matrilineal Clan	X	
Ethnicity	X	X
Nationality	X	X
Origin (coastal/ non-coastal)	X	X
Education	X	X
Religion	X	X
Non/Subsistence/ Commercial History	X	
Fisher or Trader		X
Household Location (Hamlet)	X	

4.2.2. Coding Life History Attributes

Table 4.2 outlines the experiential attributes retrieved and coded from the life-history interviews. Bijagós and in-migrant entrants into commercial SSF activities (the focus of the analysis) are classified as either (i) early starters or (ii) late comers. Early starters are those, for whom the first recorded (post school or post childhood) activity is fishing. The late comers are those, who had participated in a former (post-school) activity before entering into fishing. Former occupations of late comers are also documented. Pre-fishing activities are categorised as belonging to either the primary, secondary or tertiary sector. The primary sector is defined as the '*gathering and*

processing of natural resources' (including agriculture) as follows Bryceson (1996). In contrast, the secondary sector is here considered industrial (the mass-production of consumer and producer goods by collective work forces). The tertiary sector (service sector) is a residual category consisting of anything that is not categorized as agricultural or industrial.

Table 4.2: Individual Life History Events

LIFE HISTORY EVENT ATTRIBUTE	Bijagós	In-Migrant
Early starter or late comer	X	X
Sector of Former Employment (late comer)	X	X
Entry as 'push' or 'pull'	X	X
Entry due to war or non-war (conflict)	X	X
Place of entry (home/ away)	X	X
Contact (familial/ non)	X	X
Year of Entry	X	X
Decade of Entry	X	X
Entry before or after 2000		X
Age at Entry	X	X
Total Years Worked inside Commercial SSF	X	X
Total Years Worked inside Bijagós Islands	X	X
Proportion of total fishing experience inside Bijagós Islands	X	X
Year of Exit	X	
Decade of Exit	X	
Exit as 'push' or 'pull'	X	

Circumstances behind a transition into fishing are categorised as due to either a "push" or "pull" factor. Push factors include avoidance (for example of social

obligations and pressures) or escape (social-political conflicts, poverty and environmental degradation); these are motives linked to stress-responses strategies associated with crisis management and risk aversion. In contrast, 'pull factors' are linked to perceived or expected benefits (financial returns, better prices, stronger markets, cheaper input costs) strategies and specialisations (incorporating multiple livelihood activities) such as improved technologies (Barret et al. 2001; Hilson 2010). In the wider literature, push factors are generally considered negative and pull factors positive (Brugère et al. 2008). Places of entry into fishing are classified as inside ('at home') or outside of ('away from') the natal country in which an individual was born. All contacts into commercial SSF activities are classified as either 'familial' or 'non-familial'. Entry into the commercial SSF sector is defined by 'year', 'decade' and 'individual age'. Individual experiences in the sector are also summarised in terms of total years working; the total years fishing inside the Bijagós islands and the proportion of total fishing years spent working inside the Bijagós Islands. For Bijagós respondents, information detailing decisions to leave commercial SSF are also coded. These include the year and decade of exit and whether the decision to stop fishing commercially had been due to a 'push' or 'pull factor'.

Reference to political disturbance, civil unrest and conflict are common throughout the in-migrant respondent life-histories. In many instances these events had influenced decisions to move into commercial SSF. Conflict was also described as influencing movements and actions of individuals already employed and active within the SSF sector. The distinction made here, is that individuals 'pushed'

(involuntarily) into fishing because of war, moved immediately into the sector after being forced out of a non-fishing occupation. Those that were pulled into fishing but had also experienced livelihood disruption because of war; moved into non-fishing employment after being disrupted and were subsequently 'enticed' into fishing. A wealth of non-focus information was revealed from the interviews. This is included where possible, and qualitative narrative extracts from the history interviews are included in the final section.

4.3. Data Analysis

4.3.1. Principal Components Analysis (PCA)

Figure 4.1 illustrates the analytical framework deployed in this first empirical chapter. Principal component analysis (PCA) is introduced as a dimension reduction strategy. This is intended to reduce the number of variables (coded from the life-history interviews) used in the subsequent cluster analysis, by creating a suite of focal variables which capture the original set in a simplified way. PCA is also used to solve the problem of high correlation between original variables that might distort interpretation of the results (Ansoms and McKay 2010).

PCA was attempted with the Bijago data-set to no avail and no Keiser-Meyer-Olkin (KMO) test scores above 4.0 were calculated. This lies well below the recommended value of 8.0 (Field 2005).

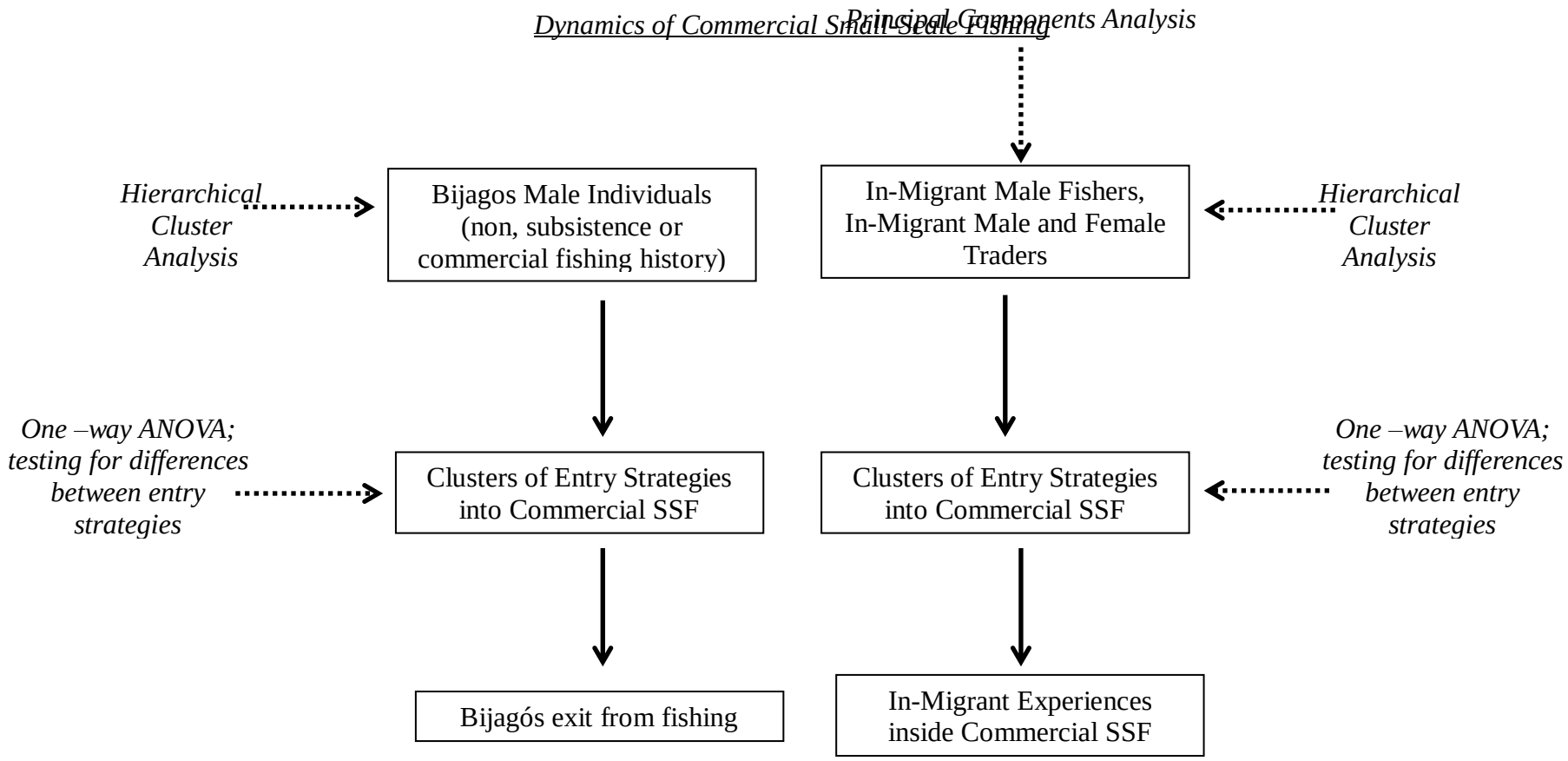

Figure 4.1: Analytical framework. This framework outlines the sequence through which the analysis progresses as presented in the results. Section 4.4.1 commences with discussion of Bijagós male respondents and considers two clusters of entrants into commercial SSF. Section 4.4.2 then considers in-migrant entry strategies into the sector and outlines their differential experiences inside fishing. The final results section 4.4.3 details the context in which Bijagós respondents described withdrawal from the commercial SSF sector

The initial PCA as applied to the in-migrant life history data set comprised fourteen individual explanatory factors (detailed in Tables 4.1 and 4.2)[89]. Explanatory variables with 'communality' values less than 0.7 were removed and the PCA repeated in their absence. Factor extraction was based upon the condition that only variables with eigenvalues greater than 1.0 were carried forward. Scree plots were used to visually confirm that the number of factors identified using the eigenvalues corresponded to a plateauing of the response. Oblique (promax) factor rotation was used as independence between the variables was not assumed.

The analysis revealed a suite of six key explanatory attributes which could define migrant entry into commercial SSF: *Early starter or late comer; Former employment sector (tertiary or non-tertiary); Entry due to war (conflict) or not; Place of entry (at home/ away); Decade of entry; Year of entry (before or after 2000).* PCA was confirmed as a robust analytical tool for this in-migrant data-set by the Keiser-Meyer-Olkin score[90] and Bartlett's test of sphericity.

The six key variables were extracted in two factor groups; the first explaining 56% of variance[91]. Factor group 1 included the 'occupational variables' associated with former employment status, movement into fishing as an early starter/ late entrant and influence of war upon occupational mobility. The second factor group consisted of 'locational and temporal' variables including whether an individual had joined the

[89] These were: *Gender, nationality, coastal or non-coastal origin; joined at home or away, place of entry (country codes as used for nationality), country of entry (Guinea Bissau or not), contact kin or non-kin; Early starter or late comer (push and pull), war or not war, fisher or trader, former employment sector; employment sector (tertiary or non); decade of entry (1970-2000), time of entry (before or after 2000).*

[90] Keiser-Meyer-Olkin = .76, Chi Square = 353.4, df = 28, $p < 0.001$

[91] Twenty five residuals were identified (42%) with residuals greater than 0.05

sector at home or away, the decade in which they started commercial SSF and whether they entered the sector before or after the year 2000. The correlation matrix confirmed an association between the two factor groups confirming that oblique rotations were most reliable with this data set. Tests for reliability (Chronbach's Alpha) confirmed inclusion of the variables within the two factor groups.

4.3.2. Cluster Analysis

Hierarchical cluster analysis was then carried out on each of the Bijago and in-migrant encampment life-history data-sets. For the in-migrants the clusters were derived from associations using the six key variables picked out by the PCA. For the Bijago data-set, cluster analysis was performed using three variables which echoed the results of the in-migrant PCA. These were the decade during which an individual joined commercial SSF, whether an individual had joined due to a push or pull factor and whether they joined from a farming or non-farming occupation.

Cluster analysis using the Wards method and squared Euclidean distances were undertaken. The number of clusters within each data set was derived from calculated differences in agglomeration values. Finally, one-way ANOVA tests were used to identify key differences between the clusters. All statistical tests were conducted using the IBM SPSS Statistical Package (Version 21).

4.4. Results

4.4.1. Bijago Entry into Commercial SSF

4.4.1.1. General Respondent Characteristics

The sixty eight Bijagós respondents were aged between 22 and 76 years. All four matrilineal clans were represented in the sample. Respondents comprised Animists (72%) and Protestants (28%). All were born on Uno Island, with two exceptions[92]. Further, across the sample, 80% resided inside their natal (home) village (Table 4.3) at the point of interview. The recorded life histories also represent five Bijagós initiation cohorts; the oldest were initiated in 1973. Across the whole sample, 7.4% had never enrolled in State education. Forty one Bijagós respondents (60%) recounted prior involvement in at least one small-scale commercial fishing venture. Thirteen (19%) described their involvement as purely fishing for subsistence (or consumption) and fourteen (21%) had never fished at all.

All but seven respondents who described prior involvement in commercial SSF had ceased to fish commercially at the point of interview. Former commercial fishers were present across all five *tabancas* in Cabuno Sector and belonged to all clans and religious groups. Connections into commercial SSF work had been through kin (41%) and non-kin (59%) contacts. In 80% of cases, the villagers of Cabuno recalled entering into commercial SSF on Uno Island itself; the majority (81%) inside Cabuno Area.

[92] One individual, a member of the Papel ethnic group born in Quinamel (Bissau mainland) who arrived to take up a teaching post; and the second a Bijago individual from Soga Island

Table 4.3: Life history respondents from the five Bijagó villages in Cabuno Area

Village	Ancoyem	Ankarabe	Cabuno	Ancombo	Ancobara
n (Individuals)	*12*	*18*	*28*	*6*	*4*
Mean Education Level[93]	4.67	5.67	4.61	4.5	4.5
Religion (% Animist)	100	16.7	92.9	100	50
Birth Place (% born within village)	66.7	77.8	96.4	100	75

Seventy seven commercial small-scale fishing contracts were documented as having occurred between 1962 and 2010. These contracts involved three principal gear types; gill nets, mullet nets and long-lines. The majority of operations however, involved gill net equipment (75.6%). Only five Bijagós respondents described diversity in terms of the gear types they had used.

All forty one Bijagós respondents who recalled entering into commercial SSF were 'late comers' to the sector, having been involved in non-fishing activities prior to entering fishing. Former livelihood activities included full-time subsistence farming, with part-time farmers also involved in construction, herding or palm oil production. One individual was working as a baggage handler in a transport boat. Other individuals were enrolled in education, while simultaneously working.

[93] Where level refers to grade; level 4 recognised as the ultimate primary class; level 10 is equivalent to matriculation standard

Rice, it was explained had been formerly produced in surplus quantities in Cabuno Sector. Several Protestant individuals described paying for civil marriage partnership certificates[94] with surplus harvests, produced particularly during the early 1990's. There was a significant association between individuals entering commercial SSF from the primary (farming) sector and entering commercial SSF due to a 'pull' or enticement factor[95]. In contrast, most individuals 'pushed' into the sector had been studying. Problems associated with leaving school included personal (or household) financial circumstance, construction projects and the national social upheavals associated with Guinea Bissau's troubled political history which had both led to school closures. Two clusters of Bijagós entrants are discerned from the data. These are differentiated in terms of education status at entry[96] and decade of entry into fishing[97].

4.4.1.2. Bijago Early Entrants (between 1960 and 1980): Early Experiences in SSF

Respondents in the first cluster entered into commercial SSF between 1960 and 1980[98]. In total, 40% of former commercial SSF respondents belong to this group. Early entrants began fishing commercially (small-scale) aged on average 21 years (SE = 1.8). Entry for these individuals therefore, occurred during their pre-initiate years as either *canhocams* or *cabarros*. These respondents were non-educated (31%); educated to primary level (38%) or beyond primary level (31%) at the point of entry.

[94] A requirement for consolidating a Christian marriage
[95] $\chi^2 = 68.0$, df = 6, $p < 0.001$
[96] $X^2 = 9.2$, df = 2, $p = 0.010$
[97] $X^2 = 41.0$, df = 4, $p < 0.001$
[98] These individuals are predominantly sons of ogubane (44%); but also oracuma (31%)

The non-educated were the oldest respondents; all of whom were Animists. They described the island before the introduction of a formal State education system emerged. Traditionally, Bijagó Animism encouraged younger male individuals to learn from and be guided by older male individuals. These 'traditional' teachers were assigned to boys during their pre-initiate *canhocam* years (aged 12-22 years). A traditional teacher was expected to provide personal advice; customary knowledge (of secrecy, language, custom) rules of social behaviour; knowledge of activities, medicinal plants and sorcery. Perhaps most critically, the teacher was expected to advise his pupil upon the *fanado* process, while representing and taking responsibility for his student during ceremonial proceedings.

The oldest recollections of entry into commercial SSF occurred during the colonial era (before Independence in 1974) and many older residents detailed their fishing experiences, working with in-migrant "foreigner" crews. Two in-migrant fishing camps (known as <*daks*>) were well known by the Bijagós during the 1960's. One encampment located on Uracane Island (adjacent to Uno) and a second encampment in Chediga on the distant island of Maio (part of the Formosa complex see Figure 4.2). One elder in Cabuno village described a Portuguese commercial investor (Eugenio) who opened the first fishery and initiated the work of Nhyominka fishers (from Senegal) inside the Bijagós Archipelago, on Uracane Island.

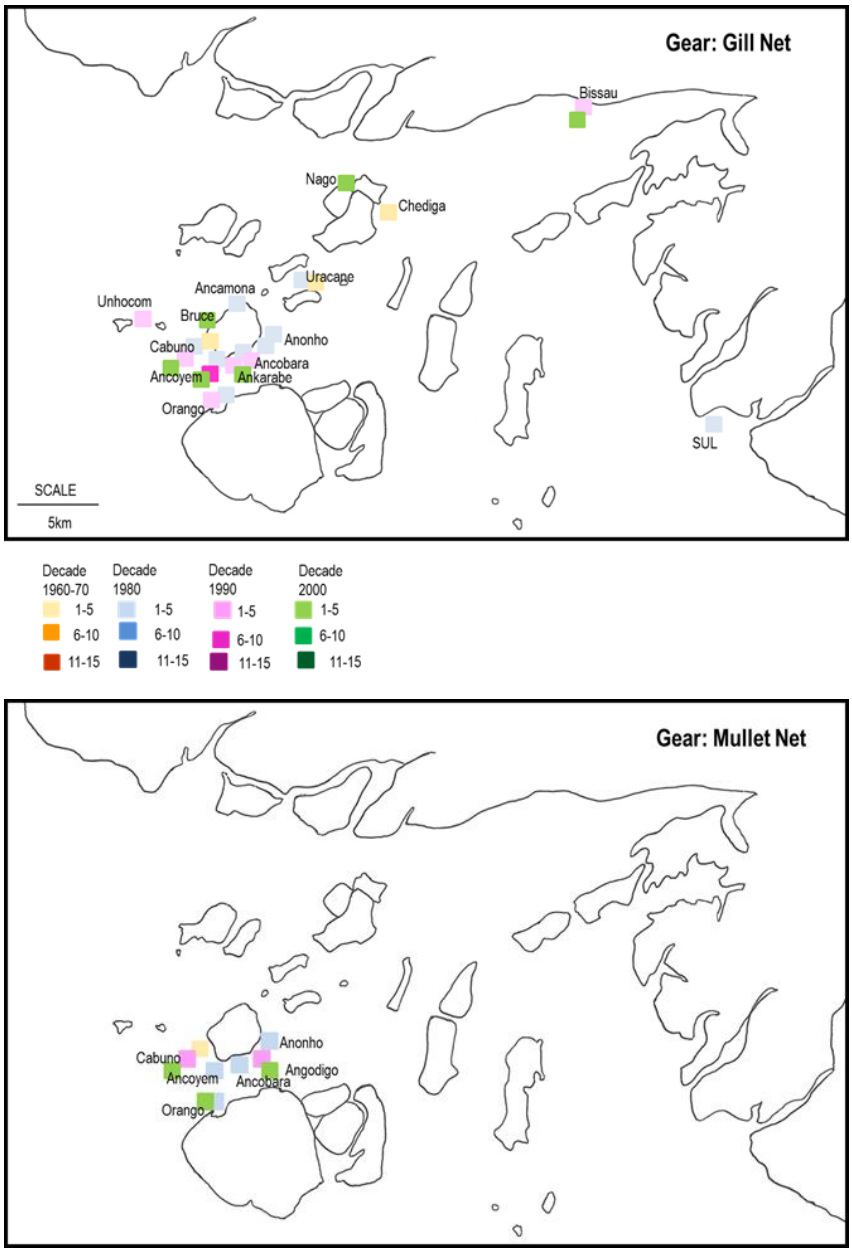

Figure 4.2: Locations in which Bijagós fishers used their gill and mullet nets for commercial fishing activities between 1960 and 2010. Decadal time is de-noted by different colours, the shade of which illustrates the frequency with which respondents referred to use of a particular area. Lighter shades illustrate low frequency and darker shades, higher frequency of responses

As one participant (born in 1934) explained, "*The Nhyominkas were the professionals here, the early arrivals- they brought equipment and ideas and new ways to catch fish. People of the Bijagós accepted them and were accepted by them as well… They were fishing a lot around Unhocom then, following the movement of the water; the <primeira*[99]*> was for the owner and everything else was for the fishermen*". Another individual recalled a Portuguese Captain who had one larger boat and four smaller canoes, each carrying gear and eight fishers. "*After every fishing campaign around the islands, we would land at the camp in Uracane, we would load all the fish into the one larger boat and this would travel to Bissau while we stayed and waited for the boat to come back; we were Muslims, Mandingas; Fulas and Bijagós people too*".

One elderly individual described his leaving Ankarabe very early in life to fish out of Bubaque with the Nhyominkas. Another described meeting Nhyominka fishers on Orango Island, in the early 1990's; "*We worked for 6 years around Ancopado before we moved on to Unhocom and continued the same work. We were catching <primeira, caudu, casupai, tiburao>*[100]*. And we were nine crew; 6 Bijagós and 3 Nhyominkas*". The use of fishing areas by individuals operating the gill and mullet nets, remained relatively constant through time. Working with foreigners inside the *daks* was remembered as a lucrative time. As one man explained "*I never found enough money here (on Uno) to make a boat. Only, leaving here and going to fish outside. This was good money. The only other way at that time was to farm peanuts"*.

[99] Or croaker (*Pseudotolithus spp.*)
[100] <*caudu*> are juvenile sharks, <*casupai*> are the guitarfish and <*tiburao*> the name for larger sharks

Eleven individuals describe preferring to work with fellow villagers rather than foreigners. For several, the solution to fishing was to settle in the *daks* as Bijagós only crew: "*I took my marineros (sea workers) with me"* an elderly Cabnuno resident explained. Several individuals recalled a "lack of monetary pay" when commercially fishing with kin, but instead being "*offered goods from Bissau*". Kin contracts were however, described as generous "*anything that I wanted, my uncle would try to get it*" one individual explains. For those who did receive cash, payments were most commonly made monthly and were variable, depending upon conditions of work and whether food was supplied with the job.

Only ten respondents detailed investing in dug-out paddle boats and each describe selling cattle in order to pay the boat maker. As one man explained: "…*To make a boat is very expensive. You have to buy rum (54 litres of it); you need 50kg of rice, 10 litres of vegetable oil, tomatoes, onions, vegetable stock and salt. This is to feed the workers while they do the job. When the boat is finished then you have to buy even more drink so that people will help to carry the boat to the port. These are the conditions and they can reach around 170,000 CFA (or £340)*". Many individuals referred to a lack of trees in Cabuno Sector and a need to travel either to the east of Uno Island (Anane or Jeu di Cute) or else the other side of the archipelago (Canhabaque Island) to find the <*bissolon*> tree (for boat building). This was not perceived as new phenomenon but rather described as an additional challenge to acquiring a boat.

Many local Bijago fishers commented upon the practice of finning sharks, which they described having learned from the Nhyominka fishers (of Senegal). As one man explained "*The nhyominka captain still lives in Bissau. He took us all to Senegal- he is the one that taught us to catch shark"* Although others explain that the Nhyominka were originally not involved in finning practices themselves; they were instead selling their shark capture whole and only later adopted finning in response to growing market demand. As one man explained "*By the 1970's there were Fula buyers here in the villages (on Uno) looking for fins".* Commercial interest in the shark fins had grown, such that by the 1980's many respondents claimed that they were only interested in catching shark- not the white fish[101] for salting. One respondent described catching two swordfishes <*pis espada*> off the Island of Orango Grande in the late 1980's. The money derived from shark fins, it was explained could pay for school fees, new nets and medical care. Sales were always more valuable however if you could travel to the capital first.

4.4.1.3. Bijagós Entrants (between 1990 and 2010): Later Experiences in SSF

Sixty per cent of Bijagós respondents entered the commercial SSF sector later, during the 1990's and 2000's[102]. These individuals were either primary educated (64%) or educated beyond primary level (36%). The average age at entry for this cluster was 24 years (SE = 1.2), which is not significantly different to that of the first cluster and still falls within the pre-initiate age range. Respondents of this later

[101] The croaker, known locally as <djoto> or <premeira>
[102] These individuals are predominantly sons of ominca (44%); but also oracuma (40%)

cluster described how today, individuals receive formal (State) education in addition to their traditional teaching. The increased role of State education is such that the scheduling of traditional Bijagós animist ceremonial activities now accommodates the State school-term calendar, to avoid disruption to studies. Respondents in this cluster made little reference to buying fishing material. Rather an alternative method of renting paddle boats was described by two individuals, who both paid a catch percentage to owners in Ancolho village to the north of Uno Island. Many respondents describe beach-combing activities to find net discards, lengths of rope and twine or otherwise working as fishing crew members. All recollections of the second cluster involve fishing activities on Uno Island, working with village crew members.

4.4.2. In-Migrant Entry into Commercial SSF

4.4.2.1. General Respondent Characteristics

In contrast to the Bijagós histories, the fifty nine interviews collected inside the in-migrant fishing encampment include male fishers (n=31) and fish-traders (n = 28). Of the traders, eighteen are male and ten female. Natal countries of origin included seven neighbouring West African states, with fish traders showing a greater diversity of nationality (Figure 4.3). The most common ethnic identity of the fishers was Temne (of Sierra Leone). This was followed by the Sousou (from Guinea Conakry) and Diola Felupe (from northern Guinea Bissau and southern Senegal). Trader

respondents were also predominantly Temne (Sierra Leone) and Mandingo (from Guinea Conakry). The vast majority of respondents were Muslim[103].

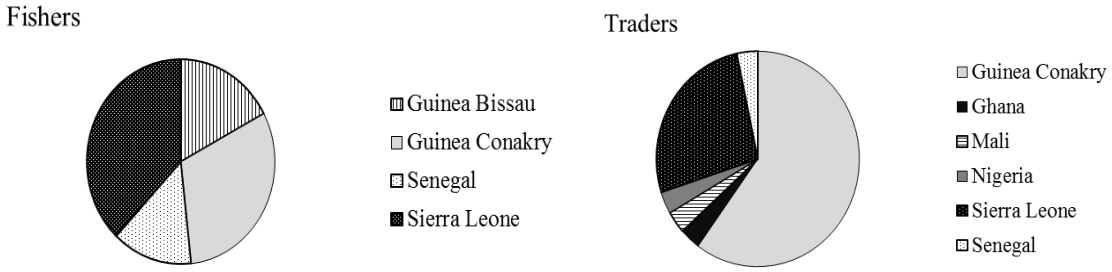

Figure 4.3: Nationality status of the in-migrant fishers and traders

Of the fishers, 74% had attended State schools in addition to participating in Koranic lessons. In contrast, 82% of traders were purely Koranic-School educated. Seventy one per cent of individuals originated from towns and villages located within 100 kilometres of the coast. Non-coastal entrants included individuals from the highlands of Guinea Conakry and the furthest individual was from Timbuktu, in Mali. Origins of in-migrant respondents are illustrated in Figure 4.4.

[103] Only two fishers claimed otherwise (both Christian)

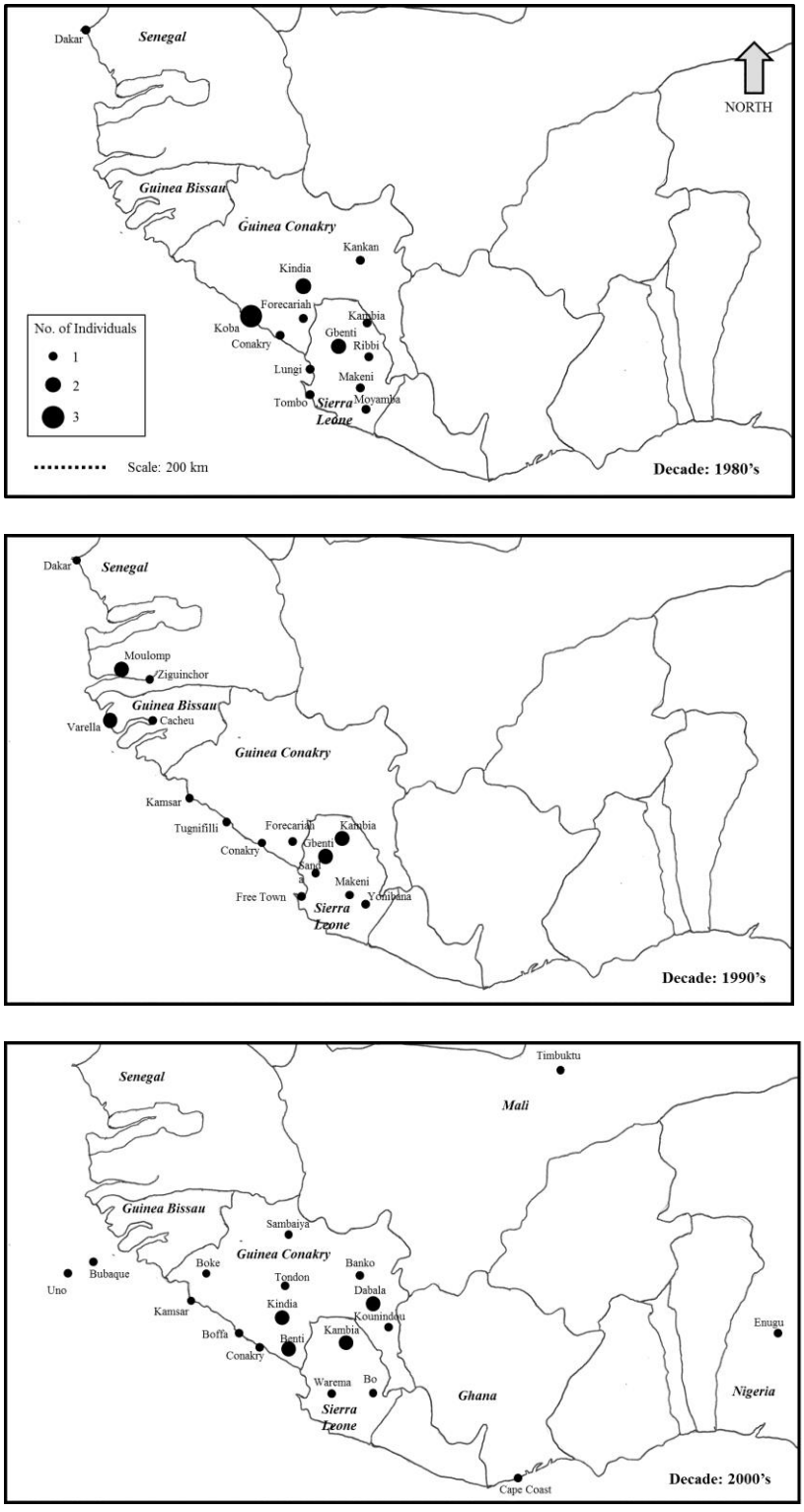

Figure 4.4: Origins of life history respondents (fishers and traders) entering into Commercial SSF during the 1980's, 1990's and 2000's

Of the in-migrant respondents only 30% were early entrants into commercial SSF. The majority (70%) were late-comers; 57% of whom had been 'pulled' or enticed into fishing. For all enticed into commercial SSF, the primary motivation cited was financial gain and the understanding that there were profits to be made from catching, buying and selling fish. Late entrants to fishing arrived from an array of former occupations; most commonly located within the 'tertiary' sector'[104]. These are presented in Table 4.4.

Table 4.4: Former occupations of 'late comer' in-migrant respondents

General Attribute	Fishers (n=31)	Male Traders(n=18)	Female Traders (n=10)
Primary Sector	Farmer Herder	Farmer Forester	Farmer
Secondary Sector	Construction	-	Receptionist
Tertiary Sector	Transport (boat) Transport (taxi) Car Washer Welder Mechanic Miner Trader (non-fish) Carpenter Tailor Dish Washer	Transport (taxi) Mechanic Miner Trader (non-fish) Photographer Shaman	Trader (non-fish) Dancer

In all, 60% of respondents had joined commercial SSF between 2000 and 2010. One third of all respondents had started fishing or trading in fish within Guinea Bissau. All others had joined the sector inside neighbouring coastal states. Fishers described

[104] Defined here as small-scale industry, trade or manufacturing

their fathers' occupations and how they had worked predominantly within the primary sector: as farmers, herders and palm-wine tappers[105]; but also as leaders, in positions pertaining to both customary and state institutions. In only one instance, entry into commercial SSF followed a paternal connection. Instead, many fishers described having followed older male siblings who were already enrolled in fishing tasks prior to their own entry. In contrast, traders were very often descendants of fish trading mothers. Across all individuals 48% arrived into the sector through the advice and assistance of a kin (family) member.

The in-migrant fishers defined six fisheries as their starting or entry points into the commercial sector [106]. In total, 91% of entry activities involved monofilament, long-line and gill-netting[107]. Overall, there was a significant association between fisher nationality and the gear-type used upon entry[108]. Sierra Leoneans predominantly used monofilament nets upon entry; Guineans (from Conakry) long-lines and the Senegalese specialised in gill netting. Migrant fishers were found to have had experience with up to three different gear types; although most individuals were acquainted with only one (50%) or two (33%).

4.4.2.2. Differentiating In-Migrant Entry-Strategies

Cluster analysis reveals three groups of in-migrants following unique entry-strategies into commercial SSF. Cluster 1 is the smallest (30% of respondents) and comprises

[105] Applying to 60% of "early starters"
[106] Where "fishery" describes fishing operations or gears targeted specific species catch groups
[107] Industrial trawling, herring and snapper fishing were each mentioned only once as a point of entry into the fishing sector
[108] ($\chi^2 = 32.075$, df = 18, $p = 0.022$)

all the 'early starters'. These eighteen individuals declare that SSF provided their first employment role; as either a fisher or trader. Members of this group had entered commercial SSF most commonly during the 1980's and 1990's (Figure 4.5). Most (83%) were already involved in fishing 'at home' (or else inside their natal-state) and very few had migrated first and then entered a fishery-related activity (Figure 4.5). Political conflict was commonly cited as a motive driving displacement (or migration events) once these individuals were already established and working inside the fishing sector.

Cluster two contains 34% of respondents; all 'late entrants' to fishing. This includes individuals both 'pushed' out of another occupation and also those 'pulled' into fishing. All individuals within this group are formerly tertiary sector workers. Reference to conflict is greatest in this group; and one third of individuals cited war as driving their occupational mobility into the fishing sector. Bouts of disturbance included the 1991 war out-break in Sierra Leone and the 1998-1999 civil war in Guinea Bissau, which also affected the Casamance region of Senegal. Seventy five per cent had joined the sector 'at home' or before migrating. Members of this group entered the sector most commonly during the 1980's and 1990's.

Cluster three is the largest and comprises 36% of respondents. Again all are 'late entrants' to the sector. This group is dominated by individuals pulled (enticed) into commercial SSF and includes only one individual 'pushed' out of a former employment opportunity.

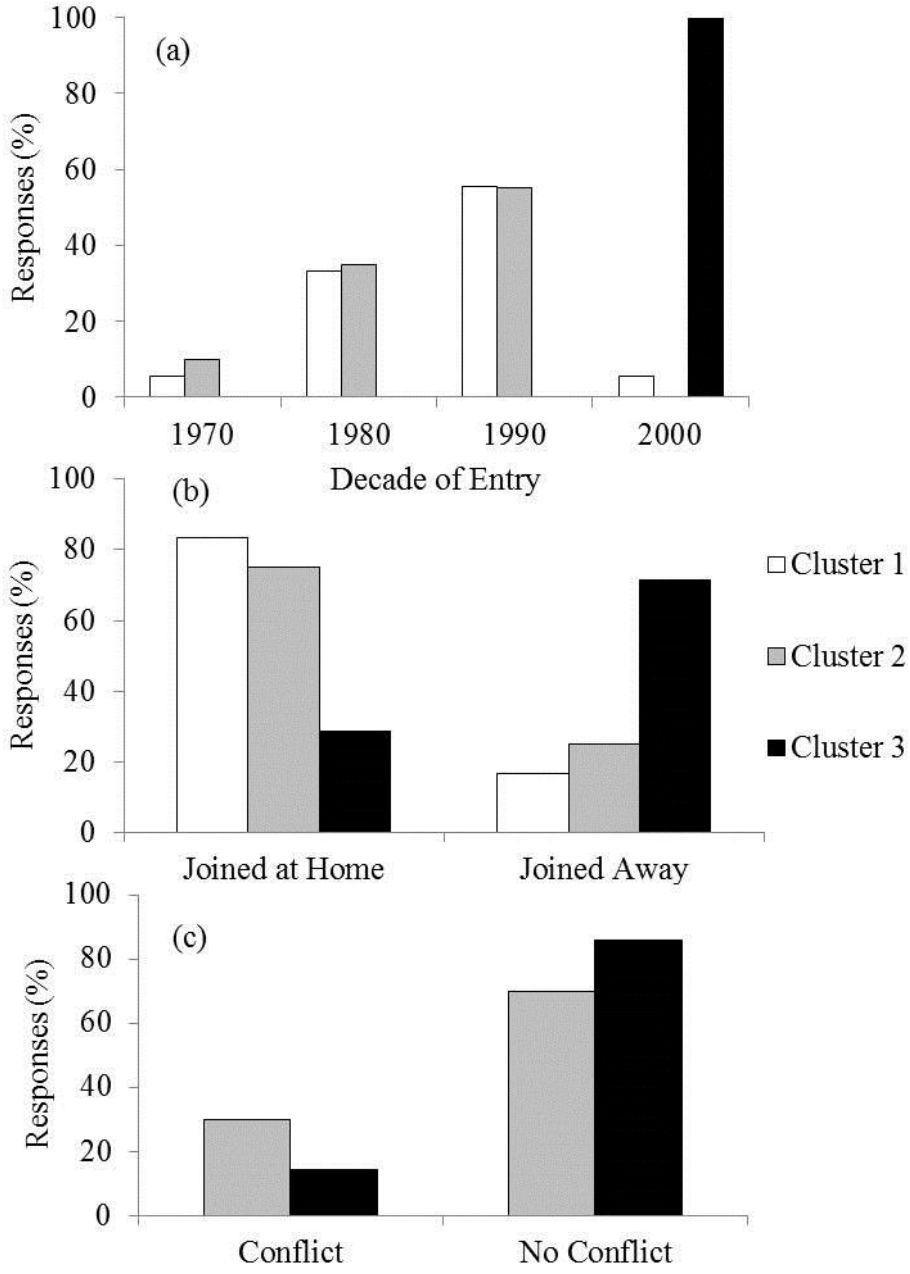

Figure 4.5: (a) Decade of peak entry and (b) prevalence of joining commercial SSF inside natal country and (c) prevalence of conflict in influencing entry strategy for late entrants (no early starters into fishing described entry due to conflict)

For this group reference to conflict and political disturbance is minimal[109]. Rather the primary motivation is financial. This group comprises all who were formerly involved in the primary sector (farming, agriculture and forestry) although this accounts for only 20%. The majority were again, workers inside the tertiary sector. Seventy one per cent of respondents in this group entered into fishing outside their natal birth country, having migrated over at least one national border (Figure 4.6). Furthermore, all members of this group entered into fishing between 2000 and 2010.

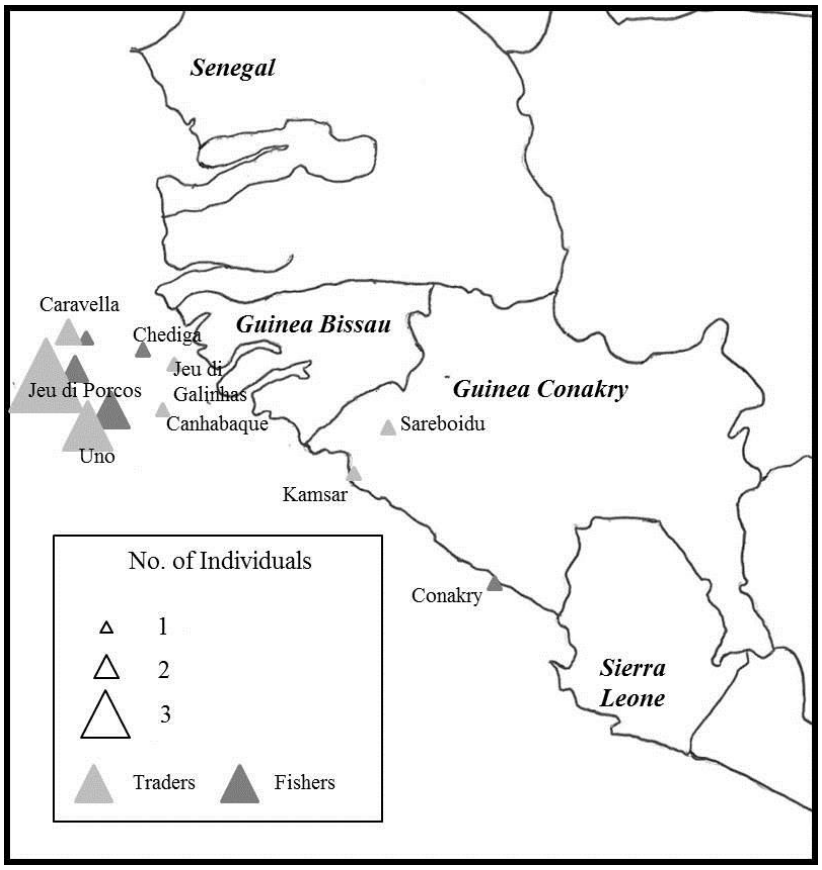

Figure 4.6: Places of entry into commercial SSF during the 2000's, as applies to Cluster Three

[109] Only three individuals belonging to this cluster cited conflict as having influenced their decision to join

4.4.2.3. Age at Entry and Experience in Commercial SSF

Unlike the Bijagós residents, the in-migrant clusters show significant variation in 'age at entry' into commercial SSF activities[110]. Members of the first cluster (the 'early starters') entered commercial SSF aged (on average) 18 years (Figure 4.7). The very youngest early starter individuals were female traders, who were aged between just 10 and 12 years. As a result, the early starters (Cluster 1) had evidently entered into commercial SSF aged significantly younger than individuals in both Cluster 2[111] and 3[112]. Individuals grouped into the second cluster (both pushed and pulled into fishing, before 2000) revealed the widest age-range at entry into the sector. Individuals in this group entered commercial SSF between the ages of twelve and fifty. Respondents in Cluster 3 (mostly pulled into fishing who entered after 2000) were generally oldest upon entry into the sector. The average age at entry for an individual in this group, was 29 years. In this respect, Clusters 2 and 3 were not significantly different.

The three in-migrant clusters also revealed variation in terms of years of experience inside the commercial SSF sector[113]. Clusters 1 and 2 emerge as similar, with respondents in both groups having worked for an average of 20 years inside

[110] $F_{(2,56)} = 12.5$, $p < 0.001$
[111] Bonfrroni ($p = 0.014$)
[112] Bonferroni ($p < 0.001$)
[112] Bonfrroni ($p = 0.014$)
[112] Bonferroni ($p < 0.001$)
[113] $F_{(2,56)} = 48.8$, $p < 0.001$; assumption of between-group homogenous variances is violated

commercial SSF. Individuals in Cluster 3, who generally entered fishing later in life (and more recently) have worked for typically less than five years[114].

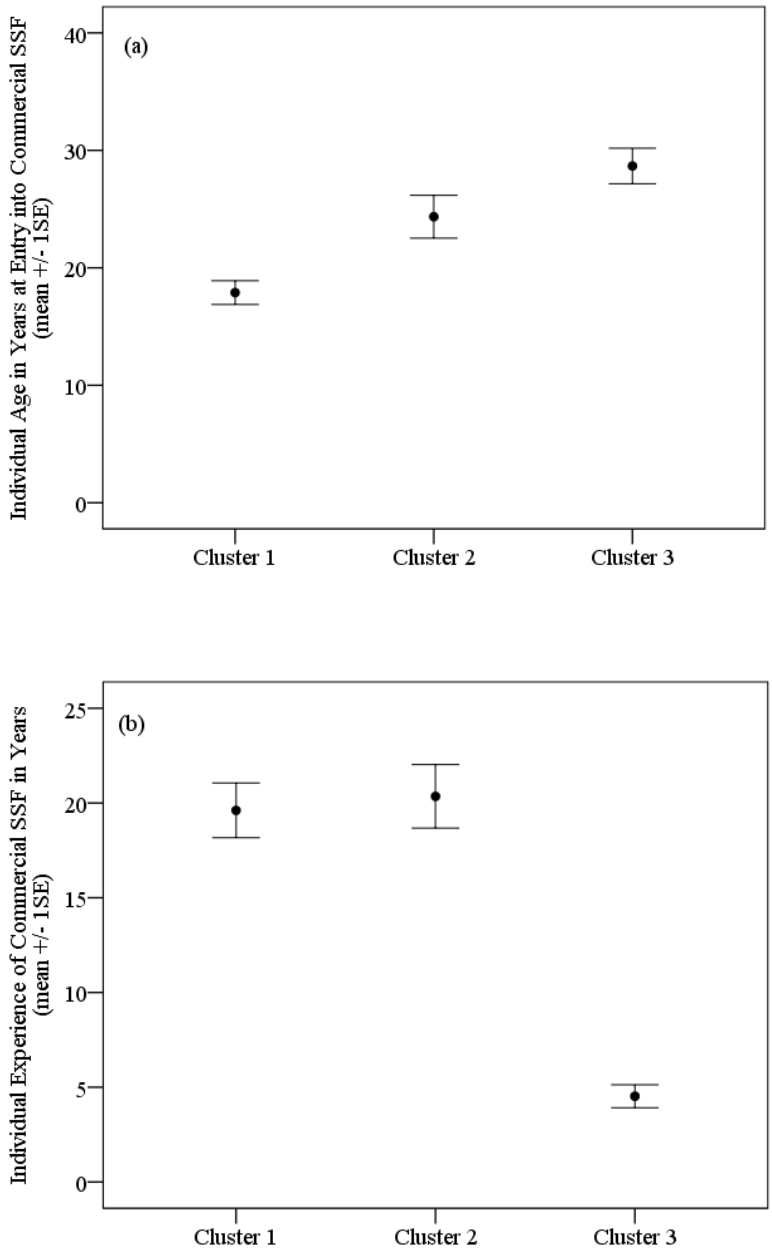

Figure 4.7: (a) Average age at entry into fishing and (b) average years of fishing experience in the Bijagós for each cluster group

[114] Tamhane Post-Hoc Test (given that equal variances cannot be assumed): Difference between Cluster 1 and 2 ($p < 0.001$) and between Cluster 1 and 3 ($p < 0.001$)

Respondents had accumulated between 3% and 100% of their fishing employment experience, whilst working inside the Bijagós Islands (Figure 4.8). The variability between clusters was significant[115].

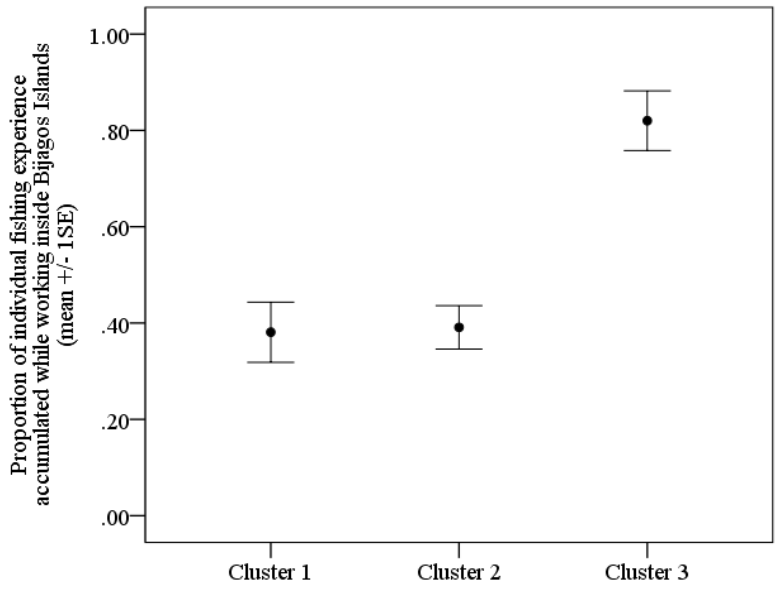

Figure 4.8: Average proportional fishing experience attained inside the Bijagós Islands for each cluster group

For respondents in Cluster 1 (the early starter group), individuals had passed on average only 39% of commercial fishing experience inside the Bijagós Islands. For Cluster 2, proportional experience inside the islands was also low; on average 40% of fishing years. These figures indicate that individuals in both groups had accumulated knowledge, skills and experience; and were accustomed to fishing before arriving onto the islands. For Cluster 3 (late entrants commencing SSF after 2000) the proportion of fishing experience accumulated inside the Bijagós was greatest and for an average member of the cluster, equated to 82%. This extent to

[115] $F_{(2, 56)} = 10.5$, $p < 0.001$

which members of Cluster 3 had 'practiced' fishing on the Bijagós islands was greater therefore, than for both Cluster 1[116] and Cluster 2[117]

Respondents who entered into the Bijagós area during the latter part of the 1990's and earlier, offer several insights into management strategies which influence in-migrant fisher and trader behaviours. From the perspective of the in-migrant fishers, arrival onto the Bijagós Islands was due to several contributing factors. Fishers describe declining catches in other areas, mainly southern Senegal and Guinea Conakry; an increased presence of industrial fishing vessels and a need to travel further from the shore to obtain any catch. This last factor was crucial, as fishers described a need to travel so far out, this was beyond the ability of most rowers. Traders describe a decline in fish availability in the urban wholesale arena and an increasing need to travel offshore and out to the fishing camps; in order to secure fish to trade on the mainland.

4.4.2.4. In-Migrant Respondent Narratives

The following section contains qualitative material extracted from the in-migrant life-history interviews, used to provide further detail of the mechanisms through which individuals enter fishing, but also to illustrate further the differences between entry clusters. This first history serves to exemplify the life of an early-starter (as described in Cluster 1) to the commercial SSF business. This history places particular emphasis upon family connections with the trade.

[116] Bonferroni ($p < 0.001$)
[117] Bonferroni ($p < 0.001$)

(Cluster 1) *Respondent (i) was born in Port Loko, Sierra Leone; his mother a Temne fish trader of bonga. Leaving school early, by 13 years of age he was travelling between Koidu Sefadu and Free Town selling fresh fish on ice with his Aunt. His cousin meanwhile had travelled to Virginia and his elder brother was sending out fish and vegetables to African communities in the US. As the war started, he crossed into Guinea Conakry and moved to Boffa where he started smoking fresh bonga. His elder sister "made introductions up country" and he sent his smoked fish 600 km up into the highland area of Gegedou and Kindia."Fish was cheap then" he explains "and money had value; you could build 3-4 baskets for 500,000 FG. Today you need 5 million". Five years later he made his first trip out to Caravella with his sister after they had heard word in Conakry there was fish to be found. In 1999 during one month they had secured 1 tonne of smoked catfish, which they carried by sea to Kamsar and onto Conakry City by road. Within three weeks, the fish was sold (to wholesalers and small traders in the capital) and Almammi was back on his way out to Caravella. This way he opened a shop in Boffa and started moving goods between there and the capital. He started buying salt fish in Conakry City and travelling with this up to the highlands around Labé; and from there travelling across to Dakar, Senegal where he purchased cosmetics for sale back in Conakry City. He made this journey several times and every 2-3 months was making deposits into his bank account. By 2008 he had sold the shop in Boffa and opened a store in Conakry City, which he filled with smoked bonga from Kamsar that fetched a higher price in the capital. In 2009, he returned to the Bijagós Islands this time to Uno; where it was "cheapest to buy fish" which could then be sold in either Kamsar or Conakry City.*

The next four histories represent individuals who joined commercial SSF later in life, (as seen in Cluster 2) and whose entry mechanisms were influenced by wider instances of conflict across the region. These histories attemnpt to illustrate the safety-net function that SSF has provided to date:

(Cluster 2) *Respondent (ii) was born in Gbenti in Sierra Leone. He was twenty five when the 1992 war began. He had finished primary school early and started selling groceries in his fathers' shop. By 1984 he had learned how to drive. Wanting to*

become a taxi driver he attained his licence and borrowing money from his father bought a second-hand car to start up his business. When the rebels attacked in 1992, his house was burned and his car stolen. Fleeing to the coast he arrived in the fishing camp at Yeliboya where at the age 26 he started fishing bonga as an apprentice, receiving no fixed pay for the work. By 1994, the crew had moved over the border to Conakry and having established himself as a fisherman he received fish as payment every third day for his skills.

(Cluster 2) *Respondent (iii) was born in Tombo, Sierra Leone, in 1961"The year of Independence" he remembers proudly. By fifteen he had a holiday job at the Lungi airport as a baggage handler "it wasn't paid" he explains "but they would dash me"; his main aim at the time being to finish secondary school. He dropped out in form five no longer able to afford the time and moved to his grandparents in Freetown, where he worked as a kitchen porter assistant in the Hotel "Bitumani", washing pots and cleaning in the kitchen. When his girlfriend fell pregnant, he moved to Shenge in 'disgrace' and stayed with his mothers' sister, a clerk in the 'Magbampo' bonga fishing company. She soon got him a job as a numerator at the dock, where he controlled ten boats that would fish offshore for up to five days 'catching sharks and barracuda as well as bonga' he recalls. The company offered scholarships abroad and he was making an application to study engineering in Germany when the war started. He travelled first to Kindia, Guinea Conakry to stay with his mothers' family "but her side are all soldiers" and feeling under pressure to join the army returned quickly to Free Town. From there he moved over to Goderich, where he got a job with 'Penny-Penny' selling ice to small-scale street traders; but as fighting intensified he sought refuge in Tombo and reluctantly left for Guinea Conakry in 1993. "We were many people" he remembers, "from Goderich, Tombo and Waterloo. And we arrived into Nongo, Conakry City where we stayed with a man from Kambia, Sierra Leone". Down at the port, now aged 33 years Zola was taken on as an apprentice snapper fisherman: "One Aunty, she would buy the line and she would keep the fish" he explains. When not out fishing, they would move back into Sierra Leone carrying rice and provisions, shoes, seeds and alcohol.*

(Cluster 2) *Respondent (iv) was born in Ziguinchor, Senegal; although his parents were originally from Varella in Guinea Bissau. Following independence of Guinea, the family moved back and by twenty years of age he was working as a gardener for a Portuguese former Independence fighter in Bissau City. Aged 21 years he was given the name of a Diola on the <Jeu di Jeta> near the island of fish <Jeu di Peixe> north of the Bijagós Islands. He was advised to find that man and learn how to fish, which he did for five months, before returning to Varella in time for the rice ploughing. After ploughing, he moved again to Ziguinchor and selling the catch he had earned (salt fish) he purchased his first fishing net; before returning to <Jeu di Jeta> and working for another five months. This continued until the 1998 civil war broke out in Bissau City. During the war he stayed at home in Varella but soon afterwards returned to fishing; when a man on <Jeu di Jeta> lent him his canoe and told him to travel out to <Jeu di Porcos> to see what he could find. Retuning with a substantial load, he was quickly advised to return to <Jeu di Porcos> where he worked for a whole year. "There were many fish back then" he explains, "we could fish for one month and go back with one tonne of croakers. And that wasn't like the trips we make now because back then we never slept in the sea and never fished far out from the beach". By 2002, he had joined the fishing crews moving south and he worked for two years in the camp known as Ancopado, on Orango Island. "The fishing is less now" he explains "and if I had the choice, I would stop fishing and buy a transport boat".*

The following six narratives illustrate the personal histories of late entrants to commercial SSF, who may have been affected by wider regional conflicts, but whose entrances into SSF have all occurred since the year 2000 (as described for Cluster 3). These histories empahasise the importance of the Bijagós Islands as a seat of regional importance for commercial SSF, the histories also illustrate the financial pull associated with the trade.

(Cluster 3) Respondent (v) *at the age of twenty was working in construction in Free Town. Within two years of starting out as a worker, the signs of war were beginning to emerge. Relocating to Koidu Sefadu, in the diamond mining region, he worked for his mother's second husband as an assistant; buying rice and shovels in Free Town and carrying these up for sale in the mines. His step father was also sponsoring a group of workers, 'the pits were 6 kilometres out of town' he explains. 'And they never did find any diamonds'. With the 1995 'diamond rush' the road to Freetown was blockaded. Now trapped in Koidu, he decided to stop the diamond work and begin selling perfume. At this point he married a young Temne girl from the town, "there was no money to employ an assistant" he explains "and the only solution, get married". A year later the town went under siege, and he fled back to his mothers' home in Freetown. There he entered the 'junks' trade, buying and selling second-hand clothes which he purchased in bulk and sold on to smaller traders. In 1999, the situation in Koidu seemed calmer and he returned only to experience another rebel attack which this time left the road to Freetown closed. Taking his wife and young child, they moved to Rockupr, birthplace of his wife where he began work in the district hospital and 'learning' in the pharmacy. Aware that UN medical supplies were not reaching the area, he started buying small medicines and eventually opened a drug-store, from where he recalls curing head-aches and fevers, malaria and child illnesses. As the business grew, he describes 'listening to the voice of the market' and investing in wooden boards; for building boats. "You see, you could buy them in Rockupr for one price but they were worth double in Freetown" he explains. But soon the rebels reached Rockupr and together with his wife and child moved into Guinea Conakry. From there they moved to Kamsar and then by road through Bissau and Ziguinchor (Senegal) to Banjul. His motive was to become an English teacher. Instead, he secured work for a Nigerian contractor offloading freight cargo (rice, flour and sugar) at the port terminal. Two months later he met a man who had just arrived from buying fish inside the Bijagós Islands. In March 2000, aged 31 years, he set out for Bubaque carrying plastic shoes to sell and with the intention of buying fish. After a few days in Bubaque a transport boat arrived from Kamsar and he joined the passengers for Caravella Island. There he sold his shoes and purchased smoked catfish from Temne fish families, which he carried back to*

Kamsar and sold for £100 profit. In Kamsar he bought medicine to sell in Caravella. Upon returning to the Bijagós, he found that many occupants of the camp were moving to <Jeu do Porcos>. Five months later, he was back in Kamsar selling catfish, but also salt fish and the dried swim bladders <maws> which fetched a higher price. "This is what helped me to make my boat" he explains. In 2004, he bought wooden boards and nails and sealant and "all the materials" to make a transport boat which he carried out to <Jeu di Porcos>. There a Sierra Leonean carpenter finished the task and after "four trips between Kamsar and the Bijagós" he had paid back all the debts he had incurred. But with the rainy season, he started losing money; especially passing Bubaque. "There you have to pay port fees, taxes, customs, fines and anchorage" he explains. The following year there was an accident after leaving Bubaque in a storm surge in which one man drowned. And he sold the boat in Kamsar and bought petrol which he sold on in the camps to the boat captains in order to secure fish.

(Cluster 3) *Respondent (vi) was born in Bubaque in the Bijagós Islands, The son of a Nhyominka fisherman from Senegal, before the Guinea Bissau civil war of 1998-1999, he had secured a job in the north of the archipelago as the captain of a speedboat for a private hotel. But when the war started the hotel closed and Arafan then began working on the 'Kamsar' passenger service running between the islands and Kamsar, Guinea Conakry. They would travel up to Banjul (Gambia) and then return right through to Kamsar. The cargo was people, palm oil, fish and petrol and the trips were one month long or more. Anchored just off the fishing encampment of <Jeu di Porcos> in 2005 the passenger boat sank, which left him aged 34 years marooned on the island, with little option but to take up a job as a crew member on a paddle boat fishing bonga.*

(Cluster 3) *Respondent (vii) was born in Boffa, Guinea Conakry and by seventeen was completing his carpenter's apprenticeship with his elder brother. Moving along the coast to Koba, he was soon a qualified carpenter, making beds and other small*

furniture items. But work was not steady and when the 'Aisali' bridge building company put out a call for workers, he stepped forward and took on the construction contract, as a worker building the steel frame for the concrete bridge near his home town of Boffa. But the work was short term and four months later he moved back to his father's home town of Kamsar, where he stayed unemployed for many months. Ending up in the old Port, aged 24 years respondent (vii) met a man from Sierra Leone who mentioned that he was going to earn money fishing in Guinea Bissau. "What he didn't tell me" the respondent explains, "was that he was returning to confront a debt of 150,000 (£300) CFA". "I was with other people from Uno (on the passenger boat 'Business') who later told me….if they had known then I was going to be paying the debt of that man, they would have advised me never to leave Kamsar".

(Cluster 3) *Respondent (viii) was born in Sambaiya near Kamsar, Guinea Conakrywhere he never even finished his first class at school. When his brother died, his parents separated and by fifteen years of age he was working as an apprentice mechanic in his mothers' home town of Fria in the central highlands. The apprenticeship finished and unable to find work, he started washing cars, which he remembers was good money. His mother died suddenly and unable to stay in Fria, he moved down to Kamsar on the coast where he was born. There he heard that his father had travelled out to the islands in Guinea Bissau and aged 24 years; boarding the passenger boat 'Kamsar' he met his father on Uno and began long-lining for catfish in his fathers' paddle boat. During a storm surge the line was lost and his father became ill with stress returning to Kamsar and leaving respondent (viii) as a crew member on a neighbours' boat inside the Uno camp.*

(Cluster 3) *Respondent (ix) was born in Enugu State, Nigeria in 1980, but moved to Benin City at a young age where he finished secondary school. At twenty four he moved to Lagos and staying with his uncle, started an apprenticeship as a trader in the family store. Two years later, having established himself as a 'business man' and*

with a loan from his older brother, he signed a seven year lease on a small store in the 'Fair Trade Complex' which had "no electricity, no running water and no employees". Selling cartons of juice and soft drinks that he purchased from a wholesaler, he was visited one day by the 'Navdak' fraud squad that recognised his carton of 'vitamilk' had been brought in from Thailand through Cotonou and held no standards number. They subsequently closed his shop, took him to court and eventually shut down his business. By 2006, he had reached Conakry City overland and was selling jewellery and other hair attachments in the road with fellow Nigerians. By 2008, his brother had reached Bissau City and was selling shoes when he advised respondent (ix) to follow. A brother finally introduced the respondent to a friend, from Eno State, Nigeria, who explained that he was buying smoked catfish on Uno Island and carrying this by road back to Nigeria where he had observed handsome profits were to be made by the enterprise. The same year, aged 30 years of age Respondent (ix) moved out to the Uno encampment to find fish.

(Cluster 3) *Respondent (x) was born in northern Guinea Bissau the son of a cattle herder father. At eleven years of age he was out of school and tending to the family herd. But ten years later, his ambition had changed: "I'd started to see those people coming from the sea, they'd been fishing off <jeu di jeta> and they had money, lots of it"*

4.4.3. Bijagós Decisions to Exit Commercial SSF

Many individuals inside both Bijagós clusters (entering commercial SSF between (i) 1960-1980 and (ii) 1990-2000) describe being 'pushed' out of commercial SSF. In Cluster 1, this accounts for 56% of respondents. Several described misfortune in the family or sickness. The majority storm damage to their boats. Many also explained an emerging need to purchase rice for consumption. This relocation of funds was

seen as fuelling an inability to re-invest in storm damaged fishing gear. For respondents in Cluster 2, 55% also described a 'push' out of fishing. As with cluster one declining rice yields were cited.

The emergence of hunger <*fomi*> was considered a new phenomenon; one with which the islanders on Uno at least, felt ill-equipped to deal. As explained: "*We don't know hunger! In the past, our grain stores <bembas> were full; our mothers saw so much rice they couldn't cook it all*[118]". The causes of declining productivity are contested by respondents in Cabuno. For individuals of Ancoyem and Ankarabe villages, the declining village yields are undeniably linked to the presence of hippopotamus that have settled in proximity to the rice paddies. As one individual explained: "*Many people arrived from Bissau in 1998 (*the time of civil war*)); but also God is great! We had rice, mangos and fish plenty; the hippos hadn't started (making problems) yet*[119]*"*. Another individual stated that: "*At that time, if the hippos came close then we could light a fire and they would go away*". The problem of the hippopotamus emerged later during the 1990's when they increasingly encroached upon the rice-crops, causing damage through grazing and trampling; and exhibited increasingly aggressive behaviour. The problem with the explanation of declining yields being linked with the hippos alone, however; is that rice paddies outside of the hippos grazing territory have also experienced declining yields. As a result, declining yields have also been linked with increasingly unpredictable rainfall, lack of access to fertiliser and insecticides; and bad luck.

[118] *<Anos, no ka kunsi fomi; na ke tempos passados no teneba bembas inchi di arrouz; no mames I teneba arruz manga del, suma I ka pudi cuna tudu>*
[119] *<Djintis tchieu bin sai di Bissau ke tempo. Mas tambem, deus garandi- nos teneba arroz, mangos e pis tchieu. Pis caballo, i ka rankaba ainda>*

Bijagós respondents in Cluster 2 (who had joined commercial SSF later, between 1990 and 2000) also described declining fish catches. This was blamed as failing to provide financial opportunity for any reinvestment in storm-damaged boats. As one individual summarised his departure from the sector in 1998: "*It was starting to become difficult to catch sharks. Many Senegalese were fishing outside (the paddle zone) by that time. They were making campaigns*[120] *and they were taking our fish".*

However, in each of the two clusters approximately 45% of respondents described being pulled or lured (enticed) out of commercial SSF activities, in order to secure a place in the village *fanado* ceremony. This finding was consistent across all generations[121]. The finding also extends outside of SSF. For example, life-history respondents who had never fished commercially but were employed in construction, as taxi drivers, workers in the capital; all described leaving their employed positions to return to the island to join their age-grade cohort[122].

For the Animists, membership of an age-grade within the village and in the wider initiation group has numerous ceremonial requirements. These are hugely varied; but include periods of social exclusion, isolation, fasting and working for the elders. The most important is the *fanado* itself; when up to forty five days are passed in ceremony. This is followed by a further month of exclusion inside the village *baloba*.

[120] A Kriole term used to describe several consecutive days of fishing by a small-scale vessel offshore without touching land

[121] For example individuals fishing during the 1980's left for the 1983 ceremony (the <*Russians*>); others left for the 1993 ceremony <*Chinese*> and finally for the 2003 initiation of the <*Japanese*> cohort.

[122] In October 2010, the Bijago radio station "Djan Djan" (which broadcasts nationally) introduced two elders from Canhabaque Island, who in a dialect only known by their village made a plea to all members of the village cohort working in Bissau, in Oio, in Farim and the north; to return to their village, as the initiation group are waiting to start the <*fanado*> ceremony

The initiation period comprises three critical years before the ultimate *fanado* ceremony. During this interval numerous ceremonies are undertaken. The most significant is known as <*mañake*> which occurs in the final week before initiation begins and this represents the presentation of an ultimate offering. On Uno, informants described a need to offer purchased consumer goods, as the following extract explains: "*In that ceremony, you're going to offer cloth, drinking cups, water containers, spoons, hats and plastic buckets. You're going to give it all to your teacher. You're going to open your bag in front of all the people, all the families- and then, they're going to see what you bought*[123]". This is not the case on all islands; for example, as explained by informants initiated on Orango Grande; cloth payments were never used in the initiation ceremonies there.

With the average duration for which an individual pre-initiate Bijagós male worked inside the commercial SSF sector standing at only 5 years, it emerges that an individual villagers in general entered, worked and left commercial SSF during and towards the end of their term as uninitiated *cabarro*. The resultant role of SSF seems to be one of short-term engagement, in the life-cycle of many Bijagós, attributed as a chance engagement in paid work before joining the initiation cohort.

[123] "*Na tempo di cirimonia di fanado, bo na patti panos, copos, esterras, pote di yagu, cullieres, chapeos e baneras. Tudu bo na dar bo Lambé. Bo na abri bo malla alfrente di tudu djintis, tudu familia- e elis, i na olha ke ku bo kumpro*"

4.5. Discussion

This discussion returns to each of the three chapter objectives outlined in the introduction. The first section asked whether residents of the Bijagós study villages had ever fished commercially in the past and what parameters defined their entry into the activity. Analysis revealed that the majority of Bijagós life-history respondents did recount prior involvement during their life course, in at least one commercial SSF venture. Fishing had also been associated with considerable opportunity and financial gain in the past. The Bijagós have been described as part-time fishers (Tvedten 1990; Haakonsen 1991). It seems likely that for some who were formerly engaged in commercial fishing, commitment to rice cultivation prevailed such that they were even at the height of their involvement, seasonal rather than full time employees within the sector. Although rice is today available to purchase on Uno Island, the price is high and market supplies considered unreliable, such that abandoning agriculture altogether has been described as 'dangerous' (Baekgaard and Overballe, 1992: 188).

This study does inform us that sharks were a welcome by-product of fishing excursions in former years; if not a target catch. Admittedly the value of sharks had been 'learned' by the islanders, and this study supports the findings of Diop and Dossa (2011) that prior to the 1970's sharks were not the target of coastal fishermen operating in the area. The Bijagós Islands have been described however, as a "safe breeding ground" for sharks which have never been the target of sustained fishing practices by the indigenous islanders (Tous et al. 1998). The life history surveys of

respondents in Cabuno question this claim and suggest that targeted shark fishing was an income generating opportunity in the past, at least for some in Cabuno Area.

The second section asked what characteristics had shaped entry decisions for the in-migrant residents of the fishing encampment. Analysis reveals three entry groups into the sector. The largest group comprises the most recent new-comers into commercial SSF and they are considered here first. The presence of this group in West Africa is not surprising given the high unemployment levels, effects of which place considerable strain upon the regional workforce. Poor infrastructure in the interior of West Africa, particularly in Guinea Conakry has been described as hugely influential in driving people to the coast, where open access arrangements and the low profitability of agriculture has encouraged and enabled individuals to take up fishing; despite most having no previous knowledge of or working experience in the sector (Solie 2006; cited in Njock and Westlund 2010). A wider trend of inland Senegalese communities diversifying to take up fishing has also been documented (Cormier Salem 2000). The Djola Felupe fishers from Senegal, identified inside the Uno encampment are traditionally described as professional farmers who saw seasonal contracts as an "opportunity to carry out profitable short term" work, escaping from otherwise seasonal unemployment. (Boujou1991).

In this study, references to conflict are inter-woven within many of the life-history interviews. For respondents in both Clusters 2 and 3 (all late entrants) conflict proved influential in framing decisions to move and to move into fishing. Other studies have shown that not only the immediate influence of war, but also resounding effects of

economies recovering after war, can influence movement into fishing, as power and investment priorities are transformed by emerging governments (Jul-Larsen and van Zweiten, 2004). The influence of conflict upon migration is contextualised by outlining one period of conflict in this region, namely the onset of armed fighting in Liberia in 1989, from which the Upper-Guinea region experienced dramatic population in-migration (Black and Sesay 1997). Between 1992 and 1995, an estimated 150,000 refugees moved out of Liberia and Sierra Leone into Guinea Conakry of which less than 20% were living in refugee camps but rather, those from rural areas tended to flee to rural areas and urban dwellers settled in cities (van Damme 1999). By 1995, the total estimated refugee population in Guinea alone was over 500,000, and despite a series of cease-fires and peace agreements, the prospects for repatriation remained bleak (Black and Sesay 1997). People who are forced to emigrate as a result of armed conflict; violations of human rights, or natural disasters, including refugees and internally displaced people, have few assets and depend heavily on the environment for their livelihoods (Zommers and McDonald 2012).

The prevalence of late entrants to fishing among the in-migrant encampment respondents confirm that effort dynamics inside the fishing sector depend as much on general economic and social development in the region, as on the fishing economy (Jul-Larsen and van Zweiten 2004). The multiplicity of skills identified within the in-migrant life histories, provide evidence of the 'entrepreneurship and employability of fishermen' identified by Hannesson (2002) in his critique of SSF management initiatives. This study does illustrate that for some late entrants, many of whom have little experience of commercial SSF the importance of the sector in

providing a safety net, against otherwise complete unemployment must be acknowledged. Furthermore, this study confirms the importance of the Bijagós Islands as a critical place in which this 'safety net' is realised.

This study also highlights that fishing remains an attractive option. That former diamond miners are now found in the SSF sector contextualises the 'pull' of fishing, which when compared with mining offers similar rewards but lower-risks and higher probabilities of success (Graz 2001: 131 cited in Allison and Horemans 2004).

Evidence from Uno Island illustrates that early entrants into the sector (both fishers and traders) are still a prominent feature of migrant fisheries, all be they perhaps a minority. Many early starters identified here, entered commercial SSF during the 1980's and 1990's; a period in which entry was advocated in national structural adjustment programmes across the region (Chavance 2000). For these individuals at least, SSF cannot be considered a 'safety net' opportunity, given that the conventional definition of this term is associated with short-term involvement in the activity. Presence of this group (and in particular the early starter fish traders, many of whom learned their trade from an older familial relative) does indicate that for some actors, the adoption of fishing as a 'way of life' is steeped in personal family history. Further, this information relays the importance of the sector as having providing for decades economic and social support, to a group which has accumulated extensive knowledge of both fishing grounds and availability.

The final section asked what factors led Bijagós villagers to exit from commercial SSF operations. Interpreting 'willingness to exit fishing', has emerged as a popular topic in the literature, given the current rate of growth of the sector and concerns associated with declining fish stocks. Rather than researching whether existing fishers would be willing to leave fishing and what factors might influence this outcome; this analysis provides a retrospective view from individuals who formerly used to fish and investigates the reasons why they stopped doing so.

Results reveal a split between Bijagós respondents. Some described an unwillingness to leave fishing but an inability to carry on given that gear was damaged, rice production was in crisis and surplus cash was needed for food, rather than physical asset investment. The presence of hippopotamus inside some rice paddy cultivation areas in Cabuno appears to have exacerbated already dwindling production levels triggered by seasonal rainfall change. However, unlike reports from other areas (for example, see Kendall 2011) Cabuno villagers did not responded to the crop-raiding events with culling episodes. Villagers admitted however that if anybody did have a gun big enough, killing the hippos would have been supported. This study therefore supports other research, which has found that fishers are often reluctant to leave or stop fishing, even when difficulties are being encountered (Pollnac et al. 2001; Pita et al. 2010). Fishers' willingness to exit fishing activities has also been studied in designed experimental surveys. Fishers have been observed to show greater willingness to leave the activity when hypothetical scenarios of catch declines are at their most severe and when perceptions of future abundance of valuable catch components are negative (Cinner et al. 2008). Some former Bijagós fishers described

stopping fishing reluctantly, even though they admit that their catch rates were seemingly in decline. At least half the Bijagós fishers in Cabuno were reluctant to stop fishing but described how they had felt forced to do so; suggesting that any decline in catch rate observed by an individual fisher was not in itself enough to deter that individual from fishing activities. Further, perceptions of future availability of important catch components (such as the shark) do not appear to have been so low, that this also fuelled individual incentives to stop fishing. This suggests that fishing in Cabuno area, as seen from the perspective of the Bijagós villagers was, up until the 1990's, still an attractive activity.

In contrast, 53% of former Bijagós commercial SSF did willingly or readily stop fishing. These individuals explained that the cultural and social significance of their individual participation in the village initiation ceremony was paramount to this decision. This persistence of '*isolationist*' practices inside the Bijagós animist arena has been acknowledged in other research (Lundy 2006). And the commitment of Bijagós males to their initiation cycle has been documented on other islands, as prohibitive of a full-time commitment to the fishing sector (Tvedten 1990). This study suggests that commitment to the *fanado* over-rides a long term opportunity in many occupations, not only fishing. High willingness to leave fishing has been associated with locations in which infra-structure is generally poor and the opportunity for occupational mobility low (Daw et al. 2012). Given the isolation of Uno Island, the minimal infra-structure and large distances to markets, it could be said that the financial rewards attained from fishing were not sufficient to keep individuals inside the sector; when compared with the immediate socio-cultural and

future financial rewards; associated with participating in the village *fanado*. In this case-study, strong social and cultural ties between the youth and village elders have encouraged many respondents out of long-term fishing activities (including shark fishing) and driven them periodically in groups, to an initiation ceremony during which they accumulate knowledge, wisdom, respect and huge debts that subsequently prevent their immediate return into commercial production. The government of Guinea Bissau has declared an upper-time limit of four months on all initiation ceremonies of all ethnic groups, which they describe as a threat to national production activities as well as education (Baekgaard and Overballe, 1992: 175). What this rule seemingly overlooks is that the customary payments of post-initiation debts frequently render individuals unable to return to former opportunities of employment, held before initiation began.

This chapter has deconstructed the entry strategies of workers into commercial SSF. Evidence supports the safety-net function of the sector and highlights the adaptations individuals make in order to participate. Life-histories of new-comer in-migrants illustrate that involvement is often associated with 'coping' strategies aimed at counteracting the prevalence of conflict in this region. For the Bijagós, a shorter-term involvement in fishing is shown as a means of circumventing the 'crisis', of not being able to afford initiation. However, the information gleaned also indicates that safety-nets aside, involvement in commercial SSF is also, for some, a family legacy; and for others a calculated investment decision, prior to which financial merits have been realised.

Chapter Five

Conflict and Commercial SSF

Chapter Overview

This fifth chapter investigates the factors which shape contemporary patterns of resource use. This topic is aligned with the theme of access to fishing areas and the likelihood that a race to fish attitude will develop, as outlined in Section 1.3.ii. The chapter also engages with a particular spatial management strategy implemented inside the Bijagós Islands which attempts to control fishing. Quantitative data derived from time allocation observations made with Bijagós and in-migrant focal males investigate determinants of individuals engaging in fishing activities. Qualitative data derived from semi-structured interviews with the same actors and key informants, are used to define the political processes through which fishing occurs in the study area and the context in which conflict between these two groups has manifested.

Bijago males allocated only 5% of total time to catching fish and this activity occurred only during the dry season. However the matter of fishing was found to infiltrate wider cultural and religious activities, demonstrating that fishing signifies

more than commercial income-generation inside the Bijagós village. Bijagós males were expected to fish during ceremonial procedures, even if they lacked prior experience or knowledge of the activity. However proportional time allocated to fishing for the Bijagós was greatest for those with prior experience in commercial fishing and for those, undertaking a diverse portfolio of activities. In-migrant fishers allocated around 30% of their time to catching fish which declined but was still widely undertaken during the stormy rainy season. Migrant time in fishing was influenced by the proportion of fishing experience an individual had gained working inside the Bijagós Islands. Those with little experience outside the Bijagós tended to fish more on Uno. Conversely, individuals with greater experience outside of the islands were more closely involved with fishing equipment repairs and typically were engaged with a wider portfolio of fishery related activities.

5.1. Literature Review

5.1.1. Resource Dependency, Environmental Degradation and Conflict

Human population growth has been for years associated with, often negative, environmental change. However, it is increasingly recognised that cultural traits, social norms and political circumstance critically influence human-environmental interactions and this challenges the original simple association (Agrawal and Yadama 1997). Furthermore, the resource-dependent-nature of a human population and in particular availability of non-natural resource based livelihood opportunities are considered key factors in this association. Resource dependency is notoriously

difficult to measure given that in reality most people are mobile with respect to their occupations and may combine different activities in a complex bricolage or portfolio of multiple activities at any point in time (Scoones 2009; Palaciosa et al. 2012). Although a positive relationship between poverty and individual discounting behaviour has been observed (Akpalu 2008) it is also argued that poverty and environmental degradation have rather tenuous links given the heterogeneity of 'the poor' in terms of material wellbeing and agency (Ansoms and McKay 2010).

Migrants provide an interesting case for understanding the relationship between resource dependency and environmental degradation. Migration is described as an expected life-course event (Lambert 2002); a mentality activated when individuals observe others moving (Odotei 1991) or when individuals move and develop migratory capital becoming more likely to move again (Guilmoto 1997; White and Lindstrom 2005). Others claim that whether or not an individual migrates is a product of selection; and some people are inherently either 'movers' or 'stayers': although employment status is considered of key importance here, with those individuals without work increasingly likely to move (Reed et al. 2010). Curran (2002) describes the differential and circumstantial impact of migration upon the environment. Cassels et al. (2005) conclude that contrary to other studies, little evidence exists to suggest that migrants have a significantly larger effect upon the environment than non-migrant households. In a more recent paper, Zommers and McDonald (2012) conclude that different types of migrants may have different effects upon resources.

As multiple resource users come together in a negotiation of resource access, conflicting interests may arise. Conflict is described as one of the greatest challenges facing conservation today (Redpath et al. 2013). Conflicts over the use and management of natural resources are widespread yet the formation and impact of such situations are very seldom understood (Bennett et al. 2001).

5.1.2. Chapter Objectives

This chapter addresses a situation of conflict between a local and in-migrant user-group, to investigate the links between resource dependency, environmental degradation and conflict. The chapter also addresses three research questions. The first asks what the importance is of fishing, as a livelihood activity, to Bijagós villagers and in-migrant encampment residents. The second asks which attributes (of an individual and their household) determine the time allocated to fishing. The third section considers the processes driving the politics of resource access in Cabuno.

5.2. Method

A comprehensive description of the national and local nature of the study site (Cabuno Sector, Uno Island, Bijagós Archipelago, Guinea Bissau) is provided in Chapter Two. The data sets used in this chapter are derived from several sources. Analysis of the 'importance of fishing' to members of the two study groups is of a quantitative nature. Quantitative data collection was undertaken with a sample of individuals from within two focal villages in Cabuno (Ancoyem and Ankarabe) and focal fishers within the in-migrant fishing encampment. Thirty seven Bijagós

individuals from Ancoyem (n = 16) and Ankarabe (n = 21) form the basis of this focal sample. These individuals were resident within twenty nine distinct household units (Ancoyem n = 13 and Ankarabe n = 16). Twenty one in-migrant fishers form the focal encampment sample; these were occupants of 21 households. Information used to define key conflicts of interests for the two groups originates from SSI's and key informant conversations inside each of the study groups and SSI's in the wider geographic area. The qualitative accounts of in-migrant arrival onto the Cabuno beach are derived from semi-structured interviews (SSI's) undertaken with members of the in-migrant fishing encampment, over the course of the study period. As a backdrop to this debate is an account of customary Bijagós land use regimes, information for which is also derived from SSI's and key informant conversations with Bijagós villagers inside the study area.

5.2.1. Coding Time Allocation Data

Time allocation (TA) to different livelihood activities was measured using the spot-check method (described in Section 3.4.6). In total 2237 half-day observations were made of Bijagós male villagers; of which 1070 relate to dry season activities (between November 2009 and April 2010) and 1167 activities during the rains (May to September 2010). A further 1005 activity observations were made for the focal in-migrant fishers; 533 during the dry season and 472 during the rains.

In total 107 different activities were described and documented during the time allocation spot checks inside the Bijago village (Table 5.1). Fewer activities were observed inside the in-migrant fishing encampment (Table 5.2). Activities (in both

Bijagós and in-migrant locations alike) were coded by a "schema" which grouped activities into Production (also referred to as extraction), Construction, Commerce, Repairing Equipment and 'Other' activities (including free time and leisure). Activities inside the "Production" scheme were further categorised into "themes" comprising agriculture, livestock, fishing; hunting of wild-animals, collection of NTFP's and wood cutting. Inside the Bijagós villages, agricultural activities were classified into domains or categories: these included lowland rice, upland rice, palm fruits, palm wine, cashews, vegetable gardens, non-rice field crops and mangos. Activities classified as "other" included domestic and village tasks; education, free-time, ceremonial, sickness and travel. The spot check observations also described (i) whether the observed focal individual was working alone or in a group and (ii) who the focal individual was working for (classified as 'for self' or 'for another').

5.2.2. Coding Individual Attributes

A Household Survey (described in Section 3.4.4) provided a quantified framework of attributes defined by each community during participatory wealth ranking. The attributes are outlined in Table 5.3. Information detailing the individuals' prior fishing experience and entry strategy into commercial SSF was derived from Semi-Structured Life History interviews (3.4.5).

Table 5.1: Bijagós activities (males only) as recorded inside two focal villages Ancoyem and Ankarabe

SCHEME	THEME	DOMAIN
Production	Agriculture	Palm Wine (Tasks inslude cleaning trees, making climbing cord, collecting stoppers, tapping wine)
		Fields (Tasks include planting, weeding of non rice crops)
		Cashew Orchards (Tasks include repairing fencing, clearing ground, gathering cashews)
		Oil Palms (tasks include cutting, gathering, pounding, cooking)
		Vegetable Gardens (Tasks include repairing fencing, watering)
		Upland Rice Fields (Tasks include repairing fencing, clearing ground, stripping overhanging palms, ploughing, planting, guarding/ bird scaring, weeding, harvesting)
		Lowland Rice Paddies (Tasks include clearing ground, stripping overhanging palms, ploughing, transplanting head-started seedlings, guarding/ bird scaring, weeding)
		Mangos (Task include gathering)
	Livestock	(Tasks include guarding, watering)
	Fishing	(Tasks included fishing with the hand-net, gill-net, lance)
	Hunting	(Tasks included hunting monkeys and wild pigs and gathering wild fruits)
	Gathering fuel wood	
Construction	Clearing land; Digging/ building foundations, carrying water and digging earth, making bricks; cleaning carrying bricks, carrying water and digging earth to make mud "cement"; building walls. Cutting palm tree trunks for roof, cutting branches to make eaves. Laying roof, weaving cord to tie the eaves; Tying the eaves; Thatching new house (or re-thatching old house); Carrying sand; laying a sand floor; Fixing doors and windows.	
Commerce	Carrying to sell; or selling; palm wine, cashew nuts, fishing nets, food imports (rice), pigs and livestock, grass for thatch.	
Reparation	Repairing of nets and dug-out canoes	
Other	Domestic (cleaning house, laundry, cleaning water jugs, cutting/ gathering firewood, collecting food, medicine, winnowing rice and palm fruits, cleaning/ pounding rice cooking, drawing water); Education (teaching in state or missionary school; attending school classes or seminars); Free Time (praying- animistic and protestant, drinking palm and cashew wine, making offerings of palm/ cashew wines; dancing ceremonial and recreational, playing football, resting, repairing ceremonial items- drum, entertaining/ visiting friends and family, receiving medicinal treatment traditional and western; caring sick, visiting sick); Village Tasks (cleaning roads, wells, weeding churchyard/ baloba, carrying stones, cement and building village wells; village meetings).	

Table 5.2: In-migrant male fisher activities as recorded for focal individuals inside the Cabuno encampment

SCHEME	DOMAIN
Production	Fishing (with motorised or paddle-powered) monofilament nets, long-lines (small and large hook) and gill nets
	Wood Cutting (for fish smoking)
Construction	Cutting wood (for buildings), thatching, repairing
Commerce	Collecting, weighing, carrying, cleaning fish; carrying wood for sale; weighing, selling imports, baking bread for sale
Reparation of fishing gear	Drying, tying, patching, loading nets; hauling, cleaning, painting, repairing boats; fixing the long-line, catching/buying and cutting bait; removing barnacles, gathering floats (polystyrene beach drift), making glue
Processing Fish Catch	Cutting wood, sorting, smoking/ salting, packing fish; Cutting bamboo/ reeds/ palm fronds, , weaving baskets; Repairing and thatching smoking ovens
Other	Domestic: cooking, cleaning, drawing water, laundry; Free-Time; drinking, resting, playing football, entertaining, visiting, receiving medical care; travel

Table 5.3: Predictors or Attributes defining individuals and households inside the Bijagós and In-migrant fishing encampment settings, derived from the Household Survey (except where indicated)

Attributes	Attribute Description	BIJAGÓS	IN-MIGRANT
Household Demographic	Total Capita	X	X
	Proportion of independent adult males	X	X
	Proportion dependent children	X	X
Individual Social Status	Head / non-Head	X	X
	Age	X	X
	Age-Grade	X	
	Matrilineal Clan	X	
	Ethnicity		X
	Nationality		X
	Years on Site	X	X
	Education	X	X
	Religion	X	
	Household Location (hamlet)	X	
Individual Fishing Experience*	Subsistence/ commercial/ non fisher	X	
	Years working in fishing		X
	Proportion of fishing experience in Bijagós		X
Household Physical Assets	Hand nets	X	
	Monofilament nets		X
	Gill nets		X
	Long Lines		X
	Canoe		X
	Motor		X
Household Natural Assets	Paddy Yield in kg (2009)	X	
	Average annual household cashew yield (kg)	X	
Household Financial Assets	Cows	X	
	Goats	X	
	Pigs	X	

*Source: Life history interviews

5.2.3. Time Allocation Responses

Prior to analysis, observations for each focal individual were summarised. These summaries are called the individual responses (defined in Table 5.4). For Bijagós males, the total number of livelihood activities undertaken is here defined as the sum of 'the number of agricultural domains + production themes + schemed activities (excluding free time)' undertaken by an individual. Total livelihood diversification as discussed here therefore overlooks participation in individually defined tasks. For the in-migrants, the value of livelihood diversification for each focal individual distinguishes between fishing (with no distinction between gear) and wood cutting as production activities and similarly to the Bijagós analysis, overlooks individual tasks but rather focuses upon the number of 'schemes' with which an individual was engaged. For both Bijagós and in-migrant focal individuals, the 'total number of fishing gears used' is defined separately. TA by focal Bijagós individuals is defined as the proportion of individual TA observations during which an individual was involved in fishing. For the in-migrant focal individuals, TA is defined as the proportion of individual observations during which an individual was involved in (i) fishing and (ii) repairing fishing equipment.

Table 5.4: Time allocation (TA) responses attributed to individual focal males

	BIJAGÓS	IN-MIGRANT
Total livelihood activities undertaken	X	X
Total number of fishing gear types used	X	X
Proportion of time observed allocated to fishing	X	X
Proportion of time observed allocated to repairing gear		X

5.3. Data Analysis

The framework outlined in Figure 5.1 illustrates the sequence through which the analysis moves. Individual and household predictor variables are modelled using two multiple regression procedures.

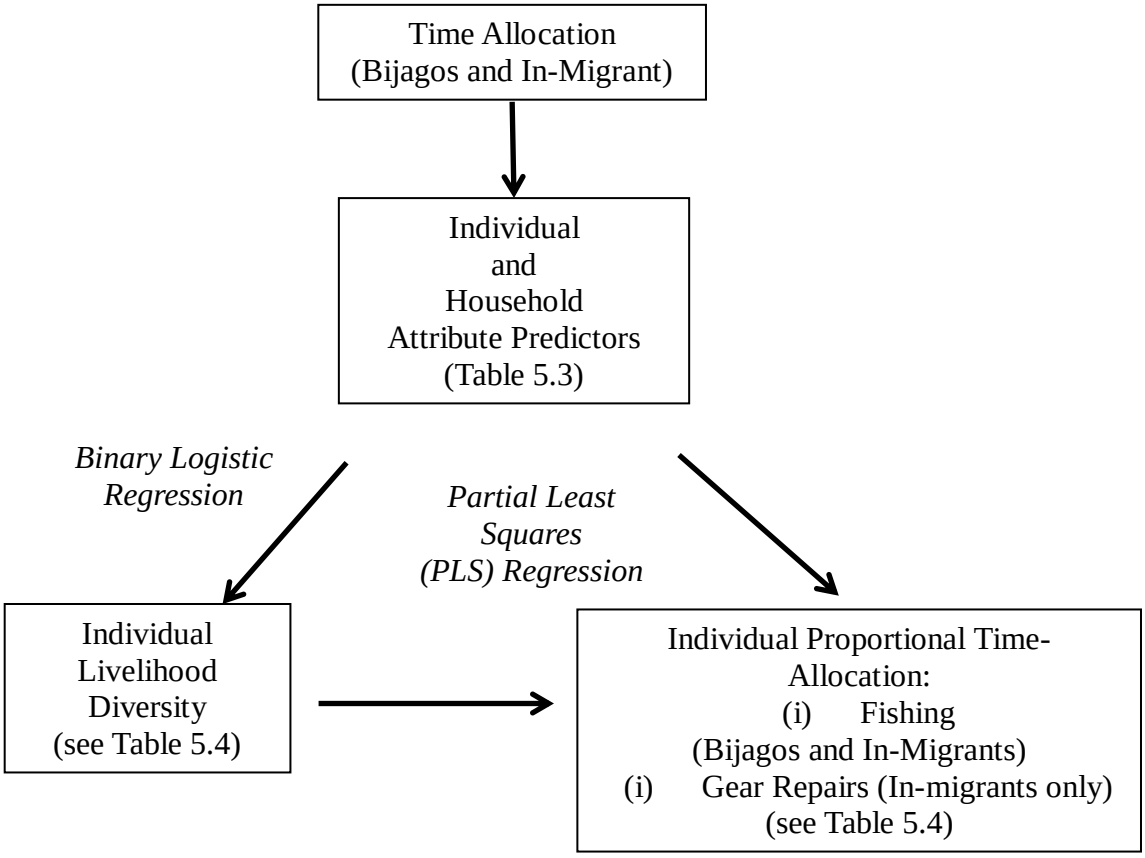

Figure 5.1: Analytical Framework for Section 5.4.1 and 5.4.2. General time allocation of Bijagós and In-migrant males is presented (5.4.1.). Individual determinants of livelihood diversification are discerned using binomial logistic regression (5.4.2.1.) and proportional time allocation is discerned using PLS regression incorporating both individual (including individual livelihood diversity) and household level predictors (5.4.2.2)

5.3.1. Binomial Logistic Regression

The total number of livelihood activities undertaken by an individual was categorised as low (three or less activities) or high (four or more activities). Binary logistic regression was then used to predict the likelihood that a focal individual would undertake "low" or "high" livelihood diversity. Similarly binary logistic regression modelled the likelihood that an individual would use few (one or two) or many (more than two) fishing gears. Regressions were conducted using the 'forced entry' method and the contributions of individual predictors (as main effects and interaction terms) were assessed using the Wald statistic. The fit of each model was assessed by the *R* value; *Cox and Snell* and *Nagelkerke* comparisons. Working outputs are listed in the Appendix 3.2. Binary logistic regression statistical tests were conducted using the IBM SPSS Statistical Package (Version 21).

5.3.2. Partial Least Squares (PLS) Regression

Partial least squares (PLS) regression analysis as a structural equation modelling (SEM) technique, was used to test for influential predictors, determining the proportion of time an individual allocated to particular tasks. The focal tasks were principally, fishing and repairing fishing gear. PLS regression is a modelling approach which falls between quantitative and qualitative analyses and brings significant improvement over univariate methods (Henningsson et al. 2001). PLS regression as a procedure is well-suited to data sets which (i) comprise small sample-sizes relative to the number of predictor variables and (ii) in instances when colinearity among predictors is acknowledged (Hair 2012).

PLS regression analyses were performed using the WarpPLS (Version 3.0) software which runs in conjunction with MATLAB (Kock 2010). PLS regression requires no validation of normality in predictor variables but all data are standardised prior to model assimilation by WarpPLS and column variables checked for problems of zero variance (Amand et al. 2004; Kock 2010).

Predictor variables (or attributes) were grouped into latent factors, defined using the individual and household attributes presented in Table 5.4. During the analysis the effects of linear combinations of several predictors on the response variable were analysed (Carrascal et al. 2009). Latent variables were directly linked to the 'proportion of observed allocated time' responses (outlined previously in Table 5.3) with all responses for each outcome modelled independently.

Latent variables can include multiple defining attributes and are therefore described as composite. The composition might be either 'reflective' or formative. Reflective composite variables are comprised of attributes which potentially are correlated. Conversely formative composite variables are comprised of attributes which are not expected to correlate. Models were defined using a standard PLS regression algorithm with a bootstrap resampling procedure (with 100 resamples); and whenever high collinearity was diagnosed as problematic by the programme, as advised, models were discarded (Kock 2010).

WarpPLS provides significance values for composite latent variables. These are denoted by path coefficients (β). WarpPLS also calculates variance inflation factors

(VIF) and significance values for each attribute (variable within the composite). In this analysis, model-fit was assessed using two criteria, as recommended (Kock 2010). Firstly, only models with significance levels '*less than 0.05'* for the 'average path coefficient' (APC) and the 'average R squared' (ARS) indices were considered. These values are computed using a complex resampling method with Bonferonni-like corrections (Kock 2010). Secondly, only models with resultant 'average variance inflation factor' (AVIF) measuring less than 5.00 were included. These values denoting model-fit are listed in Appendix 3.

Where a model did not meet fitness criteria; any latent variable represented by only one attribute exhibiting a non-significant path coefficient (β estimated with $p > 0.05$) was removed. Otherwise, individual attributes of composite latent variables were assessed using the 'variance inflation factor' (VIF). Here an upper limit of 5.0 (on all VIF values) was imposed (Kock 2010). PLS regression was then repeated following removal of non-significant attributes. Composite 'reflexive' latent variable reliability was assessed using the 'average variance extracted' (AVE) measure. Only AVE values > 0.5 were accepted. Use of the model fitness criteria was considered appropriate as the aim was not to test specific hypotheses per se, but to discover which model produced the 'best fit' from the original data-set.

This approach therefore aimed to predict which individual and household attributes within their composite latent variable 'umbrella' terms contributed to a fit model. This resulted in models, which could include non-significant latent variables (indicated by non-significant β or else non-significant *p* values associated with the

path coefficients) or individual attributes with only minimal significance (as revealed by the VIF value). The resultant models did however maximise our knowledge of all latent variables (and their attributes) which could explain variability in the data; the significance of which may have been masked however, by the small sample-size of this study and the limited number of attributes used to define 'latent variables' for the Bijagós village and the in-migrant encampment focal participants.

5.3.3. Qualitative Analysis

The final part of this chapter (section 5.4.3) comprises six sections which outline the political processes which have shaped and continue to influence access to fishing areas on and around Uno Island. Section 5.4.3.1 discusses the importance of Bijago locally sacred areas (LSA's) in customary organisation. Section 5.4.3.2 describes the arrival of the in-migrant fishing encampment onto the beach in Cabuno area. Section 5.4.3.3 considers the mechanism through which State agencies realised their power over the encampment. Section 5.4.3.4 describes observed in-migrant responses aimed at minimising the impact of State power arrangements. Section 5.4.3.5 outlines key concerns expressed by the Bijagós of Cabuno in relation to resource sustainability. Finally, section 5.4.3.6 discusses the extent to which the Bijagós stand divided as a result of the in-migrant encampment dilemma.

5.4. Results

5.4.1. Contemporary Activity Patterns

5.4.1.1. Bijagós Male Time-Allocation

Between 2009 and 2010, Bijago focal-male villagers allocated the greatest proportion of time (49%) to production activities. These were seasonally defined (Table 5.5). Production time was differentiated into five broad themes; comprising agriculture, livestock herding, fishing, hunting or non-timber forest product (NTFP) collection and gathering of fuel wood.

Outside of production, construction of and repairs to homesteads and granaries accounted for less than 20% of total time. This was concentrated during the dry season. Individual free time comprised up to 30% and was less with the onset of the rains. During the dry season, free time was allocated in various ways including education, rest, communal tasks (cleaning and maintaining village wells and roads) and ceremony. In the Animist village of Ancoyem, communal cleaning tasks were often undertaken by the pre-initiates under the guidance of elders and this work was commonly incorporated into a wider ceremonial activity. In Protestant Ankarabe communal cleaning of the village wells; the church and roads were undertaken by the younger age groups.

Table 5.5: The work schedule of male Bijago village residents (Anocyem and Ankarabe villages, in Cabuno Sector 2009-2010. White cells represent male only tasks, darker blue represent male and female combined tasks and lighter blue female only activities

<table>
<tr><td rowspan="2">ACTIVITY</td><td colspan="6">DRY SEASON (seko)</td><td colspan="6">RAINY SEASON (chuba)</td></tr>
<tr><td>NOV</td><td>DEC</td><td>ENERO</td><td>FEV</td><td>MARS</td><td>ABRIL</td><td>MAIO</td><td>JUNIO</td><td>JULIO</td><td>AUG</td><td>SEPT</td><td>OCT</td></tr>
<tr><td>Lowland paddies (rice)</td><td colspan="3">Weeding and guarding crop</td><td colspan="2">Harvest</td><td></td><td colspan="2">Clear ground, clean palms, mend dykes, burn before rains</td><td colspan="2">Ploughing</td><td colspan="2">Planting</td></tr>
<tr><td>Upland fields (rice, peanuts)</td><td colspan="2">Guarding crop</td><td colspan="2">Harvest</td><td></td><td colspan="2">Clear ground, clean palms, burn before rains</td><td></td><td colspan="2">Repair fencing</td><td>Planting</td><td>Weeding</td></tr>
<tr><td>Orchards/ vegetable gardens</td><td colspan="3"></td><td colspan="2">Clear ground, repair fencing</td><td colspan="3">Harvest</td><td colspan="4"></td></tr>
<tr><td>Palm Wine</td><td colspan="6">Cleaning palm trunks, puncturing and tapping wine</td><td colspan="6"></td></tr>
<tr><td>Palm Fruit</td><td colspan="6">Climbing trees and procuring palm fruit</td><td colspan="6"></td></tr>
<tr><td>Tending Livestock</td><td colspan="12">Watering, tethering etc.</td></tr>
<tr><td>Fishing</td><td colspan="6">Extracting fish and repairing material*</td><td colspan="6"></td></tr>
</table>

* Where during this interval, female residents harvest inter-tidal cockles and oyster

5.4.1.2. Bijagós Time in Fishing

On average focal males allocated only 5% of time to fishing and the greatest proportion (75%) of this, occurred during the dry season. During the rains, male attention turned to the labours of agriculture and mending any fishing equipment which had been removed from the beach areas. Year-round, fishing occurred mostly with the use of hand-nets, thrown actively into the water while an individual walked along the coastal shallows at low tide (Appendix 2, Photograph 11). Other equipment less frequently used included the gill net, hand line or Bijagós lance (known as the <*cañako*>). Gill nets were set inside rocky outcrops either by dug-out boat or on foot at low tide. These were made from discarded beach drift nets, fixed and repaired by the villagers. Hand lines were used off rocky points. Observations of lance-use were few, although individuals carried them while walking on foot along the beach at low tide. One trapping area was identified in an adjacent village (Bruce) where a stone wall construction created a tidal pool. This was clearly visible at low tide. Now redundant, such traps were reportedly common many years ago, when they played an important role in the initiation *fanado* ceremony.

Hand net fishers carried a basket on their back inside which the fish were stored. The nets were hand-made, with a mesh size typically 2 cm in diameter. Low tide hand-net fishing was associated with larger catches, than at high tide[124] which were associated with stronger water circulation in which fish were carried out from shore to the deeper water.

[124] '*hora ke marea i n bacha, bo na olha mas pis, ku ke hora ke marea i na inchi*'

In general, fishing grounds are open to village members. Resources from these areas can be harvested for subsistence or commercial purposes without observable harvest limits. Village boundaries are denoted by physical features (rocks, trees and inclines) and for non-village members, permission is required to enter and extract. For female Bijagós villagers intending to harvest cockles <*combé*> or male villagers to catch fish, undertaking such activities of a village of residency requires permission from the village authority controlling that area. One individual from Ankarabe complained that he was not even allowed to fish along the beach of his father's village without permission. A post-initiate *camabé* fisher-group from Cabuno also described failing to secure the right to construct a small shelter in the neighbouring port area of Angodigo, to use while fishing during the rainy season.

5.4.1.3. Bijagós Time in Non-Fishing Activities

Across the year, more than 60% of male time was allocated to agriculture. This was dominated by two palm products (oil and wine) and two rice cultivation systems (lowland and upland). Together these four domains accounted for 95% of total agricultural production time. The remaining 5% was taken up by minor activities in vegetable gardens, cashew orchards and in non-rice fields. The cutting, gathering and pounding of palm kernels accounted for just 7% of time investment. Between one and thirty palms were climbed during single excursions from which an individual could return having cut up to 150 bunches of palm fruit. Climbing palms to acquire wine accounted for 12% of agricultural time. Individuals were recorded tapping up to six palms and retrieving up to 23 litres of wine in any one excursion. An individual

could invest up to one third of time tapping palm wine; this was generally greatest in animistic Ancoyem but ceased during the rains to avoid accidents. Upland (elevated) rice cultivation accounted for a further 12% of male Bijagós village time. Fields were fenced and the ground inside cleared, but no ploughing of the soil occurred. Instead, the over-hanging palm-storey was cut back and all debris burned as a fertiliser. Planting was a female only task and the crop was left for approximately three months before harvesting. Rice fields were used for a season and then left fallow for 1-2 years.

In total 66% of agricultural time was allocated to lowland paddy rice <*bolanha*> production. These were located within open, seasonally waterlogged spaces approximately 2 miles from the village. Inside the *bolanha,* dykes were repaired to ensure water-capture, before the ground was cleared by cutting down any overhanging palms on which birds could perch or roost. These activities occurred before the first rains and resulting cleared vegetation lying on the surface of the paddy would be burned as the rains commenced. The paddies were then hand-ploughed during the rainy season. Lowland rice cultivation involved the "head-starting" of rice seedlings in village nursery areas. Water-resistant varieties[125] were sown at the time of first rains and developed for 30 days, before being transplanted into the water-logged paddy fields. Here they developed for a further 3 months. Rice fields were reportedly used for 2-3 seasons and then left fallow for 1-2 years.

[125] Six rice varieties of lowland rice were documented in use in the villages; known as <*edjancoma*> <*equerda*> <*ethunko*> <*roncante*> and <*ekpedjaka*>. One known as <*norman*> was named after a Protestant missionary who introduced the strain in the 1990's

The use of labour (working) parties <*sociedades*> was common for both male and female Bijagós village tasks. *Sociedade* membership crossed religious, kin, clan, village and cohort group boundaries. The collective formed when a group of individuals established a list of tasks they would undertake and terms (or conditions) through which they would work[126]. In general, male *sociedades* were responsible for land clearance, pruning of palm trees and ploughing; females for planting of rice and weaving of grasses into thatch. Each group would enlist a number of contracts to complete and organise a working schedule. Working days typically included Saturdays, although Sundays were a day of 'rest'. KI's explained that financial rewards particularly by male working-groups were increasingly sought by *sociedades* not just on Uno but across the Bijagós. However, only one paid contract was observed during this study, when villagers from Cabuno completed a ploughing task in a neighbouring village. Most importantly in Cabuno area, membership in a *sociedade* ensured that one meal per day was available to the worker (male or female). This was of particular significance during the rainy season when rice stocks from the previous dry season harvest were scarce. A *sociedade* would eat communally after work, normally outside the village, to avoid entrance of non-workers. A meal was required to include meat or fish. If the standard was considered poor; the host could be punished in subsequent years by having difficulty finding a work-party to meet their needs. Following the meal, sometimes before and during; workers would consume cashew wine offered by the host.

[126] Including punctuality, working hours; Food requirements and alcohol drinking limits before/ during work; and how far afield (outside the village) they would accept work

The *sociedades* emerged as the driving force behind rice production on the island. However, ceremonial ploughing of the rice paddies was also observed during which animist pre-initiate *cabarro* warriors were expected to plough lowland rice fields of their post initiate *camabé, lambé* and *odone* teachers and mentors. In contrast to the rules of the *sociedade* membership, the ceremonial ploughing event (known as <*paga cajur*> as outlined in Table 3.3 and Appendix 2, Photograph 12) prohibited the drinking of alcohol. Further, the pre-initiate males were only allowed to consume food prepared by specific approved females of the village, after dark.

5.4.1.4. In-Migrant Male Time Allocation

In comparison, activities of focal-males inside the in-migrant encampment were dominated by extracting fish, repairing fishing gear, processing the fish catch and resting inside the in-migrant encampment. Production activities accounted for 32% of total focal-fisher time and comprised the extraction of fish and wood. The time allocated to catching fish included travelling to a fishing area; setting gear into the water, passively waiting or actively working the gear, hauling and removing catch and often re-setting the gear, before returning back to the encampment beach landing area. This increased for the fishers in the transition from the dry season to the rains, linked to poor weather conditions and strong winds with which to contend. In response, fishers tended to go to sea less during the stormy rains. Time allocated to producing wood (for fish smoking) also declined during the rains, which was linked to lower catches and reduced smoking activity.

Both fishing and repairing gear, were exclusively male tasks. Females were involved in wood cutting and processing of the catch (by drying, smoking or salting). Fish smokers were more commonly female than male and male fish smokers rarely went to sea. Fish traders were both male and female.

The commercial fishing activities of the in-migrant fishing camp on Uno Island incorporated five main gears[127]. Two net gears were used to target bonga shad (*Ethmalosa fimbriata*) a small sardine like, pelagic (surface) shoaling fish. Two line types targeted the bottom dwelling (demersal) catfish species (*Arius spp*). One other net type was used to target larger fish of the mid-water column such as the croakers (*Pseudotolithus spp*). Crew members were typically mixed in terms of nationality, ethnicity, age and experience. Crews worked in contractual terms, although these were verbal rather than written agreements. Contract types varied between the monofilament, long-line and gill net fishers and also depended upon the motorised or paddle-powered nature of the canoe. However, in general contracts were organised a catch-share (rather than direct cash) system.

(i) Motorised Contracts and Catch Shares

In working motorised monofilament nets (MN-M) which target the pelagic shoals of bonga-shad, crew sizes varied between 8-12 individuals. The presence of a boat owner at sea with crew was variable, but generally it was the boat owner who also owned the nets used by that canoe. The general rule was to work three days for the

[127] In addition, mullet nets were observed used by hand to catch bait and the occasional use of hand-lines was documented

boat owner followed by one day for the labourers. Each working day was referred to as a 'date'. One date of the boat owner covered fuel costs, the second covered the expenses of buying and repairing fishing equipment including the boat. The third day was for profit. Each 'date' incurred the condition that 100 kg of catch accumulated[128]. On the first date of fishing for the owner, if less than 30kg of fish were captured, the date was annulled. Any catch from this trip could be sold off and cash used according to boat and crew requirements. If less than 100kg but more than the required 30kg minimum catch allowance, were captured this 'balance' was tied over to the following day of fishing, which proceeded as a continuation of the first date. This strategy proceeded until at least the required 100kg were captured at which point, the first date was completed and the second commenced. If, on the other hand more than 100kg were captured in the first 'date' this was all allocated to the boat owner and the second date followed. After three complete dates had accrued for the boat owner, one date followed for the workers.

Workers contracts varied between boats, although there was normally no minimum catch requirement for a 'date' of workers. Two workers might divide the majority catch derived from a crew date, for example ten kilograms of catch each from a 20kg haul. Anything leftover, for example 2-3kg could be sold off and divided between the other workers. On the next date for the workers (occurring after that of the owner) two different individuals received the larger catch share and in this way the payment rotated. Other boats simply divided the catch which accrued on a date for the workers between all crew members. In some boats workers were weighted in terms of new-

[128] Although the exact conditional catch varies between boats; some fisher reported working a 200kg minimum 'date' for the boat owner

comers and regulars, regulars receiving double the catch share on a worker date. Motorised long-line fishing trips which targeted the demersal ground-dwelling catfish followed a similar pattern.

(ii) Paddle-Powered Contracts and Catch Shares

In contrast, when monofilament nets were used inside a paddle powered canoe (MN-P) the fishing crew normally comprised only two individuals. Again the boat owner typically owned all fishing nets. The contract differed from motorised bonga fishing in that the terms were two days for the boat owner followed by one day for the workers; the difference explained by paddle-powered operators not claiming a day for petrol. Similarly, the paddle-powered monofilament netters adhered to a 100kg minimum catch on a 'date' for the boat owner. However, boat owners did report changing their strategy during the study; by simply selling or dividing catch after landing, every other day. Other boat owners reported allocating crew members a catch share every day. Paddle-powered long-line fishing trips for catfish operated in the same way.

(iii) Gill-Net Contracts and Catch Shares

Fishing with the gill-net gear whether through the use of motorised or paddle powered canoes was different to monofilament and long-line fishing. Gill-net boats typically carried nets owned by multiple individuals. These were loaded, set and hauled together by all owners and additional (supplementary) labourers working as a team. Catch from the gill net fishing trips was separated according to net ownership

which occurred as each net itself was hauled into the boat. Catch from each particular net was often stored in a separate area of the boat. One strategy of separating catch according to gear ownership as described by Senegalese gill net fishers involved each net owner to claiming a 'mark' used to identify the fish caught inside their net. Fish were scored with a symbol; each signifying a separate net owning individual within the crew. Other fishers describe simply working for several weeks with a set number of gill nets and at the end of an interval, dividing up the catch share according to net ownership.

The repairing of gear included fixing fishing nets, mending the boats and motors. Net repairs involved "patching" the holes caused by capture or removal of fish, loss of floats or weights. Nets were 'floated' using polystyrene beach litter, as well as purchased material. Nets were generally weighted with stones although occasionally purchased lead weights were used. Holes inside the wooden boats were sealed with hessian sacking, chiselled into place and coated with tar. One fisher was observed mixing a liquid of polystyrene, gasoline and opened battery fluid to make a glue to seal the holes in his boat. And one boat owner even mixed bread flour with tar to make a sealant. One particular problem was the destruction caused by barnacles to the wooden boards. In this case a chemical product called "anti-os" was used to prevent crustaceans burrowing into the wood.

Both bonga shad and catfish catch required smoking which was an extensive process; necessitating up to five fires, each lit on a separate day. Critical assessment was given to the wood used and the smoking method adopted. Wood of freshly cut

mangrove was favoured, as this presented the final product with a desirable red colouring and distinctive flavour[129]. Catfish, and other mixed small pelagic species, required smoking between three and four times. In contrast, the gill-net catch was gutted, sliced open and treated with salt to produce <*esclada*> or salt fish. In the transition from the dry to the rains, when precipitation and humidity increased, the preservation of processed catch became increasingly difficult; and rotting became a serious problem. Chemical products, known locally as <*produit*> and coarse grain salt were both used in attempts to prevent flies and mosquitos from laying eggs inside the salt fish.

Non-fishing time (30%) for the in-migrant fishers included activities such as domestic chores, resting and sickness. This increased with the transition into the rains when conditions at sea were sub-optimal. Many individuals expressed frustration at the degree of free time and resting. As one individual recounted; "*In our other camp <Jeu di Porcos> we were living as if we were in town. Whatever you wanted you would buy it. Even water to drink, you would buy it. With that, people couldn't just sit all day without work. It wasn't like here now (on Uno). Look! It's raining and everybody is just sitting around*"[130]

[129] Traders distinguish between <*bonga keta*> and <*bonga funi*> terms which distinguish between a reddish and black smoked finish to the smoked fish

[130] "*na jeu di porcos, nos staba suma na praza- ke ku bu misti son, bo na kumpra- ni si i yagu di bibi- bo na kumpra; depus djintis la i ka pudiba sinta sin tarbadjo- i ka staba suma ali agora, djubi- chuba na chubi i djintis i na sinta son"*

5.4.2. Individual Determinants of Time

5.4.2.1. Livelihood Diversity

Across the year, Bijagós male individuals undertook up to six major livelihood activities. Household heads were observed participating in fewer activities than non-head residents although this effect was non-significant. Results of the binomial logistic regression analysis are presented in Table 5.6. Across the sample, Bijagós males in Animistic Ancoyem displayed a greater diversity of livelihood activities than males in Ankarabe; suggesting a 'village' effect (Figure 5.2). Those with the greatest livelihood portfolio were also the younger individuals. This model accounts for 73.5% of variability in the data (Appendix 3.2a).

Table 5.6: Showing the results of two independent binary logistic regression models for (i) Bijagós Males and (ii) In-Migrant Males. The models predict the likelihood of an individual undertaking either 'low' or 'high' livelihood diversity (with less than four activities considered low and four or more activities considered high)

			95% CI for Exp (B)		
	B	S.E.	Lower	Exp (B)	Upper
(i) Bijagós Male					
Constant	1.5	0.5			
*Age*Village*	-.07*	0.03	0.89	0.94	0.99
(ii) In-Migrant Male					
Constant	-2.3	1.4			
Experience in Fishing (yrs)	.34**	.11	1.0	1.3	1.6

Bijagós: R^2= .24 (Cox and Snell) .34 (Nagelkerke)
Model χ^2 *(1) = 9.4, p = 0.002*
(* Wald = 5.8, *df* = 1, *p* = 0.016)

In-Migrant: R^2 = .40 (Cox and Snell) .56 (Nagelkerke)
Model χ^2 *(2) = 7.98, p = 0.005*
(** Wald = 5.1, *df* = 1, *p* = 0.024)

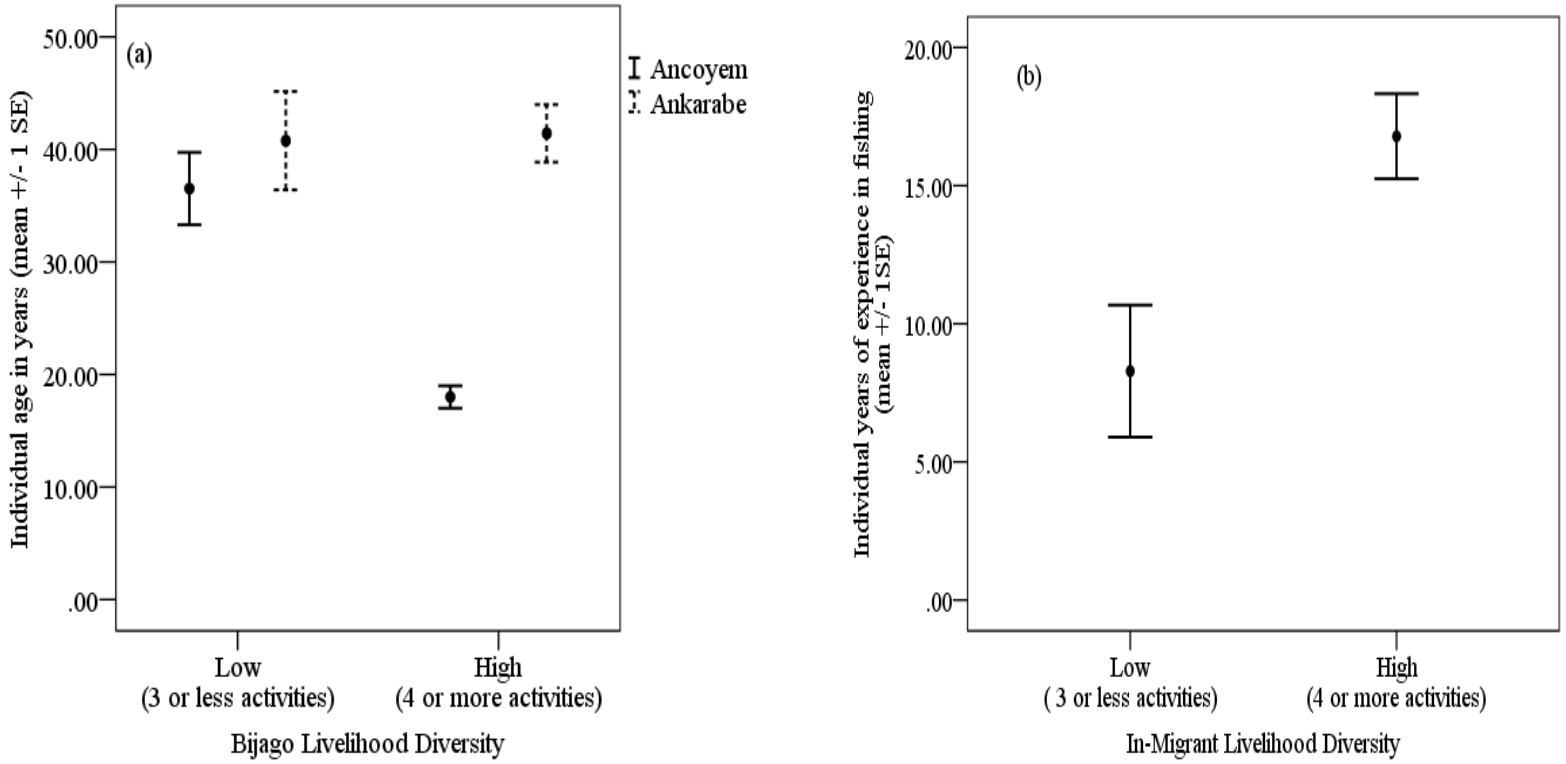

Figure 5.2: Individual determinants of 'livelihood diversity' for (a) Bijagós and (b) In-Migrant males

In-migrant male fishers undertook up to five livelihood activities. Those with greatest experience (years) working inside the fishing sector, tended to display greater diversity than those with less experience inside the sector. This in-migrant model accounts for 81% of variability in the data (Appendix 3.2b).

Binary logistic regression analysis was also used to investigate explanatory variables which could be used to predict whether an individual would display high or low fishing-gear diversity. The number of gears used by a Bijagós individual varied between age-grades and was highest with the pre-initiate *cabarro* cohort although this effect was not statistically significant. Individual in-migrant fishers were observed using between three and five different gears. Again, greater diversity in terms of gear-use was observed for younger individuals, although this effect was non-significant.

5.4.2.2. Proportional Time in Fishing

Ninety five per cent of focal Bijagós individuals were observed going to catch fish on at least one occasion. Partial least squares (PLS) regression revealed that time allocated to fishing, was influenced by multiple individual and household based attributes; however, household natural-asset ownership (of rice paddies and cashew orchards) did not significantly determine individual time spent fishing.

Household ownership of hand-net gear was significant and male members of households owning hand-nets tended to fish more (Figure 5.3). Individual status was

identified as a composite variable which comprised two significant attributes. The (i) village in which the individual and their household resided and (ii) whether the individual was the household-head or a non-head resident were of equal importance. Time allocated to fishing was greater for individuals living in Ancoyem village (5%) compared with Ankarabe (on average 2%). In Ancoyem even the animist non-fishers were expected to go fishing as part of ceremonial activities; particularly the pre-initiate *cabarro* and post-initiate *camabé* age-grades. Offerings of cash equivalent goods were made frequently by the *cabarro* warriors to the initiation group elders or *garandis*. These offerings included pounded rice flour, palm wine, cashew wine and pigs. Offerings of fish were also hugely important. The *cabarro* cohort of animist Ancoyem village for example, was observed fishing as a group all night and offering their catch to the village elders. Household heads allocated proportionally less time to fishing than non-head household members.

Individual experience in fishing emerged as non-significant, although Bijagós males with commercial (as opposed to none or subsistence) fishing experience did show a tendency to fish more. Household size had a negative effect upon time-allocation to fishing although this was also non-significant.

Livelihood diversity had a large, significant and positive effect upon proportional time allocated to fishing. Bijagós males exhibiting higher levels of livelihood diversification (engaged with a greater number of activities) were those for whom time allocated to fishing, was greatest. The model fit assessment is outlined in

Appendix 3.2c. Figure 5.4 serves to illustrate further, the varying influence of the significant attributes upon individual time-allocated to fishing.

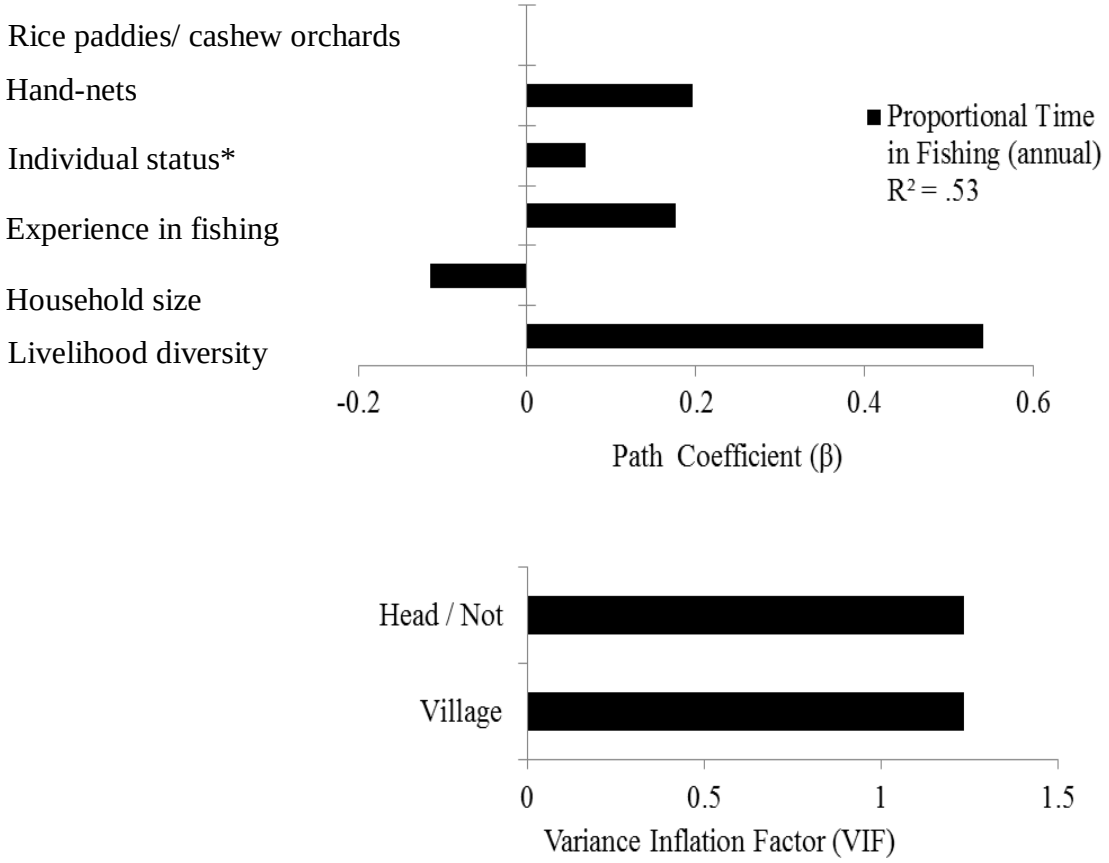

Figure 5.3: TOP: PLS Regression analysis for Bijagos male, individual time allocated to working in fishing. Estimates of path coefficient (β) for latent variables include: Hand-net ownership (p = .05), Individual status (p = .006), Experience in fishing (p = .102), Household Size (p = .24) and Livelihood diversity (p = .002). BOTTOM: Individual status* emerges as the only significant composite variable. This comprises two attributes 'village' and 'individual as head or non-head of household'. These have a comparable effect in determining time allocated to fishing.

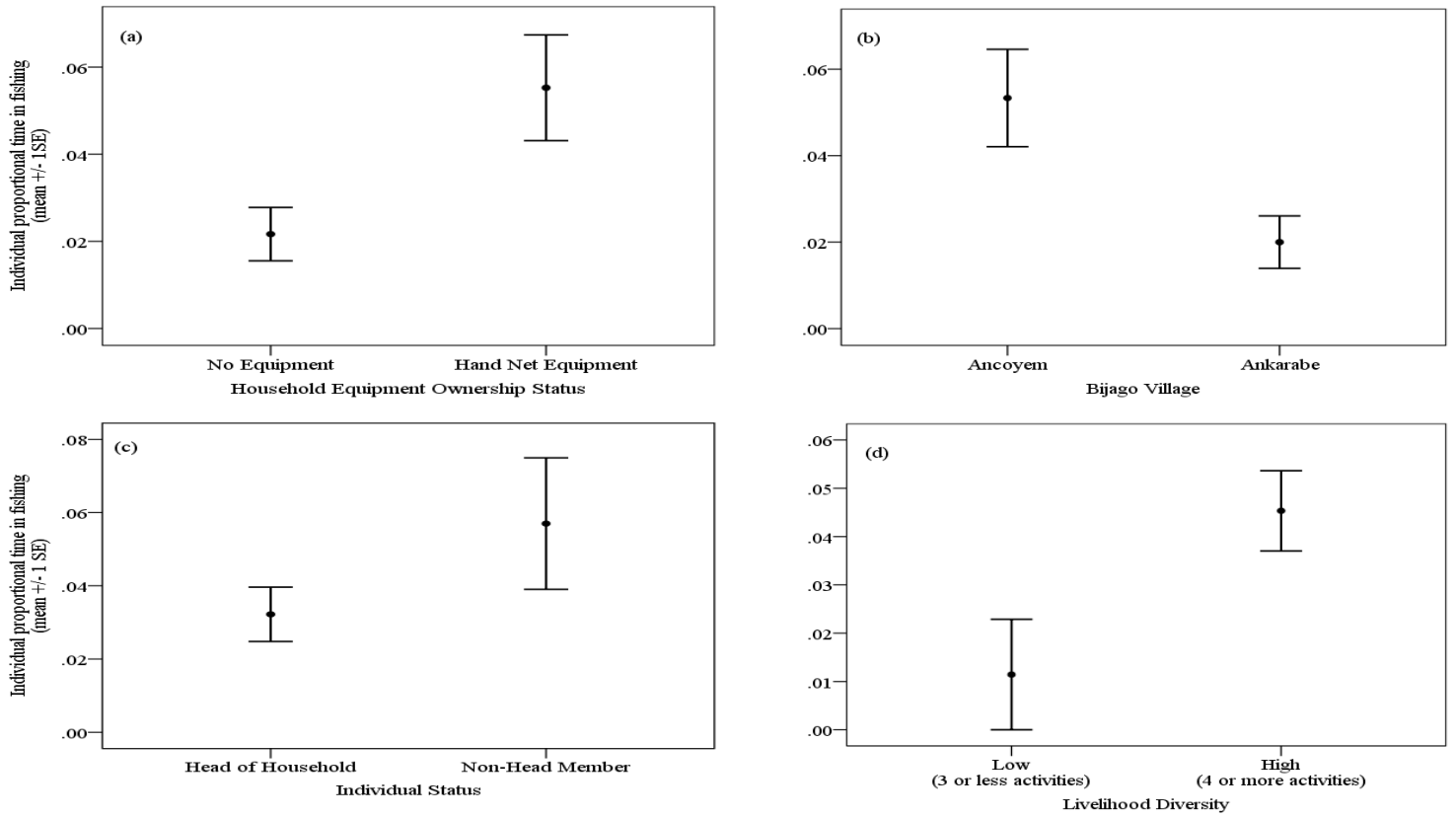

Figure 5.4: The influence of (a) household hand-net ownership, (b) village of residency, (c) individual status as head or non-head and (d) individual livelihood diversity upon time allocated to fishing

In contrast, PLS regression analyses of the focal in-migrant fisher time allocation to fishing and gear repairs did not reveal any significant models. Fishing material ownership, household size and proportional fishing experience inside the Bijagós Islands[131] all showed potential influence over time spent fishing. Individual age and years of experience in fishing were marginally non-significant in influencing time allocated to gear-repairs.

5.4.3. The Politics of Present Day Resource-Use

5.4.3.1. Sacred Areas of the Bijagós

Land use by the Bijagós in Cabuno is controlled not only by the seasons, extraction / production activitites and the ceremonial production of offerings. Animists also use some land for ceremonial purposes and completely set-aside other areas, as sacred. The village land chief or *chefi di chon*, in association with his council of elders is responsible for decisions regarding land use; although many sacred areas have been considered as such for generations.

Some land areas inside the village are by nature sacred, such as those on which traditional animist shrines *balobas* have been built. Areas around the *baloba* are generally reserved for ceremonial use. The village preist or *oronho* will be responsible for visiting the baloba and making offerings therein, to the sacred spirits *iraan*. These visits will be regular, but can also be made on an improptu basis if the village council of elders consider a ceremony necessary. The sacred spirits <*iraan*>

[131] relative to total fishing experience in years

are also offered an area outside the village, which the population refrain from cultivating, and which forms effectively a 'land sacrifice' in their honour. Other areas around the village, such as forest groves, will be restricted in access to particular age cohorts. There are normally also separated into male and female domains, known as <*barakas*> or meeting places. These areas are particularly important during village ceremonial preparations, for example when age-groups are preparing to dance.

Each initiation group on Uno, still functioning as an animist (not Christian) entity, lays claim to an area of land far outside the village where the larger, more important and most secret ceremonies of the *fanado* occur. These are known as the <*mato di fanado*> and are typically located on isolated rocky headland peninsulas surrounded by remote stretches of coast, exposed to the elements and several kilometres away from village dwellings (Appendix 2, Photograph 13). Here the *cabarro* warriors are taken to reside for up to forty-five days, guided by male post-initiates and the elders while undertaking ritual tasks and experiences.

To this day, no written description of the Bijagós male initiation ceremony exists and the rituals most likely are variable between islands. Anecdotal accounts of changing practices were heard during this study, but in general, the practices themselves were not discussed and the secrecy regarding initiation was respected. It was understood however, that during the *fanado* the sacred scrubland is completely closed to public use and footpath access is blocked and guarded. Outside of the initiation schedule, strict behavioural rules prohibiting fighting, shouting,

disagreement and sexual encounters are enforced in these areas. The cultivation of a sacred land area was observed by occupants in Cabuno (Appendix 2, Photograph 14). The *mato di fanado* of *Amutai* was used as an upland rice cultivation area (or swidden) during 2009. The sacred site had been cultivated previously, but not for some thirty years. Elders and KI's of Cabuno area explained that the cultivation at *Amutai* during 2009 was a strategy, through which it was hoped that the population could connect with and gain the approval of, the *iraan.* This, it was hoped would encourage a successful and prosperous harvest, to combat several years of declining rice yields plaguing the *bolanhas* of the area. The sacred site cultivation required following strict ceremonial proceedings. Animals were sacrificed to the *iraan* before land clearance could commence. Crops were only harvested after further ceremonial sacrifices of animals, all of which required the presence of the village priest <*oronho*> and members of the council of elders. Cultivation activities were undertaken in a controlled manner; no alcohol was consumed, work parties were quiet and almost subdued.

5.4.3.2. Arrival of the In-Migrant Encampment

During the late 1990's many in-migrant fishers were resident inside the Bijagós Islands having established an encampment on a deserted islet known as Pig Island <*Jeu di porcos*> (Figure 5.5). The islet was long-known as such, due to its use by Bijagós from Caravella Island, who had set-aside the unoccupied area for pig-grazing. The camp on <*Jeu di Porcos*> had been reportedly founded by migrant fishers from Kamsar, Guinea Conakry. These were individuals from Sierra Leone,

Liberia and Guinea Conakry, some of whom had been working in the numerous fishing camps that are scattered along the Guinea Coast. Others, wandering into the Kamsar Port had encountered by chance a boat captain looking for crew. Once the camp was established, Senegalese fishers had arrived from neighbouring fish island <*Jeu di Peixe*> (Manjaco territory) to take advantage of the availability of imports (rice and petrol) and fishing gears which were readily available on <*Jeu di Porcos*> in support of the growing SSF population. Senegalese fishers also report observing declining catches working out of <*Jeu di Peixe*>. But in addition, many were now established members of the fishing business, having worked their way up over several years from paddle-powered fishing boat crew members, to net owners and even captains of larger motorised vessels sponsored by wealthy individuals in the Ziguinchor area of Senegal. Motorisation enabled these fishers to work further off shore and many describe the Bijagós Islands then as what appeared to be a seemingly '*huge expanse of abundant fishing grounds*'. Despite housing a population of several hundred individuals, conditions on <*Jeu di Porcos*> in the late 1990's were basic. There was no well and outside of the rainy season drinking water was extracted from nearby Caravella Island then transported over to the encampment by paddle boat for sale.

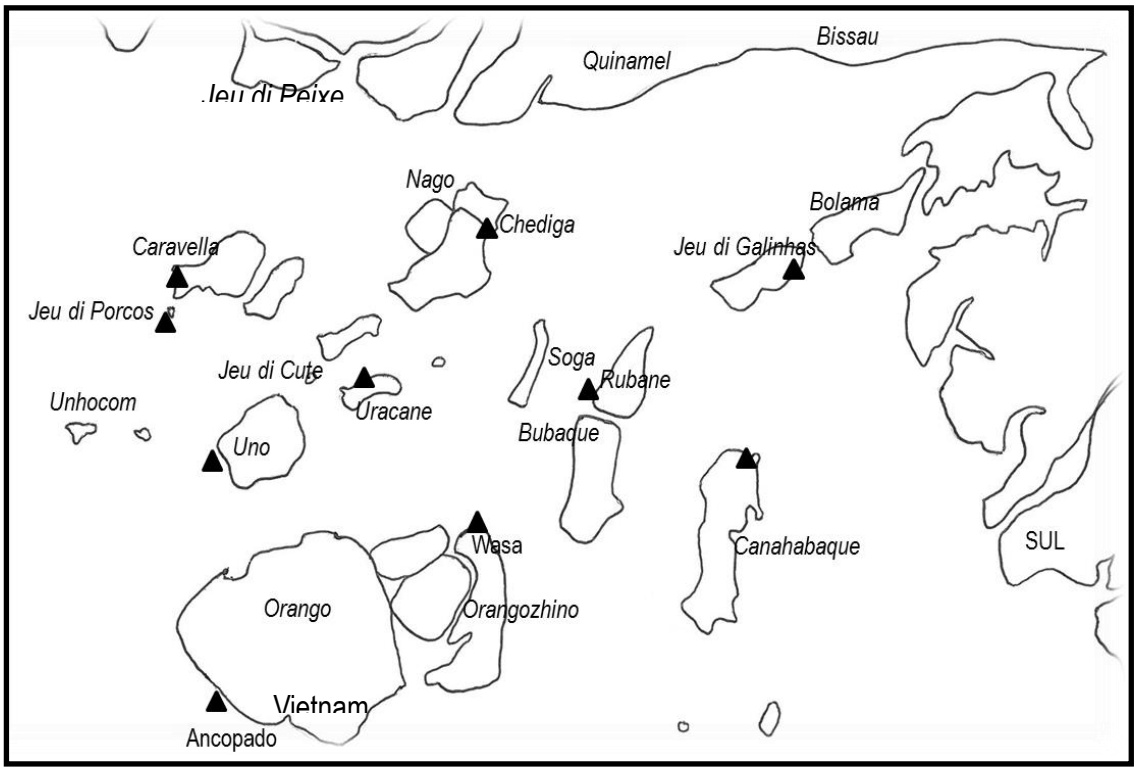

Figure 5.5: Locations of fishing camps (past and present) and key places around the Bijagós Islands, as described by respondents in the life history surveys

As an enclave <*Jeu di Porcos*> was flourishing; but with the increased arrival of newcomers from Kamsar and the Casamance (Senegal) competition for fishing space grew. Motorised boats began to fish further south and gradually Orango Island became a popular area. Moving daily between <*Jeu di Porcos*> and the Orango fishing grounds was costly however, in terms of both time and petrol. Gradually many in-migrants became accustomed to the surrounding islands. Many recall that during these days of travelling, the beaches on Uno (including Cabuno) were frequently used as a stop-over. Gradually, many settlers from <*Jeu di Porcos*> relocated to the area of southern Orango known as Imbone. On Imbone, two encampments were established known today as *Ancopado* and *Vietnam*.

By the time the Orango National Park (PNO) was decreed in 2000, many hundred in-migrant fishers had relocated from the north (<*Jeu di Porcos*> and Caravella Island) to the Orango fishing grounds in the south. As legislation for the National Park was finalised by State environmental and development agencies, in-migrant settlers inside the newly gazetted protected area met with forceful resistance. Groups of armed individuals from the Team for Inspection and Control of Fisheries (FISCAP) a sub-section of the national Ministry of Fisheries arrived on Orango Island. The in-migrant encampments were forcibly dismantled and all occupants evicted. Respondents in this study recall the eviction from Orango as violent, describing a looting of goods, the destruction of fishing material and burning of encampment houses. Hence the name 'Vietnam' now used. As one individual described "*That place is a zoo! There the politicians like to keep everything perfect and not have no fishing man touch nothing"*. Following evictions from Orango most settlers moved back north, returning to <*Jeu di Porcos*> which again housed an extensive population. Over the following years, an already depleted mangrove habitat was further cut for cooking fuel and fish smoking material.

Former inhabitants of the <*Jeu di Porcos*> camp identify wood removal as exacerbating the extreme high water storm surges that occur during the rains; one of which eventually ripped through and destroyed the camp. *"It was the middle of the night"* one individual recalled *"the place swamped and became really dirty with the high water. Our belongings started to float around; plastic water containers were banging against the inside of our houses"*. The storm destroyed the fishing encampment, and many individuals relocated to neighbouring Caravella Island,

where a camp known as <*Ancorete*> was already established. Others turned south and arrived on the beach in Cabuno, on Uno Island.

5.4.3.3. Realised Power of the State

Bijagós residents of Cabuno still recall the 1980's before any occupancy by stop-over or permanent in-migrant fishers had occurred on the beach area. Several described one very large tree formerly positioned on the encampment site which was a place of ceremony in animistic marriage. An animistic shrine <*baloba*> still stands inside the fishing encampment of Cabuno area and is maintained by the Bijagós animists.

Bijagós villagers describe a trickle of fishers throughout the 1980's and 1990's, arriving and stopping over but moving on again. A friendly rapport developed with these groups; exchanges of goods (fruit from the Bijagós villages, fish from the fishers), of news and knowledge were welcomed. Many of the male Uno Islanders were familiar with fishing and foreign fishers, having spent time inside the *daks* of Chediga and Uracane. The foreign fishers arriving on the beach provided an opportunity for trade. Bijagós villagers carried goods across the island to sell to the foreign fishers.

However, after eviction from Orango and collapse of *Jeu di Porcos* collapsed, several hundred fishers and their families arrived *en masse.* Relations quickly soured. As the in-migrant population on Cabuno Beach grew, continued to fish and showed no signs of moving on, villagers from Cabuno sector walked out to the

beach. As one individual explained "*we begged them to leave here, because of what was happening to our sea*".

The problems reached a climax in the dry season of 2003 as the cohort of Bijagós *cabarros* warriors from *Amutai* (in Cabuno Area) about to enter their *fanado* ceremony, stormed and burned the in-migrant fishing encampment. It happened in the middle of the day and a fire quickly spread while the perpetrators stood their ground. Unsure what to do, the in-migrant encampment dwellers fled. Many on foot, walked across the island to meet with the Island police in the administrative outpost <*An-Onho*>. Others left by boat: "*We sailed north around Uno"* one Sierra Leonean man explained. *"And we begged one village there (Ambeduco) to let us camp on their beach. But they refused. We sailed all around the island until we reached the police post in An-Onho. And they just told us to come back here, to Cabuno".*

As the in-migrant settlers reached the police post, actions of the Bijagós warriors were reported and control moved directly into the hands of the Island State Authority. Members of the administration, none of whom are Bijagós, saw the villagers of Cabuno as lacking any right to evict an in-migrant fishing camp, given that all national land was decreed in the Land Law (of 1975) as belonging to the State. To the island administration, the encampment was clearly and simply on State land, and as the in-migrant residents made their plea to stay in Cabuno, so various institutions put into place a series of regulatory and organisational mechanisms that would enable this to happen under State defined rules. This proceeded in a manner

which not only overlooked the interests of, but also disempowered the Bijagós residents of Cabuno.

The national Ministry of Transport and Communications assumed responsibility for the port landing area in Cabuno, as it does for all landing sites around the country: *"from the point of and 80 metres back from, the extreme high water spring-tide line"*[132]. The national maritime police assumed responsibility for monitoring access into and through the port, as they do for all national landing areas. This is undertaken by checks for the national boat licence known as the <*capitaneer*>. Since there is no maritime police presence on Uno, the island police unit assumed this role. The right to fish outside and land fish within the landing area fell under the control of the Ministry of Fisheries, responsible for issuing the fishing licence certificate <*pescarte*>. Licences are valid for one year with prices revised annually (Table 5.7). These are variable for paddle-powered, 15 and 40 horse power (HP) engines and as explained previously (Section 2.3.4) for national and foreign citizens. Charges for the cutting of wood around the encampment were to be collected by the Department of Forestry (within the Ministry of Agriculture) who explained that while in rural areas, wood cutting does not normally require a licence, due to the commercial nature of fishing inside the encampment, the 5000 CFA[133] (or £10) duty per quarter, was valid.

Given these substantial requirements to be met by in-migrant settlers inside the Cabuno encampment the area became subject to and remains the site of, frequent

[132] As explained during a visit to (CIPA) in Bissau, 2010
[133] CFA (*franc d'afrique central*)

and irregular visits by various members of the Uno island administration, fisheries officers on Uracane and Bubaque Island, inspectorates from Bolama and of course from the capital city Bissau. Impromptu visits are also common from the national maritime police, immigration officers and the inspection and control of fisheries team (FISCAP) who led the eviction from the PNO, many of whom arrive simultaneously and unannounced. In the event that in-migrants encampment residents are found without any identity papers, boat certification, fishing licences or wood cutting documents, fines for all cases can be issued.

Table 5.7: Small-scale fishing licence prices (2010)

Licence-Type	Price (CFA)	Equivalent in £
National citizen paddle-licence	30,000	60
Foreign citizen paddle-licence	50,000	100
National citizen 15 HP motor-licence	84,000	168
Foreign citizen 15 HP motor-licence	175,000	350
National citizen 40 HP motor-licence	180,000	360

5.4.3.4. In-Migrant Responses to State Empowerment

In response, members of the fishing encampment were observed (between 2009 and 2010) enacting various strategies, seemingly regularly adopted to manage individual circumstances. Foreign residents in possession of a Guinea Bissau citizen identity card (which can be purchased in the capital) frequently take responsibility for boat

licence and fishing licence papers. They do this for non-national citizens who own boats but lack national (or sometimes all) identity papers, charging a fee for their service. The cost of the fee is considered marginal, relative to the substantially higher costs asked of non-national fishers and the fines imposed for those found without any documentation. When inspectorates arrived into the camp intending to spot-check papers and licences; in-migrant residents frequently hid-out in the bush, sometimes overnight, to avoid paying the fines they anticipated. Fishing boats were often hidden inside the mangrove areas on these occasions. Further, stocks of smoked and salted fish and valuable household possessions were hidden for fear of confiscation. If an inspection was taking place inside the camp, fishers often stood on the beach front and warned any boats they could see not to land. Finally, news of any imminent inspections was carried when possible by passing fishing boats or traders from nearby islands, encampments or from the mainland.

5.4.3.5. Bijagós Express Sustainability Concerns

The Bijagós villagers describe the year-round fishing effort of the in-migrant encampment residents, indicative of their *"not cultivating the sea correctly"*. As one Villager explained: *"In the time of working the rice paddies (the rains) we (the Bijagós), haul out all of our fishing nets*[134] *from the water, we come onto the land and we work. But those people, they are at sea every day. For us, we have different types of work. We don't only fish".* Many Bijagós villagers explained frustration at

[134] There are gill nets which are otherwise left inside the water and periodically checked on foot at low-tide

the extensive effort of the in-migrant settlers "*because of tomorrow*"[135] (Appendix 2, Photograph 15). Others explained that the in-migrant effort only acted as a dis-incentive to go to sea, given that there were so many nets further out, trapping and catching the fish before they reach the shoreline. This point was contended however, as one informant explained: "*It might be true that before (the encampment) there were more fish in the sea, but who went to catch them? We had no boats then, just as we have no boats now*".

In-migrant fishing effort inside the water was coupled with extensive cutting and removal of forest and mangrove habitat on land. The large quantities of wood removed to smoke fish generated great concern, this time over the vulnerability of Bijagós sacred places, most particularly, those used during the secret initiation ceremony, the <*fanado*> (Appendix 2, Photographs 16 and 17). As one individual explained: *"If they start to destroy our initiation sites with their tree-cutting, then they will destroy the heritage of our villages"* Or as another explained*: "In the beginning, they respected the terrain of the village. But now, this is their terrain. This camp is more permanent. The people have begun staying longer. They don't listen to the voice of the village".* When one member of the in-migrant fishing encampment, a notorious wood cutter who was frequently observed cutting down trees in the sacred area known as <*Amutai*>, fell ill and after several weeks died; the Bijagós villagers quietly commented that this was the work of the <*iraan*>.

[135] *Pabia di amanha*

5.4.3.6. Bijagós Division in the Dilemma

With the re-instatement of the encampment after the burning of 2003, a split emerged between the Bijagós residents of Cabuno area. The elders are described as 'accepting' of the state administration, a decision which the youngsters refute. One young individual from Ankarabe explained. *"It's because all the elders were sitting with all the power. The elders turned to us youngsters saying 'leave those people in the beach alone' and that is how the problem has come back again. In the older times, responsibility was always given to the elders; but their ways of understanding are not complete- youngsters now also have to take part"*. Yet the elders also seem to regret the island administration decision to re-instate the camp as one informant explained: "*the State is the only one to benefit. According to the administration, they (the in-migrants) must stay. But then they (the State) are the ones going there every month to collect money".*

A further division has emerged between Bijagós men and women. Female respondents generally voiced positive opinions of the camp. Many referred to the trading opportunities provided, as one explained "*they bring the market closer'*. In contrast, many male respondents spoke of increasing cases of intermarriage between Bijagós village girls and encampment male fishers. Only one Bijagós female teenager was observed residing inside the encampment during the course of the study. In general, all of the Bijagós females (approximately ten in number) to whom children had been born with in-migrant male fishers, resided inside their natal village inside Cabuno area, making daytime visits to the beach. The fishers with whom they were involved also made evening excursions into the villages of Cabuno

to visit their wives and children, normally returning to the encampment after dark, in order to prepare for early morning fishing commitments. Pre-initiate male warriors in Cabuno appeared outraged at this practice of 'inter-marriage' claiming that '*soon all the girls would be finished'* (Appendix 2, Photograph 18). As a result, Bijagós males seemed more reluctant to visit and less reluctant to talk about, the encampment. In three instances working contracts were undertaken inside the encampment by male Cabuno villagers. All were undertaken with a boat owner of Guinea Bissau nationality. Contracts between individuals from Guinea Conakry and Sierra Leone and Bijagós fishers were never seen or described. Similarly, involvement of the in-migrant fishers in Cabuno village activities was rare. The exception was non-animistic, but rather nationally recognised public holiday events or celebrations, when the in-migrant male fishers would wander into the village (some by invitation, others not) to observe and participate in dancing. In-migrants were not involved in ploughing or membership of the Bijagós working parties <*sociedades*>. Further, in-migrants were not invited to attend village meetings in Cabuno area.

5.5. Discussion

This discussion is structured by the three main objectives of the chapter, the first of which considered the importance of fishing, as a livelihood activity, to Bijago villager and in-migrant encampment residents. This study found that less than five per cent of Bijagós male activity time was allocated to fishing activities, which supports similar accounts of the part-time fishing tendencies of the Bijagós (Tvedten

1990; Haakonsen 1991, Campredon and Cuq 2001; MRAG 2010). Limited mobility outside of the primary sector illustrates the restrictions facing Bijagós islanders in this study area where off-farm paid opportunities are rare. The degree of dependency upon natural resources for the Bijagós villagers of Cabuno therefore, emerges as exceptionally high. In comparison, participation in fishing for the focal in-migrant residents is full-time. In general non-fishing opportunities for those engaged inside the sector are considered quite poorly understood (Brugère et al. 2008). Clearly this is influenced by the geographic location in which involvement in fishing occurs and the non-fishing opportunities available in this area. Certainly for the in-migrant residents on Uno, non-fishing opportunities appear to be scarce and limited to trade in agricultural goods produced by the Bijagós, for example cashew nuts. None of the focal individuals described here were undertaking any such ventures.

The second objective investigated the individual (and household level) attributes which influenced time allocation. Fishing was found to be a male only task on Uno, which contrasts with Formosa Island for example (also in the Bijagós archipelago) where female fisher groups have also been described (Campredon and Cuq 2001). That 95% of focal males did fish on at least one occasion, although none were identified as 'full-time' fishers and rather that fishing and agricultural were so intertwined, serves to illustrate the finding of other studies, which highlight that SSF cannot be seen in isolation from a diversity of livelihood activities taken up by inhabitants of coastal communities (Hanazaki et al. 2013; Cinner and Bodin 2010). Bijagós males were engaged with up to six livelihood activities, the majority of which were located inside the primary production sector (including fishing, farming

and animal husbandry) indicative of occupational multiplicity as observed elsewhere in rural coastal communities (Pollnac and Crawford 2000). As documented in other studies those Bijagós engaging in the greatest diversity of activities also allocated proportionally more time to fishing (Martin et al. 2013). This finding lends support to the welfare function, provided by SSF (Béné 2008). Younger Bijagós males typically undertook a greater array of activities than the elders, indicating that on Uno, individual rights increase and duties decrease with age as has been described on Bubaque island (Baekgaard and Overballe 1992: 176).

Younger in-migrant fishers were observed using a wider range of gear types, and exhibiting more 'generalist' fishing strategies. Older in-migrants fishers appeared more 'specialised' in terms of their gear use. In contrast to the Bijagós villagers for whom livelihood diversity generally declined with age; greater experience and typically older age for the in-migrant fishers were both associated with higher livelihood diversity. This increase in activities included fishing gear and equipment repairs which were typically only undertaken by those more experienced in fishing.

The third section considered the processes driving the politics of access in Cabuno. According to the UN, more than 370 million indigenous people have "retained social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live" [136](Schmidt and Peterson 2009). This chapter provides an insight into the distinct social values through which the Bijagós aspire to control land area organisation. Religious practices have been described as

[136] (UN Permanent Forum on Indigenous Issues http://www.un.org/esa/socdev/unpfii/en/history.html)

offering to guarantee a balance between man and the environment (Vogt et al. 2010). Designation of protected areas for purposes of spiritual and religious practice has also been investigated elsewhere (for example see Apgar et al. 2011). Evidence from Cabuno Sector, on Uno supports an attachment to place held in particular by Bijagós Animists, who use the site of Amutai extensively during their fanado ceremonies. A national stigmatisation is however, attached to the Bijagós depicting them as sorcerers, lazy workers and ceremonial binge drinkers. This extends across the country and hampers many attributes of Bijagós behaviour which could be harnessed more positively to promote environmental awareness. A similar reversal of negative in-migrant fisher stereotyping could also be beneficial in promoting a sense of environmental stewardship.

Numerous studies have investigated and identified the negative social-impacts of formal parks and protected areas (Cernea 2005 cited in West et al. 2006; Igoe and Brockington 2007; Miller et al. 2012). This investigation in Cabuno describes a contemporary eviction episode, the implications of which have seemingly impacted upon the social fabric of nearby communities. The use of 'legitimate violence' to justify coercion for conservation has also been described (Peluso 1993). The case of the PNO in the Bijagós illustrates that such 'militaristic management' strategies have been enforced in this region (Peluso 1993). Leakage of in-migrant fishing activities into Cabuno area has resulted; indicative of the strain population displacement can create upon resources in non-protected areas (Crona and Rosendo 2011).

Conservation displacement[137] has been linked with physical, forced removal of people from their homes and the exclusion of people from areas used in the pursuit of livelihoods (Brockington and Igoe 2006; Schmidt-Soltau and Brockington 2007). The concept of 'displacement' is however considered quite narrow, focussing solely upon the excluded (Mascia and Claus 2008). These authors advocate considering instead the empowered that gain; and disempowered who lose rights (Mascia and Claus 2008). In the case of Cabuno, the Bijagós population were not displaced but do emerge as disempowered, clearly no longer freely able to access or actually use the social, cultural and natural resources, tied into the geographic location on which the in-migrant encampment exists. While the effects of this change cannot be quantified, such displacements of local people and their resource management systems are often considered to result in unforeseen transformations of the environment (Igoe and Brockington 2007).

With growth and permanency of the in-migrant encampment, following closure of the fishing grounds inside the PNO, Bijagós villagers in Cabuno area behaved increasingly warily towards the in-migrants (Berry 2009: 26). The resultant burning of the in-migrant encampment in 2003 is indicative of the struggle by the Bijagós to defend their access rights. At this point however, various State institutions seized the opportunity to extend control over in-migrant fishing. The World Bank (2010) asserts that within Guinea Bissau, the very poor and poor households tend to rely mostly on traditional authorities to solve conflicts, while the better off rely more on the police. In Cabuno, when the local patrons of the beach area were no longer

[137] As addressed at the 2003 World Park Congress (cited in Cernea and Schmidt-Soltau, 2006)

willing to exchange with the in-migrants, with ‘hospitality, protection or recourse to enter local courts’ (Richards, 1997) the power of the Bijagós over their beach area was simultaneously lost.

Chapter Six

Capturing Data in Commercial SSF

Chapter Overview

This third data chapter focuses upon the insights provided by analysis of catch data. This topic engages with one of the key problems associated with SSF outlined in Section 1.3.iii namely a lack of data. The chapter uses information derived from a simple landing survey to assess capture for five main gears used by the in-migrants of the fishing encampment on Uno. The data provide insights into environmental knowledge harboured by the fishers, the relative importance of different fishing grounds, the significance of elasmobranch capture and the implications of elasmobranch catch in this area. Both locally sacred and nationally protected areas proved significant fishing grounds for the in-migrant commercial SSF fleet. Catch per unit effort (CPUE) of bonga shad inside the National Park of Orango (PNO) was four times higher than that of unprotected fishing areas. Gill net fishers accumulated 92% of total catch inside Bijagós locally sacred areas (LSA's) mainly associated with the secret *fanado* ceremony. Elasmobranchs were encountered during 75% of landing surveys and accounted for 10% of total landed weight of catch.

Elasmobranchs comprised three main groups; guitarfishes, sharks and mixed skates / rays. Elasmobranch CPUE was relatively constant across seasons but peaked significantly with large hook long-line gear. Seventy-two per cent of individual elasmobranchs weighed less than 10 kilograms. Weight distributions suggest a high presence of neonates and juveniles in the study area; mature adult individuals were also identified.

6.1. Literature Review

6.1.1. The Importance of Catch Data

In this thesis, while the difficulties associated with defining fish stock health on the basis of fish capture alone are accepted so too are the merits of recording catch data for commercial SSF. Marine catches are recognised as highly variable due to a myriad of inter-related causes, including management, fishing restrictions, consumption trends; fish stock density and susceptibility, or catchability by a particular fishing gear. Catchability can in turn vary due to a variety of factors including the composition and dynamics of a fleet, location and time of fishing, technology, gear-deployment decisions and variable fishing strategies; as well as non-uniform stock recruitment and migration, schooling behaviour and the targeting of particular species (Maunder and Punt, 2004; Campbell 2004; Bishop 2006). Some authors argue that the biggest sources of variation in catchability are essentially random (Gulland 1983; cited in Bishop 2006).

Catch data have been used for decades to discern marine ecosystem health. Some findings have highlighted the greater susceptibility of larger, slower-growing, less productive species (such as many of the higher predators that once existed) to extensive fishing pressure. For example catch declines for tuna and billfish were initially linked to a growth in long-lining effort (Myers and Worm 2003; Myers and Worm 2005). It has since been argued however that long-lining alone has not been responsible for these rapid stock declines, but instead a combination of increased long-lining in conjunction with purse-seining (Polacheck 2006). While this point is still contended, a consensus has been reached that average trophic levels of the world's oceans have all declined, such that fishing activity as observed today has moved significantly 'down the food-web' (Pauly et al. 1998; Worm et al. 2006).

Catch data may, it is believed however further our knowledge of fisheries, by informing at least of the size and composition of hauls. In developing countries information regarding fisheries catch is often scarce due to limited resources; the development of faster, cheaper and less demanding data collection programmes would clearly be an advantage in these areas (Agnew et al. 2013). The importance of local knowledge could be vital in the development of such programmes. The terms 'traditional' and 'indigenous' ecological knowledge are often used inter-changeably to define a '*cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans), with one another and with their environment*' (Berkes et al. 2000). Traditional knowledge offers experience with system variation over the long term (Ballard et al. 2006). Until now few studies have

focused on the knowledge and perceptions of displaced, migrant and colonist people (one clear exception is Muchagata and Brown 2000). In conventional writings, such groups are assumed to not have detailed knowledge of the natural environment (Muchagata and Brown 2000). The use of ecological knowledge, whether derived from local or in-migrant (or colonist) sources is not without its pitfalls however, and its greatest merit is perhaps in providing insights into the former state of ecosystems where written records are sparse (Saenz-Arroyo et al. 2005). More applied uses may be confounded for example, by distorted personal perceptions known as retrospective bias (Paterson 2010). As with the importance of catch data, it is here suggested that documenting such knowledge could be hugely informative in furthering our knowledge of fisheries. However, the limitations in applying ecological knowledge should not be ignored.

6.1.2. Catch Data in the West Africa Region

The status of marine fish stocks in the West African region is largely unknown[138]. Most pelagic (surface-shoaling) species have not been evaluated and the status of demersal (deeper water) species is even less clear[139]. None of the African nations are described as 'large shark fishing nations' although landings are believed to be underestimated due to a lack of data, particularly for the SSF which could be responsible for substantial catches (Kroese and Sauer 1998). Global concern about

[138] www.frms.fao.org

[139] During the 1963 Guinean Trawl Survey, the deremsal croaker (*Pseudotolithus senegalensis)* was ranked as the 10th highest taxa (in terms of CPUE); by 1979-1980 this had fallen to 18th rank and by 1999-2000 had reached 39th place (Koranteng and Pauly 2004). Today, the croakers are considered fully exploited in the Sene-Gambia region (www.frms.fao.org; Lee et al. 2009, p. 28).

the impact of fishing upon the status of elasmobranchs[140] status is particularly well documented. High demand coupled with increased value within the Far East has promoted shark fishing as a lucrative practice in West Africa with Chinese rapid economic growth providing a major driver (Bromhead et al. 2012; Carr et al. 2013).

Due to the controversy surrounding shark fishing and the illegality of shark capture, accurate figures are difficult to establish (Diop and Dossa 2011). The extent of SSF is vast while problems associated with illegal, unreported and unauthorised fishing have been described as widely present across the entire fisheries sector (Agnew et al. 2009).

6.1.3. Chapter Objectives

This chapter does not make any attempt to infer the health of the fish stocks around Uno Island on the basis of landing observations, nor to make declarations concerning the sustainability of fishing levels. Rather, the chapter aims to explore the temporal and spatial variability in catch for different gear types and to investigate the prevalence of elasmobranch capture. The first section asks to what extent fishing strategies and resultant catch vary in time and space for the fishers. The second investigates the significance of elasmobranch catch for each gear type. The third section considers what can be inferred from the size (weight and length) of elasmobranchs captured in the area.

[140] Including the sharks, skates, rays and guitarfishes

6.2. Method

The objectives outlined above are explored in the context of the in-migrant fishing settlement on the Island of Uno, in the Bijagós archipelago, Guinea Bissau. The commercial fishing settlement was established in 2002 and as the previous chapters have outlined, its presence remains a source of contention for local Bijagós islanders. A comprehensive description of the study site is outlined in Chapter 3.

The data used in this analysis were collected by means of a fish landing survey. The method through which this survey was designed and completed is outlined in Chapter 3.4.7.

6.2.1. Catch Landing Surveys

The 'catch landing survey' compiled information concerning the date and season of landing, and lunar period[141]; the gear-type and dimensions (number/size of nets and hooks), the time (hours or tides) gear spent inside the water[142]; the habitat (substrate type) and fishing area used and the composition/ quantity of catch being landed. The total observed landed catch recorded after surveyed excursions to sea was expressed as: (i) the total catch in kilograms (ii) total elasmobranch catch in kilograms and (iii) elasmobranch catch by major group (guitarfish, shark and miscellaneous skates/ rays) in kilograms. Conversions were then made to 'catch per unit of effort' (CPUE)

[141] Phase One (days 1-7) are the New Moon to First Quarter (through the waxing crescent moon); Phase 2 (days 8-14) are the First Quarter to Full Moon (through waxing gibbous moon); Phase 3 (days 15-21) are Full Moon to Last Quarter (through waning gibbous moon) and Phase 4 (days 22-29) are the Last Quarter to Dark Moon (through waxing crescent moon).

[142] The Bijagós Islands are characterised by two high tides during each 24 hour interval. Hours that gears spent inside the water (which were used in the definition of CPUE) were expressed in terms of tides, as most participants did not use watches at work. The number of tides was later converted to hours, using six hourly intervals for each tide

defined in this study by 'catch in kilogram/ gear area/ tide'. The term gear area used in this definition varies slightly in that for net gears this refers to 'catch in kg/ 1000m^2/ tide' and for long-lines the reference was 'catch in kg/ 1000 hooks/ per tide'.

6.2.2. Bijagós Fish Capture

Sixty two fish landing episodes were observed inside the Bijagós villages of Anocyem and Ankarabe between December 2009 and June 2010. Of these, forty-eight occurred during the dry season and fourteen during the rains. Thirty five individual males were observed landing fish and in total, 552 kilograms were captured. Due to the reduced effort allocated to fishing by the Bijagós villagers (outlined in Chapter 5) their fish catch data were not analysed along with the in-migrant fishing data. Instead, a summary of Bijagós fish landings is briefly outlined in Table 6.1.

Table 6.1: Catch composition of Bijago handnet fish catch in Ancoyem and Ankarabe villages

	Local name	Common Name	Species group	Kg	Prop
Actinopterygii	Tainha	Mullet	*Liza spp*	374.5	0.75
	Djoto	Croaker	*Pseudotolithus spp*	75.8	0.15
	Bhagre	Catfish	*Arius spp*	24.2	0.05
Elasmobranchii	Caudu	Ground sharks	*Carcharhinus spp*	15.8	0.03
	Raia	Rays	*Rajidae spp.*	9.8	0.02

Of the total recorded landed catch, 501 kg (91%) was procured using hand-nets. The average catch (in kilograms) per hand net fishing excursion was 3.7 kg. Catch composition comprised five main fish groups dominated by the mullet (*Liza spp*.). Hand net landings included catfish (*Arius spp*), croaker (*Pseudotolithus spp*.), grunts (*Plectorhinus spp. and Pomadasys spp*.), spadefish (*Chaetodipterus lippie*), ladyfish (*Elops spp*.) and jack (*Caranx spp*.). Landings from the hand-nets also revealed that elasmobranchs were captured, including the ground sharks (*Carcharhinid spp*), hammerhead (*Sphyrna spp*) and stingray (*Dasyatis margarita*). The rocky headlands were identified as host to smaller sharks <*caudu*> by multiple respondents; adult sharks are associated with the deeper channels. Fishers differentiated between two turtles[143] and reported sightings of manatees[144] particularly in the region of Angodigo village

6.2.3. In-Migrant Fish Capture

In comparison, a total of 217 catch landings were documented from fishing excursions inside the in-migrant camp between October 2009 and September 2010[145] (Table 6.2). The total recorded landed catch for those events was 13648.4 kg (or 1.36 tonnes) attributed to five gear types. Major descriptive details of the five main gears used by the in-migrant encampment fishers are outlined in Table 6.3. The three net gears were essentially two net-types; one of which (monofilament or fine-mesh netting) was operated through two different strategies (motorised or paddle powered). Monofilament netting (MN) was made from either fine cotton or plastic

[143] The'black turtle' and the 'brown turtle' <*castana*>
[144] Known in kriole as <*pis bus*> and in Bijagós as <*entanque e'quitan ta minto*>
[145] Dry season n = 58 days and rainy season n = 46 days

thread and comprised a very small mesh size. The method of fishing varied between paddle and motorised canoes, with motorised craft using the nets as a purse seine. Monofilament nets were used to target pelagic (surface) shoals of bonga-shad. However, fishing activities were limited by the tendency of bonga to spoil if trapped inside the net within the warmer surface waters for longer than six hours. Catch retrieved after the 6 hour cut-off was discarded from the smoking process and used as long-line bait.

Gill nets (GN) were heavier and made from a thicker cotton thread and were always set in a straight line. The GN gear targeted the croaker species, located in the mid-water column. The time a GN spent inside the water was highly variable, with croakers being caught inside colder water and suffering less tendency to spoil. Despite these differences, all three nets are operated (set and hauled) during daylight hours.

In contrast, long-line fishing occurred at night. Two lines were differentiated on the basis of J hook size. Both were baited with small chunks of bonga, or another small pelagic species, on land or in the boat upon reaching a fishing ground and prior to setting the line. For both gill nets and the long-lines, use of a motorised fishing vessel influenced the time taken to reach a fishing area. However, motorised long-line excursions in particular operated their gears in exactly the same way as paddle powered fishing trips.

Table 6.2: Details of Landings (by Gear Type)

DATA ATTRIBUTES	NETS			LINES		
Gear Name	Mono-filament Net (motorised)	Mono-filament Net (paddle)	Gill Net	Long-Line (small hook)	Long-Line (large hook)	Total
Gear Abbreviation	MN-M	MN-P	GN	LL-SH	LL-LH	Total
Recorded Landings (dry)	11	36	33	20	8	108
Recorded Landings (rain)	5	66	23	10	5	109
Total Landings	16	102	56	30	13	217
Recorded Catch Dry (kg)	3924.00	1644.75	1235.25	1332.25	372.75	8509.00
Recorded Catch Rain (kg)	510.00	2930.5	925.9	457.00	316.00	5139.4
Total Recorded Catch (kg)	4434.00	4575.25	2161.15	1789.25	688.75	13648.4
Recorded Catch (%)	32.5	33.5	15.8	13.1	5.1	100

Table 6.3: Gear dimensions and characteristics of the five gear-types recorded in the encampment in Cabuno Sector, Uno Island 2010

Description	NETS			LONG-LINES	
Gear Name	Monofilament Net (motorised)	Monofilament Net (paddle-powered)	Gill-Net	Long-Line (small- hook)	Long-Line (large-hook)
Gear Abbreviation	MN-M	MN-PP	GN	LL-SH	LL-LH
Position in Water Column	Pelagic (near-surface)		Mid-Water	Demersal (deep water)	
Mesh/ Hook Size	18-28 mm	28-32 mm	240 mm	Hooks: 7,8(3 - 4 cm)	Hooks: 3,4,5 (5-7 cm)
Net Dimensions (length x depth)	100m x 4.5 m	100m x 2.5 m	50m x 4m	-	-
Gear –Set Strategy	Set nets in circle		Set nets in line	Set line straight	
Number of Nets	30	2 - 10	2-20	-	-
Average Gear Area/ Number of Hooks	4 500 -13 500 m^2	500 - 2 500 m^2	450 - 4 500 m^2	1200-2000	450-1100
No. of Boats	3	12	12	6	6
Engine Power (HP)	8 or 15	None	6 or 8	6 or 15	8 or 15
Crew Size	8-12	2-3	2-3	2-3	2-3

6.3. Data Analysis

CPUE analysis in the context of (i) fishing grounds and (ii) elasmobranch catch, lent itself to the use of one-way Factorial ANOVA. The number of catch landings varied between the seasons and rather than pairwise analysis to test for differences between seasons, the ANOVA was used, with season as the factor. Chi square tests were used to confirm an association between gear type and habitat type. Factorial ANOVA tests again were used to investigate variation in general CPUE and in specific elasmobranch CPUE. The elasmobranchs were next separated into sharks, rays and guitarfishes and tests performed for gear selectivity on individual weight and size metrics. All statistical tests were conducted using the IBM SPSS (Version 21).

6.4. Results

6.4.1. Temporal and Spatial Variation in Fishing Strategies

6.4.1.1. Temporal Variation

All gears were preferentially set[146] during the outgoing tide, known as the 'dry water'. This allowed an ease of handling the gear but also ensured that the nets and lines were in place as the tide turned. The outgoing tide was described as the creator of the 'wet water' which brought fish in towards the shore[147]. The monthly tidal cycle incorporated a period of 'live' <*yagu subibo*> and 'dead' water <*yagu sumorto*> (Figure 6.1). The live water occurred with the emergence of the new moon which was described as a contest, during which the sun and moon fought in order to

[146] And in the case of the gill-nets and long-lines, re-set
[147] Fishers also differentiating between the winds off the sea (trade winds) pushing the fish towards the shore and the continental winds, which push the fish further out from the land

rise first. Each month, the moon consistently lost the battle rising later into the dawn; until eventually the sun rose first and the moon died. This live water (between the new and full moon) was a time when the water was 'alive' with fish. Water moved slowly during this period, exerting less force over the movement of fish. Fishing activities were acknowledged as generally good during this period. Fishing began as bonga shad moved in towards the shallows of the beach and it was said that '*once the bonga moves in, everything else follows*'. Night fishing was also preferred during the live water, as the nights were dark and fish could easily detect the reflection of bonga bait used. In comparison the 'dead' water was a time when the force of the water was too great. The water was effectively 'dead' as the fish had been forced out, separated and pulled into the deep. Night fishing was considered relatively futile during this period, but especially when the full moon was high, as fish were unable to detect the brightness of the bait, in the full illumination of the water.

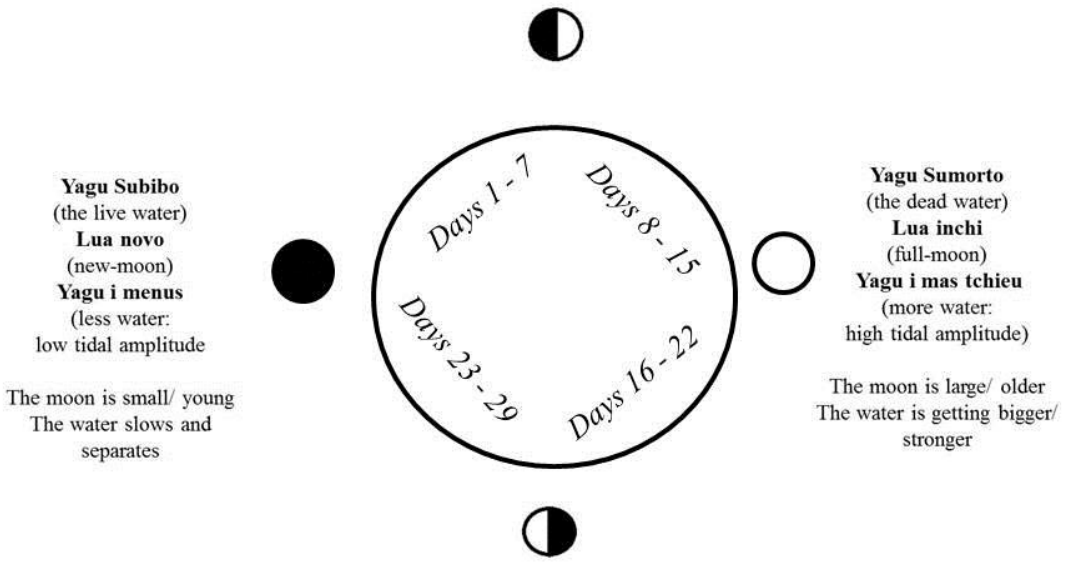

Figure 6.1: Changing characteristics of the water between the new and full moon, with lunar days as indicated

On all expeditions to fish with both MN-P and GN, the gears were only ever set once into the water. For the other gears, operations varied temporally and with lunar phase (Table 6.4). During the dry season MN-M nets were set fewer times; but both LL-SH and LH-LH were set more frequently. The LL-SH, were also set more times, during the first lunar phase. Duration of time for which a gear was left inside the water was also variable. However the MN-M and MN-P fishing excursions left the nets inside the water for no longer than six hours, on account of the bonga tending to spoil. In contrast, GN could remain in the water for up to 264 hours before being checked. Both the LL-LH and LL-SH were left for longer intervals inside the water during the dry season.

Table 6.4: Variations in gear-set frequency and duration of set inside the water (measured in hours) as documented on individual excursions to fish

ATTRIBUTE	NETS			LINES	
	MN-M	MN-P	GN	LL-SH	LL-LH
Gear-Set Frequency	1- 2	1	1	1- 4	1- 3
Seasonal variation	Increasing during the rains	-	-	Increasing during the dry season	
Gear-Set Duration	Max 6 hours	Max 6 hours	12 – 264 hours	12 – 48 hours	12 – 48 hours
Seasonal variation	-	-	-	Increasing during the rains	

Total levels of catch per unit of effort (CPUE) for all five gears were highest during the dry season (Figure 6.2). This difference was only statistically significant

however, for the motorised monofilament (MN-M) [148] and the small-hook long-line gear (LL-SH; see Appendix 3.3a)[149]. Landing surveys also confirmed that bonga CPUE did vary significantly with lunar interval for both the motorised[150]and the paddle powered[151] monofilament nets (see Appendix 3.3b).

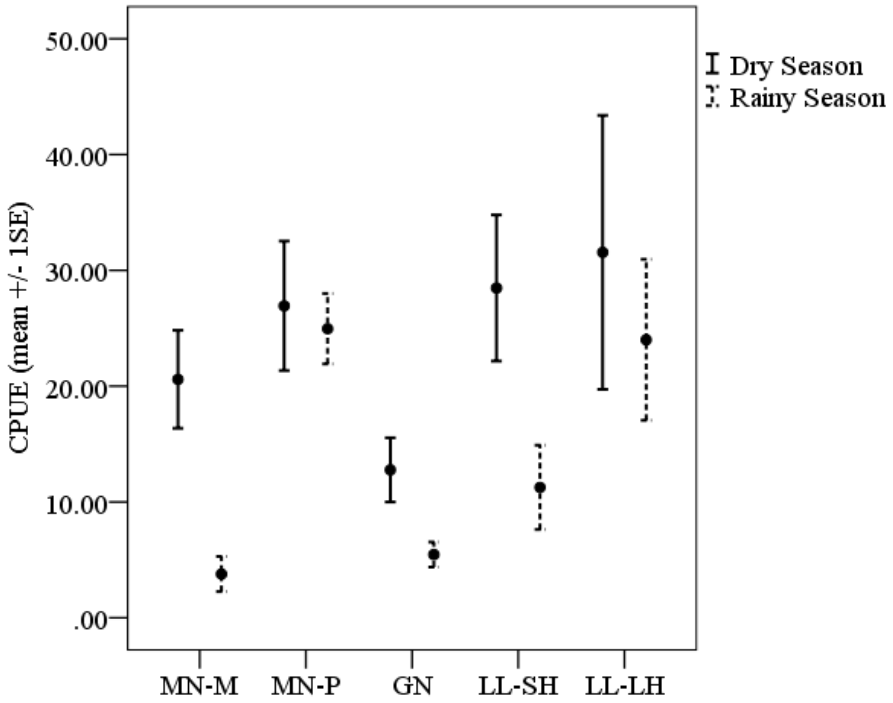

Figure 6.2: Seasonal variation in mean CPUE measures (+/- 1 Standard Error) for the five gear types

6.4.1.2. Spatial (Habitat) Variation

The five gear types were set inside four main habitats; classified as 'sandy shallows', 'rocky headlands', 'deep water channels' and 'sandy banks'. Sand banks are notorious across the Bijagós island marine system. These accumulate and erode

[148] $F_{(1,14)} = 15.597$, $p = 0.001$;R^2 (adj) = .50)
[149] $F_{(1,27)} = 4.915$, $p = 0.035$; R^2 (adj) = .12)
[150] $F_{(3, 12)} = 8.9$, $p = 0.002$; R^2 (adj) = .62) Significant peak with first lunar phase
[151] $F_{(3, 73)} = 9.0$, $p < 0.001$; R^2 (adj) = .23) Significant peak with second lunar phase

through tidal action and fishing occurs not on the top of the sand mound but rather at the slope edge. Banks are visible with the rising tide, when the waves "laugh" or crash upon them. The "channels" are deep water gullies also common between the islands where water moves through deep rock or mud bottomed trenches. These are streams of fast-moving, deeper water; used not only during fishing but also during general boat navigation. Sand flats are open shallow water areas, distinct from the rocky headlands and from the banks, where pelagic shoals of fish can be captured in the surface waters. With the exception of the MN-M, all gears were used in multiple habitat types; although each gear showed a significant habitat association (Table 6.5).

The monofilament nets (paddle-powered and motorised) were used inside the sandy shallows; long-lines set across the deeper water channels and the gill-nets off the rocky headlands. Gear use inside the habitat types did not vary seasonally. Catch per unit of effort (CPUE) was found to be variable between habitats; most significantly for the LL-LH[152] and the MN-P[153] .

[152] $F_{(2,12)} = 5.1$, $p = 0.033$; R^2 (adj) = .43)
[153] $F_{(2,98)} = 4.223$, $p = 0.02$; R^2 (adj) = .06)

Table 6.5: Total number of trips recorded in each habitat type, with total catch (kg) in parenthesis; Results of Chi-Square significance for gear-habitat association; dark blue shades most frequently used habitats, light blue shades less frequently used habitats.

Gear Type	Gear	Shallows	Rocks	Channels	Banks	Total	X^2	df	*p*
NETS	MN-M	16 (4434.00)				16 (4434.00)	-	-	-
	MN-P	97 (4535.25)	3 (25.00)		2 (15.00)	102 (4575.25)	358.22	2	*< 0.001*
	GN	5 (186.5)	51 (1974.65)			56 (2161.15)	115.2	1	*<0.001*
LINES	LL - SH			24 (1344.25)	6 (445.00)	30 (1789.25)	11.463	1	*0.001*
	LL - LH		1 (8.5)	11 (595.75)	1 (84.5)	13 (688.75)	63.500	2	*<0.001*

6.4.1.3. Spatial (Fishing Ground) Variation

Individual fishing grounds (or fishing areas) were identified for each habitat type. These included seven sandy shallow areas, two rocky headlands, four deep water channels and three banks. The CPUE of the MN-M varied significantly between the four 'sandy shallow' fishing areas[154] (Figure 6.3) reaching a maximum inside the area known as 'Vietnam' a former fishing camp now set-aside as the marine protected area known as the PNO (See Appendix 3.3d). Situated furthest from the Uno encampment, the 'Vietnam' area was only accessible to motorised fishing excursions. The sandy-shallow nature of the substrate within 'Vietnam' and an absence of deep water channels or rocky outlets rendered this fishing area unsuitable to long-lining. CPUE of the MN-M gear could reach four times higher inside the

[154] $F_{(3,12)} = 7.182$, $p = 0.005$, R^2 (adj) = .55

boundary of PNO (22.1 kg/ 1000m^2/ tide) compared with (5.1 kg/ 1000m^2/ tide) outside. In total 3750 kg or else, 27% of total recoded catch was attained from inside the PNO area on just ten excursions to fish.

Closer to the Uno encampment and accessible to all paddle operated and motorised boats were two locally sacred areas (LSA's) accredited as such by the Bijagós of Cabuno area and the neighbouring village district of Bruce. These were fishing grounds located offshore from the sacred initiation grounds of the Bijagós <*fanado*> ceremony. Comprising sandy-shallows and rocky outcrops the LSA's were compatible with monofilament and gill nets. Figure 6.4 illustrates the use of the two LSA areas by the encampment fishing fleet. The gill net (GN) fishers retrieved 92% of total capture, while fishing inside these two sites. The greater proportion of catch for the gill netters was taken from Cabuno initiation site <*Amutai*>. Monofilament net fishers frequented the LSA's less and CPUE levels were generally higher in non LSA fishing grounds.

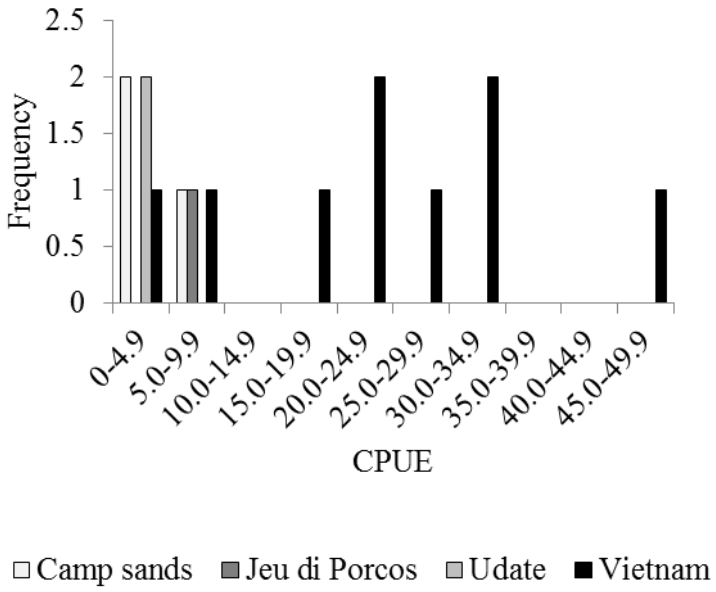

Figure 6.3: Frequency of CPUE (expressed as kilograms of fish per 1000 m^2 per tide) attained by the MN-M gear inside four fishing grounds characterised as 'sandy shallow' habitat

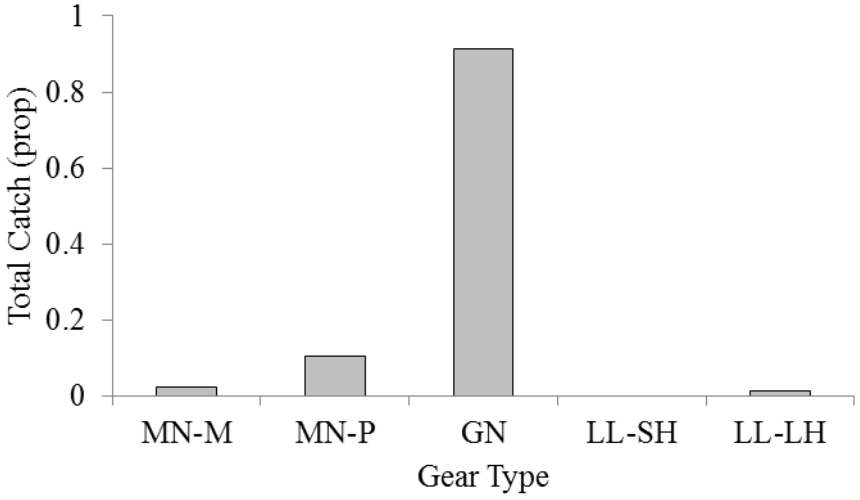

Figure 6.4: Proportion of total catch for all five gear-types retrieved from locally sacred areas (LSA's) adjacent to the Uno encampment

6.4.2. The Significance of Elasmobranch Catch

Catch of the five gears, comprised five main groups. The landings consisted of bonga shad (57%), marine catfish (13%), croaker (11%), elasmobranchs (10%) and mixed small pelagics (8%). Across all five gears, 1395 kg of elasmobranchs were captured. The GN landed the greatest proportion of elasmobranchs by weight (41%). The LL-LH landed 25%, the LL-SH less at 21% and the MN-P only 14% (Appendix 2, Photograph 19).

Elasmobranchs were encountered during the majority (75%) of fishing expeditions. Gear CPUE was significantly varied and peaked with the LL-LH[155] (Figure 6.5; See Appendix 3.3e). This particular gear captured elasmobranchs on 83% of trips to sea. In contrast, the LL-SH captured elasmobranchs on 57%[156]. Across all gears, elasmobranch catch was generally higher during the dry season. For the GN the seasonal disparity was only marginally non-significant.

[155] $F_{(3, 66)} = 4.6$, $p = 0.006$; R^2 (adj) = .13. Post hoc Bonferroni LL-LH Elasmobranch CPUE is significantly higher than MN-P (.008) and GN (.01)
[156] GN captured elasmobranchs on 46% of trips to sea and the MN-P gear on 17% of fishing trips

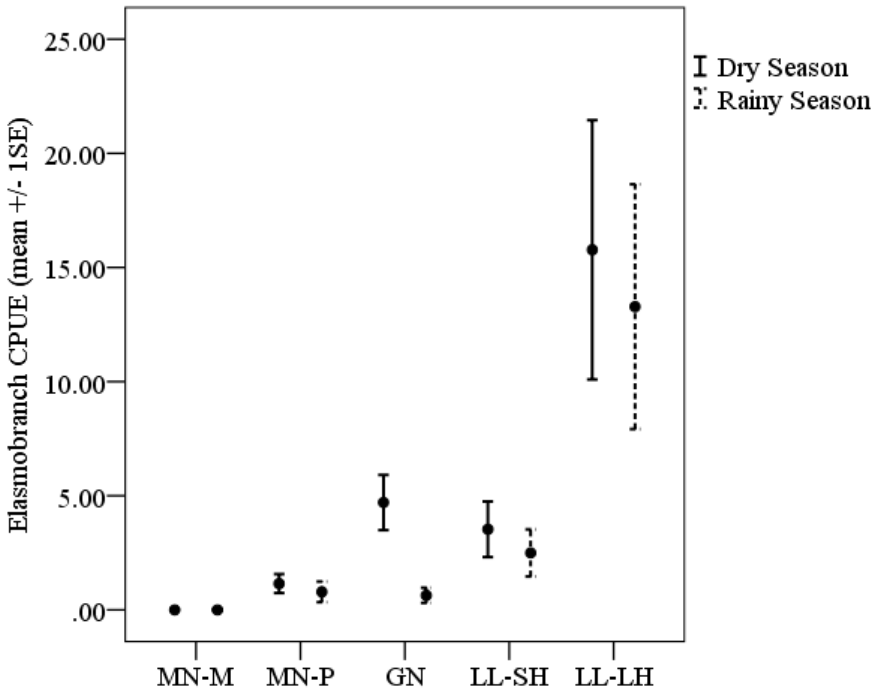

Figure 6.5: Seasonal variation in Elasmobranch CPUE (average +/- 1 SE) for all five gear-types. Where CPUE for MN-M, MN-P and GN is expressed as '*kilograms of fish per 1000 m^2 per tide*' and CPUE for LL-LH and LL-SH is '*kilograms of fish per 1000 hooks per tide*'

In total 36% of total elasmobranch landings (by weight) had been captured following fishing trips to the two rocky headland points, where GN gear was used. There are both characteristically defined as LSA's for the Bijagós. Elasmobranch CPUE by the GN gear did not vary significantly between these two sites. A further 31% of elasmobranchs were captured inside the deep water channels, in which only the long-lines were used.

6.4.3. Elasmobranch Taxa and Biometrics

Catches from five elasmobranch orders were documented (Table 6.6). In total, 155 individual specimens were measured during the surveys. Of these, 85 individuals

were ground sharks, accounting for 444 kg (or 33%); 42 specimens were mixed skates and rays (comprising in total 404 kg or else 29%) and 28 individuals were guitarfishes, accounting for 530 kg (or 38%) of landed elasmobranch weight. Figure 6.6 illustrates the landed elasmobranch catch of the five main gears, by numbers of individual specimens (Figure 6.6a) and landed weight in kilograms (Figure 6.6b).

Seventy two per cent of the measured elasmobranch specimens weighed less than 10 kg. This was the case for 80% of ground sharks, 63% of skates and rays and 50% of guitarfishes (See Appendix 2, Photographs 20 and 21; and Appendix 3.3f). Weight of the average captured ground shark was less than 10 kg for all gear types although weight did vary significantly between gears (Figure 6.7). The LL-LH tended to land (on average) smaller specimens. The GN gear captured the heaviest individual shark (weighing 72 kg. See appendix 3.3g)[157]. Testing for gear differences in shark capture using individual total length (TL) measurements confirmed this difference[158] (see Appendix 3.3h). The GN tended to capture the larger individuals (with an individual average TL of 69.3 cm).

[157] Kruskal Wallis: Chi Square = 13.0, *df* = 3, *p* = 0.005 (n = 85 individuals)
[158] Kruskal Wallis: Chi Square = 8.4, *df* = 3, *p* = 0.04 (n = 45 individuals)

Table 6.6: Catch components of the elasmobranchs (sharks, skates, rays and guitarfishes) or cartilaginous fishes

Local Name	Common Name	Species	Family	Order	NETS		LINES	
					MN-P	GN	LL-S	LL-L
Caudu**	Shark	*Carcharhinus spp.*	*Carcharhinidae*	*Carcharhiniforme*	X	X	X	X
Pis verga**	Hammerhead	*Sphyrna spp.*	*Sphyrnidae*			X	X	
Bombolak**	Nurse Shark	*Ginglymostoma cirratum*	*Ginglumostomatidae*	*Orectolobiforme*			X	
Dogfish*	Dogfish	*Centroscyllium*	*Etmopteridae*	*Squaliforme*	X	X	X	
Casupai**	Guitarfish	*Rhinobatus spp.***	*Rhinobatidae*		X	X	X	X
Raia**	Daisy stingray	*Dasyatis margarita*	*Dasyatidae/ Gymnuridae/ Myliobatidae*	*Rajiforme*	X		X	
	Common stingray	*Dasyatis pastinaca*				X		X
	Stingray	*Dasyatis spp.*				X	X	X
	Spiny Butterfly Ray	*Gymnura altavela*			X	X		
	Ringed torpedo	*Torpedo mackayana*	*Torpediniae*	*Torpediniforme*		X	X	

* Names given in Kereole (English) of Sierra Leone. All other names, given in Creole (Port) of Guinea Bissau
** Including the blackchin guitarfish (*Rhinobatus cemiculus*) and the common guitarfish (*Rhinobatus rhinobatus*)

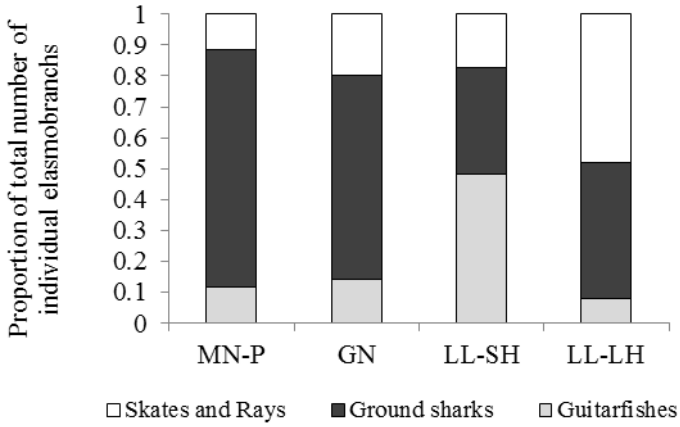

Figure 6.6a:The three groups (skates/ rays, sharks and guitarfishes) defined as a proportion of the total number of landed elasmobranch specimens: Where for *Skates/ Rays: MN-P (n=3), GN (n=10), LL-SH (n=5), LL-LH (n=24);* for *Ground sharks: MN-P (n=20), GN (n=33), LL-SH (n=10), LL-LH (n=22)* and for *Guitarfish: MN-P (n=3), GN (n=4), LL-SH (n=7), LL-LH (n=14)*

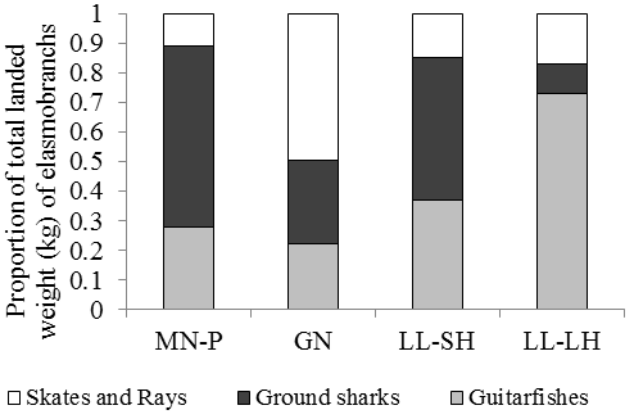

Figure 6.6b: The three groups defined as proportion of total landed elasmobranch weight (in kg): Where for *Skates/ Rays: MN-P (21.5kg), GN (281.5kg), LL-SH (41.0kg), LL-LH (60.0kg);* for *Ground sharks: MN-P (116.5kg), GN (159.25kg), LL-SH (134.0kg), LL-LH (34.0kg)*; and *Guitarfish: MN-P (52.8kg), GN (127.5kg), LL-SH (100.3kg), LL-LH (249.8kg)*

The diversity of skate and ray species captured by the gears, limits the insights of this study at gear-level. Landings of skates and rays included the spiny butterfly ray (*Gymnura altavela*), common stingray (*Dasyatis pastinaca*), daisy stingray (*Dasyatis margarita*) and manta ray (*Manta birostrius*); all of which exhibit enormous variability in terms of growth and behaviour. The individual weights of 40 specimens were recorded (Appendix 3.3f). Both the GN and LL-LH were observed landing the larger individuals (Figure 6.7).

Two species of guitarfish were confirmed; the common guitarfish (*Rhinobatus rhinobatus)* and the blackchin guitarfish *(Rhinobatus cemiculus)*. Gear captures showed no statistically significant size-selectivity; although the MN-P was observed landing the smallest specimen (weighing just 6.5 kg) and the GN the largest individual (59.5 kg.). The average weight of an individual guitarfish, captured inside the GN was higher than for all other gears (Figure 6.7) However given that only four individuals were taken by this gear it is thought that this result might be biased by one very large specimen. Total length measurements (TL) were documented for nine individuals (see Appendix 3.3i) with sizes ranging between 50 and 250 cm.

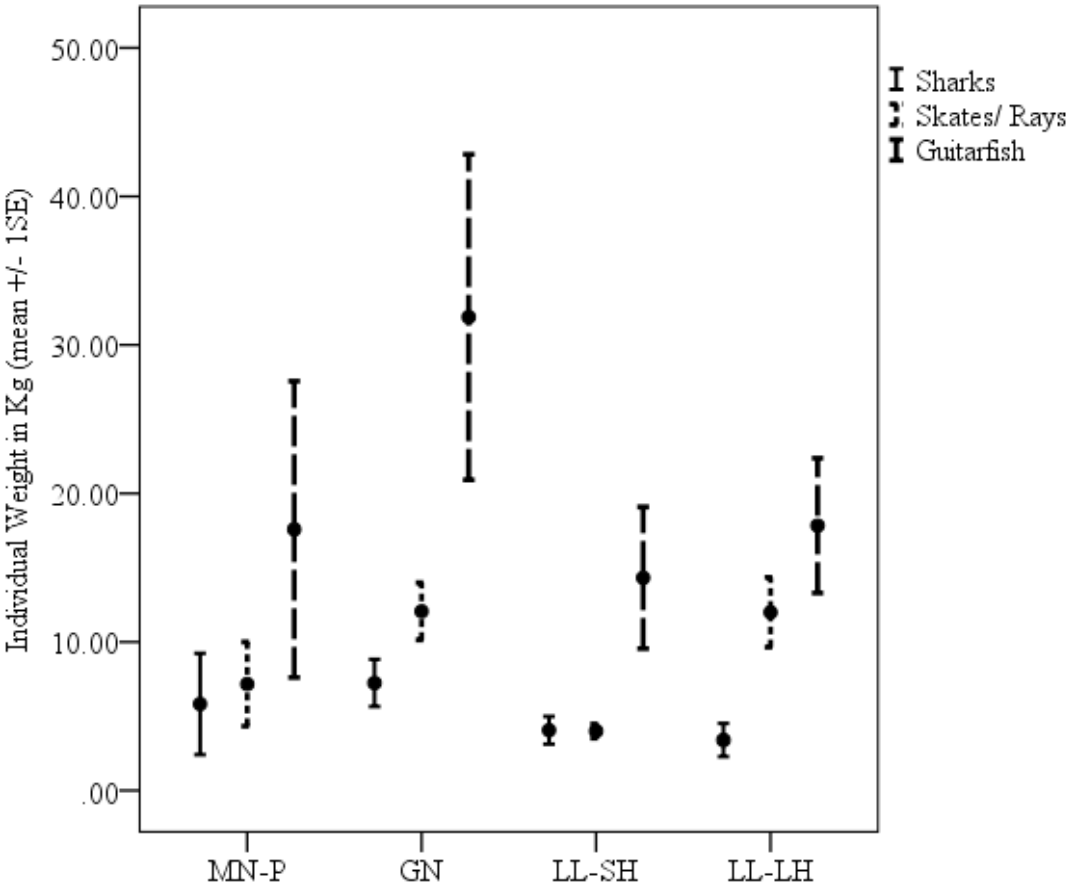

Figure 6.7: Average weight in kilograms (+/- 1 Standard Error) of individual specimens of guitarfish (n=28) skates and rays (n=42) and ground sharks (n=85) captured by the five in-migrant gears

6.5. Discussion

This discussion returns to each of the objectives outlined in the introduction and contextualises the findings relevant to each point. The first section asked to what extent fishing strategies and resultant catch varied in time and space for the fishers. The impact of fishing on Uno could potentially be high. The length of long-lines used per set, (Cartamila et al. 2011); length of gill net sets (Cartamila et al. 2011; Farias 2007) and the time that gear spent inside the water (Bizarro et al. 2007) were

all greater on Uno than have been reported from SSF studies elsewhere. Fishers described varying their strategies of going to sea, in line with lunar periodicity. Such knowledge of when fish are most available is age-old (Parrish 1990). Correlations between lunar phase and catchability of marine species have been recognised and exploited by SSF for centuries (Vunisea 2005: 921; Lunn and Deardon 2006). Information derived from fish catch data can be revealing in this regard (Parrish 1999).

In total sixteen fishing grounds were identified as in use. Paddle powered excursions used those areas closest to shore. The furthest fishing area (Vietnam) was located inside the adjacent PNO. In total, 27% of catch was obtained from fishing efforts made inside this area. CPUE inside the PNO was significantly higher than outside. This finding is suggestive of theories defining *rebounding fish populations* inside reserve areas which imply conversely that extensive fishing activity outside of marine managed zones can depress fish stock densities and sizes (Gell and Roberts 2003; Russ et al. 2004). Without use of catch data before Vietnam fishing ground attained protected status however, such conclusions remain only speculative. The GN gear was not recorded as having fished inside the PNO area, but as outlined in Section 3.3.5 (which discusses the shortfalls of the landing survey) overnight fishing excursions (known as 'campaigns') were not captured in the data-set and it is likely that GN campaign fishers did also use the PNO area.

What this study does suggest is that the current status of the PNO does not appear to deter fishers from entering the area to work. Fishers past experiences have been

described as influential in choices and decisions concerning future fishing locations (Teh et al. 2012). As previously described (Chapter 5) many members of the in-migrant fishing encampment formerly resided inside the PNO area before its protected status was declared. It has been said that conservation rules are not well understood by the majority of fishermen in the Bijagós Islands (Fernandes 2012). Whilst this might be true of some cases, in others where fishers formerly resided inside and were subsequently evicted from a newly accredited conservation area, this may be less likely. Perhaps, it could be said that the conservation ethic which surrounds the Bijagós locally sacred areas (LSA's) is less well understood than the regulations imposed upon the adjacent national park. This study illustrates that status alone, for both the PNO and LSA's of the Bijagós, is not sufficient to merit withdrawal of in-migrant extraction activities.

Fifty seven per cent of landed catch (by weight) on Uno consisted of bonga shad. This is described as the '*third most important clupeid*' in the Guinea Gulf (www.fishbase.org). Bonga is described as constituting between 53%[159] and 70% of total landed catch in the area[160]; and findings from Uno support this. However, despite its regional importance, data regarding the state of bonga stocks are scarce. Canoe fishers between Senegal and Sierra Leone are dependent upon seasonal upwellings, when clupeids are brought closer to the land. The national minimum mesh size (18 mm) for MN gear in Guinea Bissau, has been designed with the intention of sustaining pelagic shoaling fish populations such as the bonga, by preventing the capture of immature individuals (World Bank 2010).

[159] As declared by the Centre for Investigation of Artisanal Fisheries in Guinea Bissau (CIPA)
[160] According to the IUCN

The second objective investigated the significance of elasmobranch catch for each gear type. According to the FAO, about 15% of Atlantic landings (in 2007) by weight were elasmobranchs (pelagic sharks and rays) (Camhi et al. 2009). On Uno, this figure was rather less at 10%. Fishers on Uno never did describe their primary target as the elasmobranch group. Instead they considered their catch '*the work of god*' but did admit that elasmobranchs were never unwanted. Yet growth in targeted shark fishing, coupled with lower fecundity rates are such that elasmobranch landings are very much under a spotlight and reportedly declining in many places (Clarke 2007; Jacquet et al. 2008; Cortes et al. 2010 cited in Bromhead et al. 2013; FAO 2008 cited in Cartamila et al. 2011). At the end of 2007, the IUCN declared 21% of all known shark species as 'threatened', 5% were defined as 'endangered' and 13% classified as 'vulnerable' (Dulvy and Forrest, 2010). Perhaps more importantly however, 34% of elasmobranch species are considered 'data deficient' such that in most places, elasmobranchs are a common but unspecified component in many fisheries, particularly those using long-lines, or gillnets (Stevens et al. 2000; Camhi et al. 2009; Dulvy and Forrest, 2010).

No landings of elasmobranchs by the MN-M gear were documented. However, as outlined in the methodology (Section 3.3.5) this was perhaps, due to reluctance for elasmobranch capture by this gear to be observed, given the propensity for fishing crews to visiting the PNO. No fisheries management plans inside the Bijagós have successfully implemented actions which might encourage fishing behaviour sensitive to the elasmobranchs. Spatial closures such as the PNO have been the focus of conservation efforts yet as this study shows, elasmobranchs are clearly present

outside of the protected area network. On Uno, elasmobranchs were most commonly caught inside the gill-nets and on large hook long-lines. Gill net capture of elasmobranchs was seasonal. Large hook long-line capture remained consistently high across seasons.

The third section considers what can be inferred from the size (weight and length) of elasmobranchs captured in the area. Elasmobranch identification to the species level was not always possible on Uno given time constraints and the commercial nature of the fishing operations from which the data are derived. Rather the findings from Uno are informed by a separate study undertaken inside the PNO, by the French NGO Noé Conservation. This group has published online species-specific data regarding elasmobranch capture from several small Bijago-only fishing crews stationed and permitted inside the PNO area (Beziers 2009). Noé Conservation describes sharks as comprising 13% of total elasmobranch capture inside the PNO (Beziers 2009). An umbrella group (including 'skates, rays and guitarfishes') comprises the remaining 87% (by weight) inside the PNO. On Uno (where guitarfishes were differentiated) the (i) sharks (ii) skates and rays and (iii) guitarfishes, each constituted one third of the total elasmobranch catch. This suggests that sharks are more frequently captured by fishers on Uno.

Perhaps, as revealing as the amounts of each elasmobranch group captured, are details of the particular species inside these three catch groups, where recorded. Inside the PNO, Noé Conservation identified 74% of landed sharks as belonging to one species, known as the milk shark, *Rhizoprionodon acutus* (Beziers 2009). This is

also described as the most abundant elasmobranch in neighbouring Senegal (Capape et al. 2006). Milk shark prevalence in coastal fishery landings in West Africa has been linked with declining populations of higher apex predators as a result of overfishing (Ba et al. 2013). The milk shark is considered of 'least concern' under IUCN criteria and it is defined as an abundant inshore shark commonly caught in subsistence, commercial and artisanal fisheries throughout its range (Simpfendorfer 2003). Given the extent to which the milk shark is captured inside the neighbouring PNO, it seems highly likely that it is also abundant on Uno. Two reasons are cited for this. Firstly, that the species is considered robust and adapted to fishing pressure and secondly that fishing pressure is perhaps greater on Uno than Orango, by nature of the existence of the fishing encampment and the large number of in-migrant fishers evicted from inside the PNO area.

The milk shark displays one of the smallest sizes (35 cm) at birth of all sharks in this geographic area, comparable only with the tope shark (*Galeorhinus galeus*) which measures between 26 and 40 cm at birth. The tope shark is listed as 'vulnerable' by the IUCN. However, this species was not identified at all inside the PNO area. It is therefore questionable whether the abundance of small shark specimens observed on Uno, were the tope shark.

The remaining 70% of sharks measuring more than 40 cm in length, could possibly be juvenile milk sharks, or black tip sharks (*Carcharhinus limbatus).* Blacktips were the second most commonly identified species inside the PNO (Beziers 2009). They are also listed as 'near threatened' by the IUCN.

New-born specimens of the 'endangered' daisy stingray (*Dasyatis margarita*) and newborn spiny butterfly rays (*Gymnura altavela*) measuring less than 38 cm in diameter, were both identified on Uno The latter species is considered 'critically endangered'. Mature adult rays were also observed, including the common stingray (*Dasyatis pastinaca*) described as 'data deficient'. Finally, mature guitarfish individuals were observed in the landing surveys on Uno. This is of importance, given that both *Rhinobatus rhinobatus* and *Rhinobatus cemiculus* are classified as 'endangered' under the IUCN red-list.

Investigation of elasmobranch capture on Uno reveals the presence of both neonates and juveniles, and fully mature adults of multiple species, including sharks, skates, rays and guitarfishes. Many coastal shark species use bays, estuaries and shallow, near-shore waters as pupping and nursery areas (Belcher and Jennings, 2011). The fishing grounds of Uno certainly fit the description of a highly productive shallow water area inclusive of coastal marshes, estuaries, sea-grass or mangroves, where abundant small fishes and shrimp could provide food (Castro 1993). Prevalence of neonates and juveniles in the catch may therefore represent bias in the fishing gear used, or be indicative of a nursery area; but in either case can present a cause for concern (Carr et al. 2013). The occurrence of both neonate and juvenile sharks in gill net captures within the Gulf of Mexico have led authors to suggest that these shark nurseries are under heavy fishing pressure (Castillo-Geniz et al. 1998). The same conclusion could be reached from these findings on Uno.

Chapter Seven

Livelihood Strategies and Commercial SSF

Chapter Overview

This final empirical chapter considers the specialisation underpinning livelihood strategies (LS's) for households involved in and surrounding commercial SSF activities. This topic engages with linkages between involvement in SSF and poverty, as outlined in the introduction Section 1.3.iv. The chapter integrates household economic information derived from repeat-round surveys with quantified household attribute and asset measures. These are used to investigate household constraints in adopting particular livelihood strategies and determining resultant household economic outcomes.

Cluster analysis reveals three LS groups inside each of the two study groups. The Bijagós LS's consist of livestock, agricultural and labour-wage specialists. The in-migrant fishing encampment strategies comprise fresh, smoked and salt fish specialists. Bijagós per capita daily gross income peaks significantly for the livestock strategists. Bijagós LS group membership also significantly influences use of both Bissau City and the in-migrant fishing encampment as market-places of sale.

In-migrant strategies significantly influence per capita income and expenditure levels; proportional income derived from and proportional expenditure made inside the encampment; and finally access to cash borrowing opportunities. Associations are identified between Bijagós household portfolios of financial assets (in particular livestock ownership) and household head status, as influencing membership in a LS group. For the in-migrants, household and gear ownership status influence both per capita gross income, proportional dependence upon the encampment (for income and purchasing) and access to cash loans during the rains.

7.1. Literature Review

7.1.1. Livelihood Strategies

Identifying and characterising LS's can help to inform policy makers of differentiated groups within society and identify asset constraints, among the poor that may be targeted in development activities (Barrett et al. 2001; Tesfaye et al. 2011). Clustering a sample of households into a limited number of categories that pursue similar LS's can be a useful means of pursuing this goal, by identifying target households which share certain common traits (Jansen et al. 2006).

A LS, can be defined as a *portfolio of activities* or *choices that people make to achieve their livelihood goals, including productive activities, investment strategies and reproductive choices* (Ellis 1998; Adato et al. 2002; Jansen 2006). LS's can also be specified by *combinations of activities which contribute to household income* (Liyama et al. 2008). This final empricial chapter investigates LS's by focussing

upon household income attributes, in order to discern any associations between a household's adoption of a particular strategy and household endowments of assets (human, social, natural, physical and financial). This approach has been used in other studies to understand how particular forms of poverty predetermine peoples' livelihood pathways (Ansoms and McKay 2010).

Cross-regional comparisons of LS's are common; but exploring heterogeneities in LS's among households sharing similar biophysical conditions are rare (Liyama et al. 2008). This is surprising given that the largest source of variation in smallholder household income has been identified as lying within, rather than between, sites, villages or residential areas (Jayne et al. 2003). It follows, that informing policy makers of implications of development strategy options, may benefit from substantial investigation at the intra-community level (Jayne et al. 2003).

7.1.2. Commercial SSF and Household Poverty

Understanding how the resources associated with fisheries are related to rural income is essential, for the design of policies that support livelihoods and for the development of sustainable pro-poor incentives, within and around fishing communities. Differentiating between LS's within fishing communities may help clarify the links between fishing and income.

The idea that fishers are the 'poorest of the poor' has been refuted by several authors (Béné 2003; Allison and Horemans, 2006; Allison et al., 2006; Sumaila et al. 2008;

Béné et al. 2010a). Rather, involvement in commercial SSF activities has been linked to elevated income-generation in comparison to other primary sector opportunities, such as farming. However, further dis-aggregation of the commonly undifferentiated 'fisher-folk' will inform and develop our understanding of the relative poverty status located within and around small-scale fisheries (Allison and Horemans 2004).

7.1.3. Chapter Objectives

The emphasis of this chapter is on disaggregating household economies. The first section asks what the key differences are, between LS's. This is approached by investigating livelihood specialisation at the household level. The second section asks how adoption of particular LS's influences household economic outcomes. The third section asks which key household attributes and asset-holdings are associated with the adoption of particular LS's and thus shape resultant economic outcomes.

7.2. Method

7.2.1. Livelihood Strategy (LS) Data

The households described in this chapter are located within the two focal environs of this study, the Bijagós villages of Uno Island and the in-migrant encampment. The geography and demography of this area (as part of the Bijagós archipelago, Guinea Bissau) are described in Chapter Two. The data sets used in these analyses are compiled from two methodologies, each completed independently inside each of the study populations. LS's are derived from household cash-income components,

information regarding which were obtained using a 'repeat-round household economic survey'. Full details of the method through which this survey was devised and conducted are outlined in Section 3.4.8. The 'household economic responses' (described in the next section) are also derived from this survey. Variables associated with the particular household LS's and resultant economic outcomes (including household demographics, household head status, household physical, financial and natural capital assets) were obtained using the 'household survey', also described in full-detail in Section 3.4.4. The 'repeat round household economic survey' and corresponding 'household survey' were conducted with a sample of twenty nine Bijago households from Cabuno Area (inside the villages of Ancoyem and Ankarabe) and with thirty seven households inside the in-migrant fishing encampment.

The definition of LS as used in this chapter is the '*relative (%) contribution of different income streams to the total household cash-income economy*'. For the Bijagós household economy, LS's incorporate the use of agricultural crops, commercial cashews, livestock and small animals, grass, farming and fishing equipment and labour wages, with varying degrees of importance. For the in-migrant households inside the fishing encampment on Uno Island, income (and therefore LS) is derived from sales of fresh, smoked and salt fish types and fish body parts, fishing equipment and wood, for fish smoking. The method whereby LS is incorporated into the analysis is outlined in Figure 7.1.

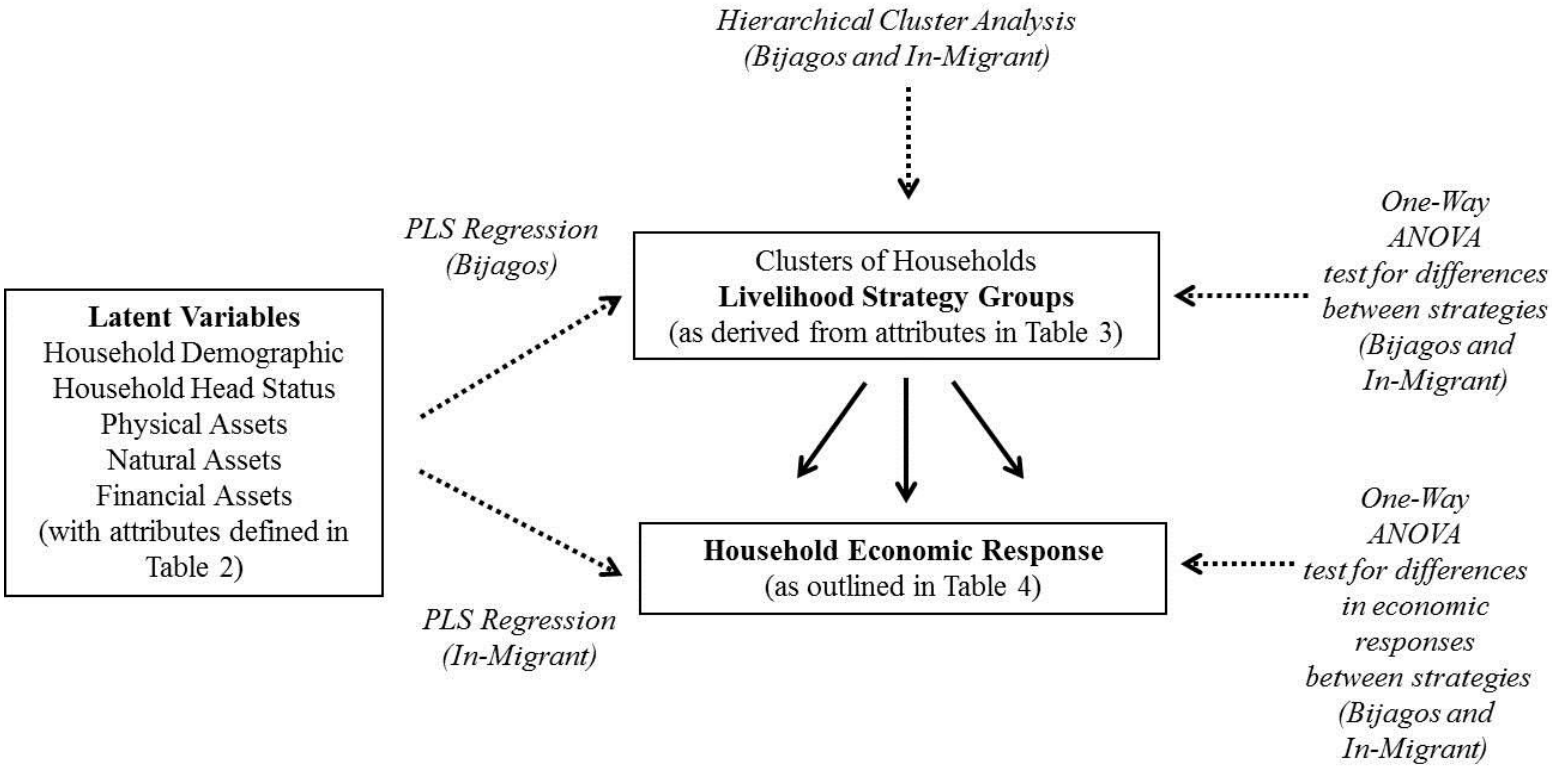

Figure 7.1: Analytical framework. Section 7.4.1 introduces the Livelihood Strategy clusters and identifies key significant differences between them. Section 7.4.2 considers variability in key economic outcomes between the cluster groups. Section 7.4.3 uses PLS regression analysis to identify which key household attributes are associated with household livelihood strategy types (for the Bijagós) and household economic responses (for the in-migrants)

The main components which therefore comprise (i) Bijagós household and (ii) in-migrant fishing encampment LS's are outlined in Table 7.1 (see Appendix 3.4a and 3.4b for product inventories).

Table 7.1: Livelihood Strategy Components

(a) Bijagós Households (n=29)

Income Streams	n*	Min	Max	Mean	Std. Dev.
AGRICULTURAL CROPS	27	.00	1.00	.23	.25
COMM. CASHEWS	21	.00	.45	.15	.13
ANIMALS	23	.00	.93	.37	.31
FISH/AQUATICS	15	.00	.54	.06	.14
GRASS	8	.00	.24	.02	.05
EQUIPMENT	8	.00	.40	.04	.10
LABOUR-WAGES	7	.00	.96	.15	.29

(b) In-Migrant Encampment Households (n=37)

Income Streams	n*	Min	Max	Mean	Std. Dev.
FRESH FISH	18	.00	1.00	.22	.36
SMOKED FISH	23	.00	1.00	.43	.43
SALT FISH	13	.00	1.00	.18	.32
FISH BODY PARTS	10	.00	.46	.04	.10
EQUIPMENT	5	.00	.75	.04	.16
WOOD	8	.00	1.00	.09	.27

*Where 'n' refers to the number of households in the sample using this income stream

Household economic outcomes for the Bijagós and in-migrants are outlined in Table 7.2. For the Bijagós these include per capita daily gross income and expenditure; proportional income derived from Bissau City and the in-migrant fishing encampment itself. For the in-migrants, responses also included the proportion of total household expenditures made inside the in-migrant fishing camp and cash borrowing negotiated by the household.

Table 7.2: Comparative Household Economic Outcomes

Economic Outcome		BIJ	MIG
PC INCOME	Per capita income (gross)	X	X
PC EXP	Per capita expenditure (gross)	X	X
PROPINCENC	Proportion of total income derived from	X	X
PROPEXPENC	Proportion of total expenditure inside encampment	-	X
PROPINCBISS	Proportion of total income derived from Bissau	X	X
BORROWING	Cash Borrowing	-	X

7.2.2. Coding the Household Survey

The different household attributes and assets identified during wealth ranking exercises and later quantified during the 'household survey' are outlined in Table 7.3. Bijagós and in-migrant encampment households are comparable in terms of certain human demographic measures, household head attributes and physical (fishing gear) assets. In other ways, there was no possible comparison given that the focus of the investigation was upon assets held inside the in-migrant destination.

Table 7.3: Household attributes used in the Bijagós and In-migrant equivalent versions of the 'Household Survey'

Household Asset Category	Description	Local Bijagós	In-Migrant
Human Demographic	Total Capita	X	X
	Proportion of Independent Adult Males	X	X
	Proportion of Independent Adult Females	X	X
	Proportion of Dependent Adults	X	
	Proportion of Dependent Children	X	X
Household Head Status	Gender	X	X
	Age	X	X
	Age-Grade	X	
	Matrilineal Clan	X	
	Ethnicity		X
	Nationality		X
	Years on Site	X	X
	Education	X	X
	Religion	X	
	Fisher or Trader Unit		X
	Household Location (hamlet)	X	
Physical Assets	Hand-nets	X	
	Monofilament Nets		X
	Gill Nets		X
	Long Lines		X
	Canoe (wooden board)		X
	Motor (15 HP)		
Natural Assets	Paddy Yield in kg (2009)	X	
	Average Annual Cashew Yield (2009/ 2010)in kg	X	
Financial Assets	Cows	X	
	Goats	X	
	Pigs	X	

On Uno Island, in-migrant encampment residents did not cultivate rice or cashews or generally own any livestock or small animals (pigs and goats). This limited comparability between the Bijagós and in-migrant groups. Neither were household

demographics comparable in terms of dependent adult members; as these were absent inside the in-migrant fishing camp.

In terms of household head status, records of age grade, matrilineal clan membership, religion of household head and household location (in terms of hamlet) were made for Bijagós household heads only. In-migrants did not use the age grade system, clan membership did not apply, all heads of household were Muslim and all households were located inside one community entity: the in-migrant encampment. Rather, the in-migrant household heads were differentiated in terms of ethnicity, nationality and fisher or trader status. In terms of fishing gear, Bijagós fishing gear was dominated by the use of hand-nets. Inside the in-migrant fishing camp there were numerous monofilament (bonga), gill-nets and long-lines. Fourteen board-made canoes and three 15HP engines were also recorded.

The variable attributes of an average household in the Bijagós village and in the in-migrant encampment are outlined in Table 7.4. Average Bijagós village households are larger with 5.7 occupants, compared with 1.8 inside the in-migrant fishing encampment. Bijagós village households on average comprise 60% independent adults; 30% dependent children and finally around 10% dependent adults (the extremely elderly). In contrast, the encampment households comprised 90% independent adults and 10% dependent children. The head of an average Bijagós village household has been in residence for 15 years on the site of the current house. In contrast, an average in-migrant settler head of household has passed just 2.8 years on site.

Table 7.4: Average household attributes inside the two Bijagós villages (Ancoyem and Ankarabe) and inside the in-migrant fishing encampment

Household Asset Category	Attribute Abbreviation	Attribute Description	Bijagós Household	In-Migrant Household
Human Demographic	CAPITA	HH Size (capita)	5.7	1.8
	PIAM	HH Independent Adult	0.4	0.5
	PIAF	HH Independent Adult	0.2	0.4
	PDEPAD	HH Dependent Adults	0.1	0
	PDEPCH	HH Dependent Children	0.3	0.1
Household Head	YRSONSITE	HH Head Years on Site	15.0	2.8
	ED	HH Head Education Level	5.0	-
Physical Assets	HN	HH Assets: Hand-Net	0.8	-
	MN	HH Assets: Monofilament-	-	1.12
	GN	HH Assets: Gill-Net	0.2	1.13
	LL	HH Assets: Long-Line	-	112.3[a]
	BOAT	HH Assets: Boat (with	-	0.2
	MOTOR	HH Assets: Motor	-	0.04
Natural Assets	BOLYD09	HH Assets: Rice Paddy	149.5	-
	AVCASH10	HH Assets: Cashew Yield	106.1	-
Financial Assets	COWS	HH Assets: Cows	5.6	-
	PIGS	HH Pigs	3.5	
	GOATS	HH Goats	2.3	

[a] refers to the number of large-hooks owned by an average household; in contrast, ownership of small-hooks is less (18.12)

On average, households inside the in-migrant settlement do own at least one fishing net (monofilament or gillnet) but are less likely to own either a boat or motor. Not all Bijagós households are in possession of a hand-net for fishing. The 2009 rice yield

for an average Bijagós household was 156 kg, which (using average household capita) assures an 'average' individual with 0.76 kg (or 76 grams) of rice each day. Given that one portion of cooked rice daily offers the only substantial meal of a typical Bijagós day, this suggests that subsistence production of lowland rice is unlikely to sustain an average household to its' 'full' capacity (Appendix 2, Photograph 22). In addition, an average Bijagós household produces cashew nuts (around 106 kg per household) and owns up to 6 heads of cattle (Appendix 2, Photograph 23).

7.3. Data Analysis

7.3.1. Cluster Analysis and Livelihood Strategy Groups

Hierarchical cluster analysis was used to group households based upon their LS as defined by the attributes in Table 7.1. The Wards method was used to define the clusters and groups were differentiated using squared Euclidean distances. The number of clusters, independently inside each of the Bijago and in-migrant encampment data-sets, was derived from calculated differences in agglomeration values. Significant differences in use of these 'income streams' between clusters were identified using one-way ANOVA tests. Log_{10} transformed values of income stream data were used when assumptions of normality were violated.

7.3.2. Variation in Economic Responses between Clusters

Further significant differences between LS clusters were analysed in relation to the 'economic outcomes' (shown previously in Table 7.2). Again, analysis comprised

one-way ANOVA tests, using Log_{10} transformed values where necessary. All ANOVA analyses and the hierarchical clustering exercise were performed using the IBM SPSS Statistical Package (Version 21).

7.3.3. Associations between Livelihood Strategies and Household Assets

Partial least squares (PLS) regression analysis was used to test for associations between endowments of household-assets and resultant LS's. For an in-depth description of the PLS (regression) procedure refer to Chapter 5 (Section 5.3.2). The PLS regressions were performed using the WarpPLS (Version 3.0) software, which runs in conjunction with MATLAB (Kock 2010).

In creating each model, latent variables were defined using the household asset categories defined in Table 3 (human demographic, household head status, physical, natural and financial assets). PLS regression was attempted to illustrate which factors might be associated with (i) the household LS (defined in Table 7.1) and (ii) household resultant economic responses (defined in Table 7.2) as illustrated in Figure 1. This was possible for the Bijagós data-set. For the in-migrant household data-set, no models were found that could associate household LS's with the measured household attributes. Instead, only household economic outcomes (Table 7.2) were successfully modelled.

7.4. Results

7.4.1. Identifying Livelihood Strategy (LS) Groups

7.4.1.1. Bijagós Households

Across all twenty-nine Bijagós households (in both Ancoyem and Ankarabe villages) males generate 68% of total gross income and females 32%. In total, 44% of gross income is generated through sales of livestock and small animals (goats, pigs and chickens). Labour paid wages (for construction, teaching and commercial opportunity) account for 17%. A further 16% is generated from cashew nuts. Non-cashew agricultural crops generate 14%. Sales of building materials (grass thatch and woven mats) generate 2% of household income and the sale of farming and fishing equipment (mainly mullet net discards and hand ploughs) contribute 3%. Fisheries related income is generated through sales of mullets *(Liza spp*) and croaker (*Pseudotolithus spp.*) However, fish account for only 2% of total household income on account of the relatively low fishing effort observed inside the focal Bijagós study villages (as outlined in Chapter 5). Rather, in terms of total income from fisheries and aquatic resources, the collection of inter-tidal cockles by female villagers generates a proportionally higher income than fishing[161].

Overall, 31% of Bijagós gross income is generated through sales of produce in Bissau City; a further 16% is derived from sales inside the in-migrant fishing encampment. The remaining 53% is derived from multiple locations; in villages across Uno Island and also on the island of Bubaque. Animals and livestock in

[161] Cockles were gathered on long-stay trips to neighbouring islets (commonly Jeu di Porcos); cockles were dried and transported to Bissau for sale.

particular, fetch substantially higher profits when sold off the island. Price disparities at sale, between Uno Island and Bissau City are illustrated in Table 7.5. Household expenditures are dominated by food-stuffs (65%). On average households allocate 92% of the total food budget to purchasing rice. Non-food consumer goods account for 15% of gross expenditures and school fees approximately 8%.

Table 7.5: Comparative prices of Bijagós produce attained at sale on Uno Island and in the capital Bissau City

Product	Value Uno*	Value Bissau	Transport Cost
Palm Oil	500/ litre	1000/ litre	1000 /25 litre
Pig	10 000	40 000	10 000
Piglet	5 000	20 000	5 000
Goat	5 000	10 000	2 500
Cow	60 000	140 000	20 000
Chicken	700	1 500	500 each
Cockles	500/ kilo	1000/ kilo	5 per kilo

*All values are cited in CFA where 500 was equal to £1 in 2010

Cluster analysis defines three groups of Bijagós households, differentiated in terms of LS as defined through income generation[162]. Significant differences between these LS groups are outlined in Table 7.6. All groups incorporate the sale of commercially marketed cashew nuts into their livelihood portfolio. In addition, Cluster 1 specialise in livestock sales. Cluster 2, specialise in non-cashew agricultural crop production and Cluster 3, in paid (wage or salaried) labour.

[162] Dendogram is found in Appendix 3.4c

Table 7.6: Comparison of proportional gross income (mean value given and standard error in parenthesis) derived from each income stream. Significant differences between cluster groups identified by a one-way ANOVA test on Log_{10} transformed values of proportional income

Income Streams	Cluster 1 (n=16)	Cluster 2 (n=7)	Cluster 3 (n=6)	One-Way ANOVA		
Cluster Name	LIVESTOCK	AGRICULTURE	LABOUR	F	*df*	*p*
Per capita Income in CFA (mean +/- 1SE)	355.68 (71.8)	187.96 (54.6)	259.28 (58.8)			
AGRICULTURAL CROPS*	0.17 (0.04)	0.50 (0.13)	0.05 (0.03)	7.7	2,23	**.003**
COMM. CASHEWS	0.19 (0.03)	0.12 (0.06)	0.06 (0.02)	3.3	2,19	.056
ANIMALS*	0.60 (0.05)	0.02 (0.01)	0.15 (0.06)	41.3	2,20	**<.001**
FISH/AQUATICS	0.03 (0.01)	0.16 (0.10)	0.008 (0.004)	2.1	2,12	.17
GRASS	0.01 (0.001)	0.05 (0.03)	0.007 (0.007)	1.0	2,5	.42
EQUIPMENT*	0.003 (0.002)	0.12 (0.07)	0.04 (0.03)	5.6	2,5	**.05**
LABOUR-WAGES*	0 (0)	0.03 (0.03)	0.68 (0.09)	7.4	1,5	**.04**

Income derived from fish and inter-tidal cockle harvesting is not significantly varied between clusters, indicating that all livelihood strategies incorporate use of these resources. Similarly, sales of grass thatching are constant across the three groups.

Wage labour opportunities inside the area are relatively few and the number of households adopting this strategy rather low. Labour opportunities include 'transporters' of cargo between port landing areas on Uno (in An-Onho or Ankarabe) and the village settlements. Such contracts commonly involve working on behalf of visiting or resident 'non-Bijagós' traders. Other individuals work on transport canoes moving between Uno, Bubaque and Bissau. Positions on transport boats are largely reserved however, for immediate family or kin of the boat owner and in Cabuno nobody owns such a boat, so these positions if undertaken are temporary and diffused with other labour tasks. For example, carrying sacks of cashew nuts from (i) either a village trading spot or (ii) from a port station out onto a transport canoe at low tide both provide potential income generation options. Carriers are paid 300 CFA (or £0.50) to carry a 50kg sack of cashew kernels from village to port, a distance of approximately 3 km. Other Bijagós villagers are employed as "watchmen" to guard the cashew exchange post during the harvest. These positions are all highly sought. One individual in Ankarabe was paid 25,000 CFA (£50) for a month of employment with a Mauritanian trader, who permanently resided on the island of Carache. This included his daily food allowance. Appointments of such positions are only agreed after a village meeting and ballot. Other individuals are employed to assist in weighing the cashews or tying up the cashew nut sacks.

Some traders bring workers from outside to assist with the harvest; but return traders tend to employ Bijagós village workers (from inside the area) to maintain good relations and therefore encourage greater trade. Construction work offered another paid labour-wage opportunity. A few individuals had attended construction training courses in a regional college. Others had learned the trade of house-building or well construction on the island, through an older family member. The primary school of Ankarabe also employs three teachers, each in receipt of monthly salaries from the Brazilian Protestant missionary family in An-Onho.

7.4.1.2. In-Migrant Households

The thirty seven in-migrant fishing encampment households generate most of their gross income (43%) from smoked fish; however sales of fresh and salted fish are also considerable. The fish sold includes bonga, catfish, croaker and elasmobranchs. In general, 54% of gross household income is generated by sales inside the fishing encampment. The remaining 46% is generated through sales of fish produce, in varying locations off the island.

The mechanisms of weighing fresh goods are well-established and all ‘fresh’ goods acquire a lower price at sale than the processed (smoked, salted or sun-dried) counterparts. Fresh bonga and catfish are transferred at landing out of the nets and wooden canoes into metal containers known as ‘pans’. Each ‘pan’ is trusted to hold ten kilograms of fresh fish. As the bonga are smoked (or processed) the weights used to measure the product change. Unlike fresh bonga, smoked bonga is sold as

individual counts of fish, known as 'heads' of bonga. Smoked catfish (like its fresh counterpart) is traded in kilograms of dried fish. Fresh croakers and elasmobranchs are weighed in kilograms on spring balances at landing and graded into three size-classes; ranging from first-class <*premiere*>, through second <*deuxieme*> to third <*troisieme*>. After salting, the processed or salted croaker and shark produce are sold by the kilogram weight according to size class (Appendix 2, Photograph 24).

All smoked fish is packed into and stored inside woven baskets known as <*blyes*>. One large *blye* can hold 2-3 tonnes of fish. *Blyes* are kept inside an owner's compound and guarded against damage due to damp or pests. When a cargo boat arrives, a loading trolley is 'rented' from inside the camp and the *blye* transported out onto the beach at low tide. A 'loading team' are then deployed to lift the *blye* up onto the cargo deck of the canoe, a task for which the team are paid with a cooked meal and a sum of smoked fish (Appendix 2, Photograph 25).

Smoked fish produce generally moves south to Guinea Conakry, either directly by sea to Kamsar; or to Bissau City by sea, and then by road across the Guinea Conakry border. Road trips are preferred during the rains, when storms at sea are common. Established fish cargo vessels service several of the existing fishing camps of the Bijagós Islands. These collect both fish and passengers bound for Conakry; and carry food supplies, fishing gear and passengers for the camps on their return journey back to the islands. Services are less frequent during the rains, on account of the storms. Incentives for shipping off Uno Island are reflected in the price disparities of smoked and salted goods. These are summarised in Table 7.7.

Table 7.7: Seasonal and locational price disparities for selected smoked and salted goods shipped out of the Uno Island encampment, to locations in Guinea Bissau, Guinea Conakry and Senegal (all values recorded in CFA where 500 equals £1)

		Guinea Bissau				Guinea Conakry				Senegal	
		Encampment		Bissau City		Kamsar		Conakry		Elenkin	
		Dry	Rains	Dry	Rains	Dry	Rains	Dry	Rains	Dry	Rains
Smoked Bonga (Individuals)		8-14	8-20	12.5-20	20	25	25	33	40	-	-
Peeled Bonga (Kg)		300	300-350	500-750	300-350	-	-	-	850	-	-
Smoked Catfish (Kg)		500	500-1000	900-1000	900-1000	1500	1600	1300	1750	-	-
Salted Croaker	(troisieme) Kg	300	300	500	500	-	-	-	-	550	550
	(deuxieme) Kg	500	500	750	750	-	-	-	-	800	800
	(premiere) Kg	1000	1100	1200	1200	-	-	-	-	1750	1750
Croaker Maws	(troisieme) Kg	6250	6250	-	-	-	-	-	-	-	-
	(deuxieme) Kg	10000	10000	-	15000	-	-	-	-	-	-
	(premiere) Kg	15000	15000	-	20000	-	-	-	-	25000	25000
Smoked Mixed Pelagics (Kg)		250	350	550	600	-	-	-	-		
Smoked Elasmobranch (Kg)		300	400	-	-		2200	-	-	-	-
Salted Elasmobranch (Kg)		350	350	-	-	-	-	-	-	720	720
Guitarfish Fin (Kg)		16250	30000	30-35000	30000	-	-		60000	40000	40000
Shark Fin	(troisieme) Kg	820	820	1200	1200	-	-	5000	5000	2500	2500
	(deuxieme) Kg	1500	1500	3000	3000	-	-	-	-	3500	3500
	(premiere) Kg	2500	2500	8000	10000	-	-	-	-	10000	11500

In the encampment smoked bonga is sold at a rate of 45 'heads' for 500 CFA (or £1). The price offered in Bissau City is higher at 29 heads. In Kamsar, bonga is purchased at a rate of 22 heads for £1; meanwhile, the highest premium on smoked bonga is attained in Conakry City 9 heads of fish reach £1. Similalrly, selling smoked catfish in Guinea Conakry is a desirable goal, given that the price offered inside the Uno encampment, is less than half the price offered on the mainland in Guinea (at £1 per kilo).

One forty-two year old boat owner (from Boffa prefecture in southern Guinea Conakry) described entering the fish cargo service in the early 2000's when the fishing camp known as Vietnam was established on Orango Island (now the National Park known as the PNO). His current boat cost 2,200,000 CFA (or £4,400) to build, with additional costs for the 40 HP engine. It measures 27 metres in length. "*As a captain*" he explains "*you can earn up to 400,000 CFA (£800) in one round-trip. The total capacity is 28 large <blyes> and 30 small <blyes>; the licence to transport the fish is 50,000 CFA (£100) payable in Kamsar. In one trip, you should carry 1000 litres of fuel, but this includes extra supplies that may only be used in an emergency. The biggest cost is the removal of the oysters from the ballast of the boat every two or three years*".

In contrast, salt fish (the croakers and elasmobranchs) are moved north from the Uno encampment, to Senegal; most notably the port of Elenkin in the southern Casamance, and the northern market of Dialbe near Dakar. No transport service

operates for salt fish goods. Rather, salt fish produce is generally transported in fishing canoes. Alternatively, salt fish is moved first by boat to Bissau and then by road into Senegal.

Cluster analysis also reveals three household groups inside the in-migrant fishing camp, varying in terms of LS[163]. The three in-migrant clusters also appear to specialise in trading specific 'fish states' illustrated in Table 7.8. Households within Cluster 1 generate the least amount of cash through fish sales (under 70% on average). Instead, households supplement their income through trading in wood[164] and fishing gear[165]. The fishing gear sold by this group is typically found as beach-litter (for example polystyrene floats, discarded nets) which are cleaned or repaired and then sold inside the camp. This cluster specialise in sales of 'fresh fish' which account for, on average, 56% of total household cash generation. In comparison, relatively little income is generated through smoked (6%) salt fish (1%); or fish body parts (6%). The greatest proportion (46%) of fresh fish sold by Cluster 1 is bonga. Price per kilo of fresh bonga is 1000 CFA (or £2). Catfish account for 10% of fresh fish sales for Cluster 1; fresh croaker transactions (5%) and elasmobranch sales are rather less, at just 2%.

[163] Dendogram is found in Appendix 3.4d
[164] $F_{(1,6)} = 6.2$, $p = 0.047$; R^2 (adj) = .43 (on average 23% per household)
[165] $F_{(1,4)} = 6.9$, $p = 0.05$ (12%)

Table 7.8: Comparison of proportional gross income (mean value given and standard error is in parenthesis) derived from each in-migrant income stream. Significant differences between cluster groups identified by a one-way ANOVA test on Log_{10} transformed values of proportional income. Post hoc differences between clusters as

Income Streams	Cluster 1 (n = 13)	Cluster 2 (n = 17)	Cluster 3 (n = 7)	One-Way ANOVA		
Cluster Name	FRESH FISH	SMOKED FISH	SALT FISH	F	*df*	*p*
Per capita Income in CFA (mean +/- 1SE)	1036.87 (200.48)	4169.41 (1463.76)	5365.16 (1776.12)			
FRESH FISH	.56 (0.12)	.02 (0.01)	.09 (0.04)	23.4	2,15	< **.001**[a]
SMOKED FISH	.06 (0.03)	.87 (0.03)	.02 (0.02)	66.8	2,20	< **.001**[b]
SALT FISH	.01 (0.007)	.05 (0.03)	.81 (0.05)	16.3	2,10	**.001**[c]
FISH BODY PARTS	.06 (0.04)	.01 (0.007)	.06 (0.03)	1.7	2,7	.252
EQUIPMENT	.12 (0.07)	0 (0)	0 (0)	-	-	-
WOOD	.23 (0.12)	.03 (0.02)	0 (0)	6.2	1,6	**.05**

[a] Fresh fish: Post hoc Tamhane 1 and 2 (p = .010)
[b] Smoked Tamhane 1 and 2 (p = .008)
[c] Salted Tamhane 1 and 3 (p = .045

Households in Cluster 2 generate on average, 87% of gross income through sales of smoked fish; which is significantly more than for all other clusters[166]. Income from sources of fresh fish (2%) and salt fish (5%) are less important. Sales of body parts are lowest for this group and account for only 1%. In total, 84% of fish sold-off by households in Cluster 2 are smoked. These comprise bonga (54%), catfish (18%) and elasmobranchs (6%)[167]. Throughout the encampment, elasmobranch smoking is generally quite rare. However, traders commented on an emerging market for smoked shark in Guinea Conakry. Fish processors had also observed that by smoking the shark, damage through rainy season rotting was reduced.

In-migrant households in Cluster 3 generate on average 81% of their gross income through sales of salt fish. Sales of both fresh (9%) and smoked fish (2%) are less for this group. Similarly to Cluster 1, body part sales account for 6%. In total, 88% of sales for Cluster 3 involve salt fish, including croakers (46%) and elasmobranchs of varying species (41%). Households in Cluster 3 therefore generate significantly higher income through sales of croaker than the other two clusters.

[166] $F_{(2,10)} = 16.3$, $p = 0.001$; R^2 (adj) = .86; Post hoc Tamhane, Cluster 2-1 ($p = .008$)
[167] Plus mixed small pelagics (4%)

7.4.2. Variation in Economic Outcome between Clusters

7.4.2.1. Bijagós Households

Variations in economic responses between the Bijagós LS clusters are outlined in Table 7.9. Per capita (gross) income varies significantly between clusters. This peaks with the livestock specialists; reaches an intermediate level with the labour wage cluster and is lowest with the agricultural specialists (see Figure 7.2a). Per capita (gross) expenditure levels also peak with the livestock specialists. However, expenditures are generally low, particularly among both the labour-wage and agriculturalist clusters and the difference between groups is not significant overall.

Table 7.9: Comparison of variation in Bijagós household economic responses between the three livelihood strategy groups (agriculturalists, livestock specialists and labour wage earners)

			One-Way ANOVA		
Economic Response	Range	Mean	F	df	P
Per capita income (gross) (CFA)	40.28 – 1180.56	295.3 (44.6)	**3.4**	**2, 26**	**.05**
Per capita expenditure (gross) (CFA)	35.19 – 577.62	201.2 (25.9)	3.2	2, 26	.06
Proportion of total income derived from Bissau	0 - .87	.31 (0.05)	**4.3**	**2, 26**	**.03**[a]
Proportion of total income derived from Encampment	0 – 1.00	.16 (0.04)	**4.3**	**2, 26**	**.02**[b]

[a] Cluster 1 and 2 Bonferroni (p = .027)
[b] Cluster 2 and 3 Tamhane (p = .039)

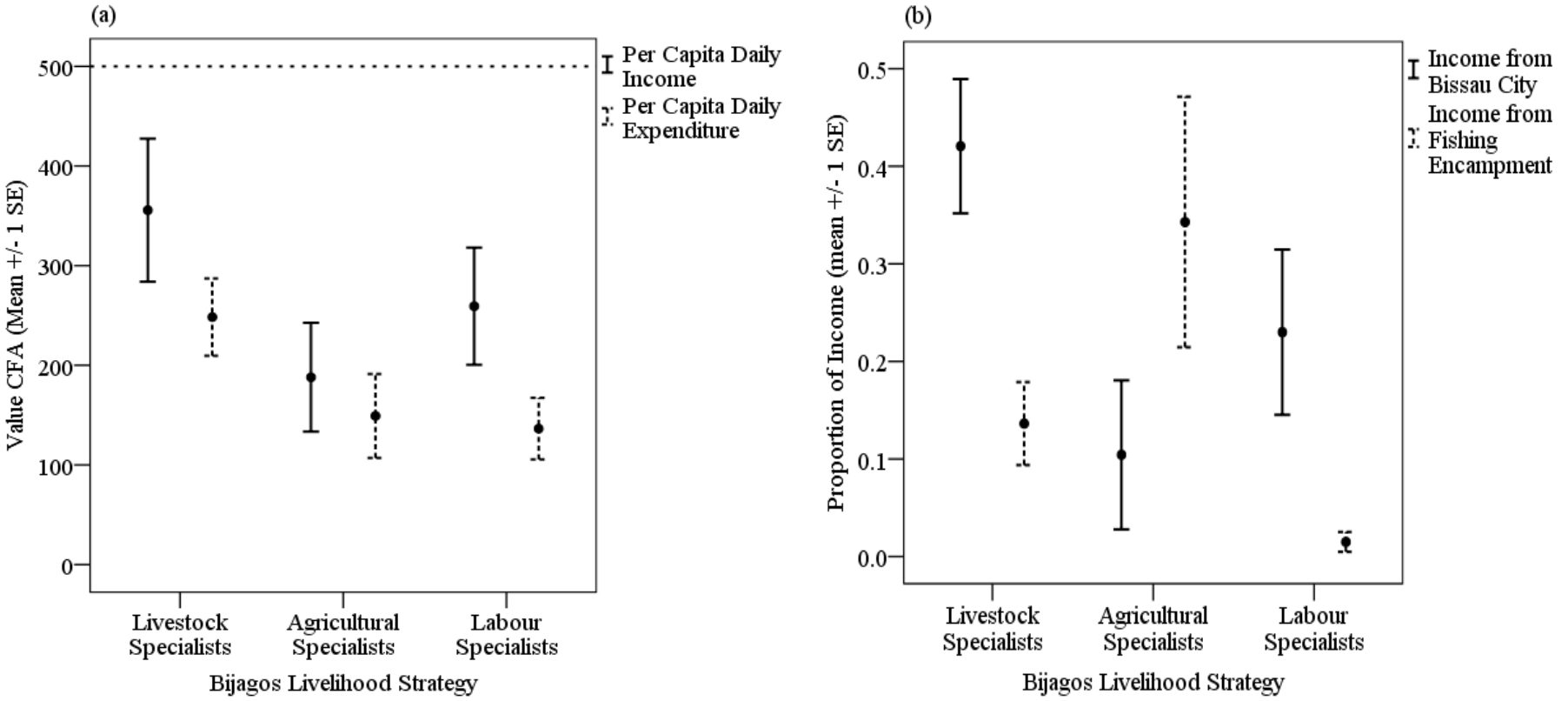

Figure 7.2: (a) Bijagós household per capita gross income and expenditure for households inside the three LS groups: livestock specialists (n=16) agricultural specialists (n=7) and labour specialists (n=6). The inserted dotted line indicates £1/ day. (b) Bijagós household proportional income derived from sales in Bissau City and the in-migrant fishing encampment on Uno for the three LS groups.

The proportion of total household expenditures allocated to food purchases remains constant across the three cluster groups, indicating that all livelihood strategies are dependent upon the purchasing of shop-bought rice for consumption. This reinforces that Bijagós households, despite extensive agricultural labour time were not achieving, total self-sufficiency between 2009 and 2010.

As illustrated in Table 7.9, the three Bijagós clusters also vary significantly in terms of their use of markets. Proportional income derived from sales made in Bissau City peaks with Cluster 1 (the livestock specialists). This is shown in Figure 7.2b. Use of the in-migrant fishing encampment also varies significantly between livelihood strategies (Figure 7.2b). In particular, the households specialising in sales of agricultural produce generate a significantly greater proportion of their income inside the in-migrant fishing camp, compared with the labour wage households.

7.4.2.2. In-Migrant Households

In contrast to the Bijagós, the in-migrant livelihood strategy clusters are significantly different in many ways. Unsurprisingly, Cluster 1 (specialising in sales of fresh fish) exhibit significantly lower per capita gross income levels, than both the smoked fish (Cluster 2) and the salt fish (Cluster 3) specialists. These significant differences between the clusters are outlined in Table 7.10.

Table 7.10: Comparing in-migrant fishing encampment household economic responses, for the fresh, smoked and salted fish specialist groups. Significant differences between cluster groups identified by a one-way ANOVA test on Log_{10} transformed values of proportional income. Post hoc differences between clusters as indicated.

	One-Way ANOVA		
Response	F	df	p
Per capita income	**6.0**	**2, 34**	**.006**[a]
Per capita expenditure	**6.2**	**2, 34**	**.005**[b]
Proportion of income derived from encampment	**23.9**	**2, 34**	**< .001**[c]
Proportion of expenditure made inside encampment	**3.7**	**2, 34**	**.035**[d]
Cash Borrowing	**3.6**	**2, 18**	**0.05**[e]

[a] Cluster 1 (fresh fish specialists) and 2 (smoked fish specialists); post hoc Bonferroni (p = .031); Clusters 1 (fresh fish) and 3 (salt fish): Bonferroni (p = .011)
[b] Clusters 1 and 3 Bonferroni (p = .034)
[c] Clusters 1 and 2 Tamhane (p < 0.001). Clusters 1 and 3 (p < 0.001)
[d] Clusters 1 and 3 Tamhane (p = .002)

Per capita gross expenditure levels are similarly lower for Cluster 1 (see Figure 7.3a). Clusters 2 and 3 are however not distinguishable in terms of per capita expenditure. Proportional household income derived from and proportion of total household expenditure made inside the in-migrant encampment, both peak with Cluster 1. This point is also illustrated in Figure 7.3b.

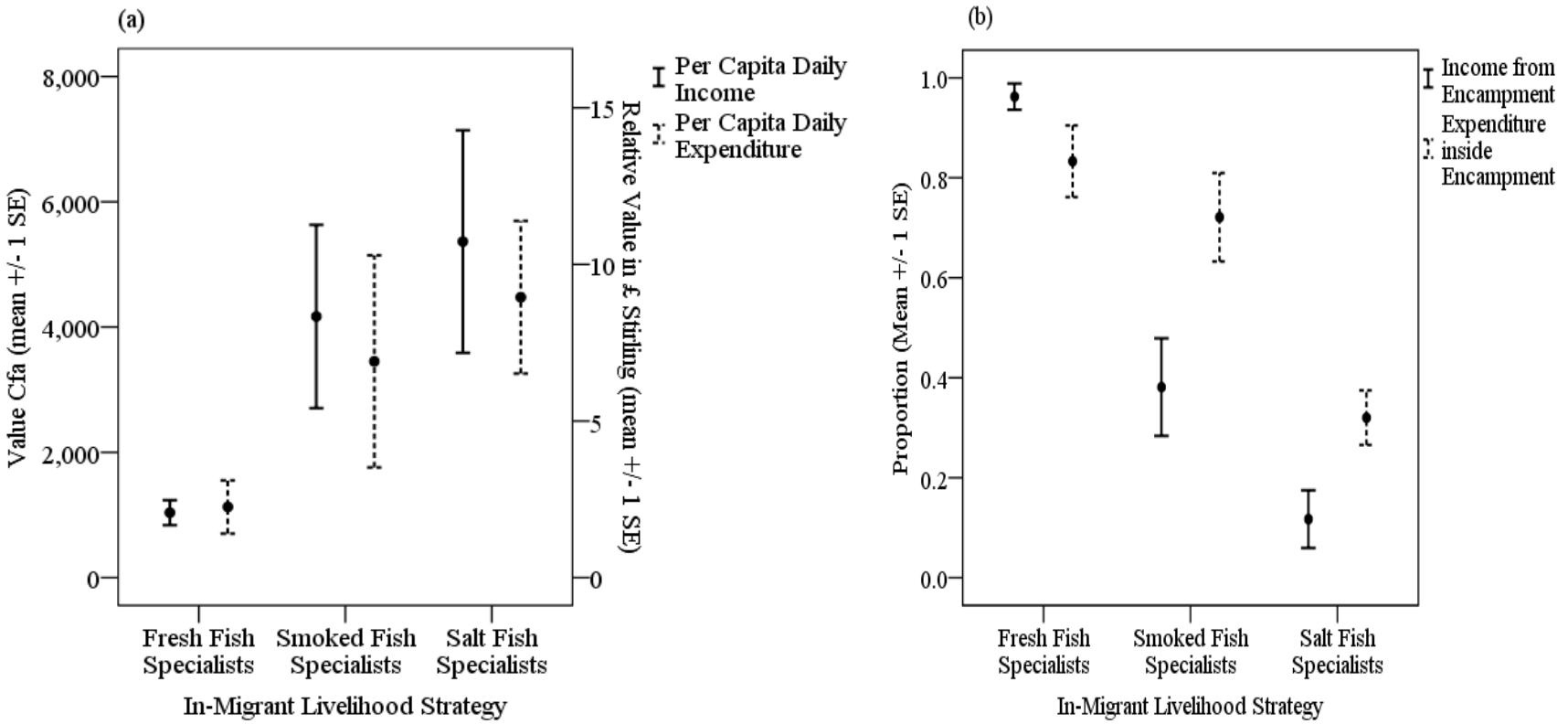

Figure 7.3: (a) In-migrant household per capita income and expenditure for the three LS groups: fresh fish specialists (n= 13), smoked fish specialists (n=17) and salt fish specialists (n= 7) (b) In-migrant household proportional income and expenditures derived from sales inside the in-migrant fishing encampment

By nature of their dealing predominantly in fresh fish, households in Cluster 1 are required to sell produce (if unable to process it) after landing, to avoid loss through spoilage. Here the distinction being that a fisher dealing in fresh fish and living alone is unlikely to smoke-process the fish himself. This is simply because the activity of smoking fish renders a fisher unable to go to sea, as smoking fires are constantly in need of attention. Only fishers, inside Cluster 1, living with or dealing with a fish processor (male or female) would be able to smoke process fish when possible. For the households in Cluster 2 (specialising in sales of smoked fish) only moderate trading occurred inside the camp. Rather 33% of fish was moved to Kamsar (in neighbouring Guinea Conakry) and 27% to Conakry City. A further 6% was sold in Bissau City. Cluster 3 sold less than 1% of their salt fish produce inside the encampment. Rather 34% was shipped to Elenkin, Senegal; 16% was sold in Bissau City and a further 2% in Dialbe, near Dakar. Sales of elasmobranchs followed these same routes but were also shipped by one household in Cluster 3, through to Accra, Ghana.

For in-migrant households in all three clusters, the transition from dry to rainy season incurs a significant decline in gross per capita income[168]. Due to the seasonality of income-generation and demand for fish; cash money-lending is therefore common. Access to credit is typically offered by the traders. Trader lending does not fluctuate seasonally and money is loaned to other traders as well as to fisher households.

[168] In-Migrant: Cluster 1 (Paired Samples: t = 2.8, df = 12, $p = 0.02$) Cluster 2 (t = 3.0, df = 14, $p = 0.01$) and Cluster 3 (t = 3.1, df = 5, $p = 0.03$)

Female traders borrow significantly more cash, from other traders, than males[169]. But in general fishers borrow three times as much as the traders. Of all documented money lending occurrences by fisher households, 7.3% is on credit from other fishing household within the camp and 1% is on loan from unknown individuals. However, the majority (92.7%) is cash on loan from traders inside the encampment on Uno, in lieu of future fish sales.

Reasons cited, by the fisher households for borrowing money from traders, include; paying carpentry fees, boat and gear repairs; repaying money borrowed (by workers), repaying long-standing debts, buying new nets, buying medicine, paying licences and for enjoyment[170].

Across the year as a whole and during the rains, fisher households in all clusters display an equivalent tendency to borrow money. In general, cash taken out on loan does increase during the rainy season; however, this is not the case for all groups. For example, the fresh fish specialists in particular borrow less money during the rains compared with the dry season. During the dry season, cash borrowing varies significantly between livelihood strategy groups and peaks with the salt fish specialists.

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[169] ($F = _{(1,9)} = 7.084$, $p = 0.03$). Female traders borrowing on average 112500 CFA (or £225) compared male traders (10008.33 CFA or £20)

[170] Traders were reportedly selling cannabis (see Table 3.4b. In-Migrant Inventory of Goods on page 372) often purchased in the Casamance, Senegal during trips to sell salt fish

7.4.3. Household Assets, Livelihood Strategies and Economic Outcomes

7.4.3.1. Bijagós Households

PLS regression provides an insight into the specific Bijagós household attributes associated with membership inside a particular LS group. The path coefficient (β) values of two specific latent variables (relating to household head status and household ownership of financial assets) are identified as significant and illustrated in Figure 7.4 (top)[171]. Household Head Status emerges as a composite variable, which comprises multiple attributes (education status, years lived on site, age-grade and religion). Figure 7.4 (bottom) illustrates the variable importance (represented by VIF scores) of these specific attributes which here define 'household head status' and are associated with membership in a LS group.

In general, heads of the livestock-specialist household cluster had lived on site for longest. These individuals are also generally older, have received lesser formal education opportunities and tend to be practising Animists rather than Protestants. Heads of households in the labour-wage cluster are younger, reside in younger households, are formerly educated to a higher-level than the livestock specialists and are predominantly Protestants.

[171] Natural assets (rice paddies or cashew orchards), physical assets (such as ownership of fishing material) and attributes defining household demographic composition, all proved non-significant in the analysis

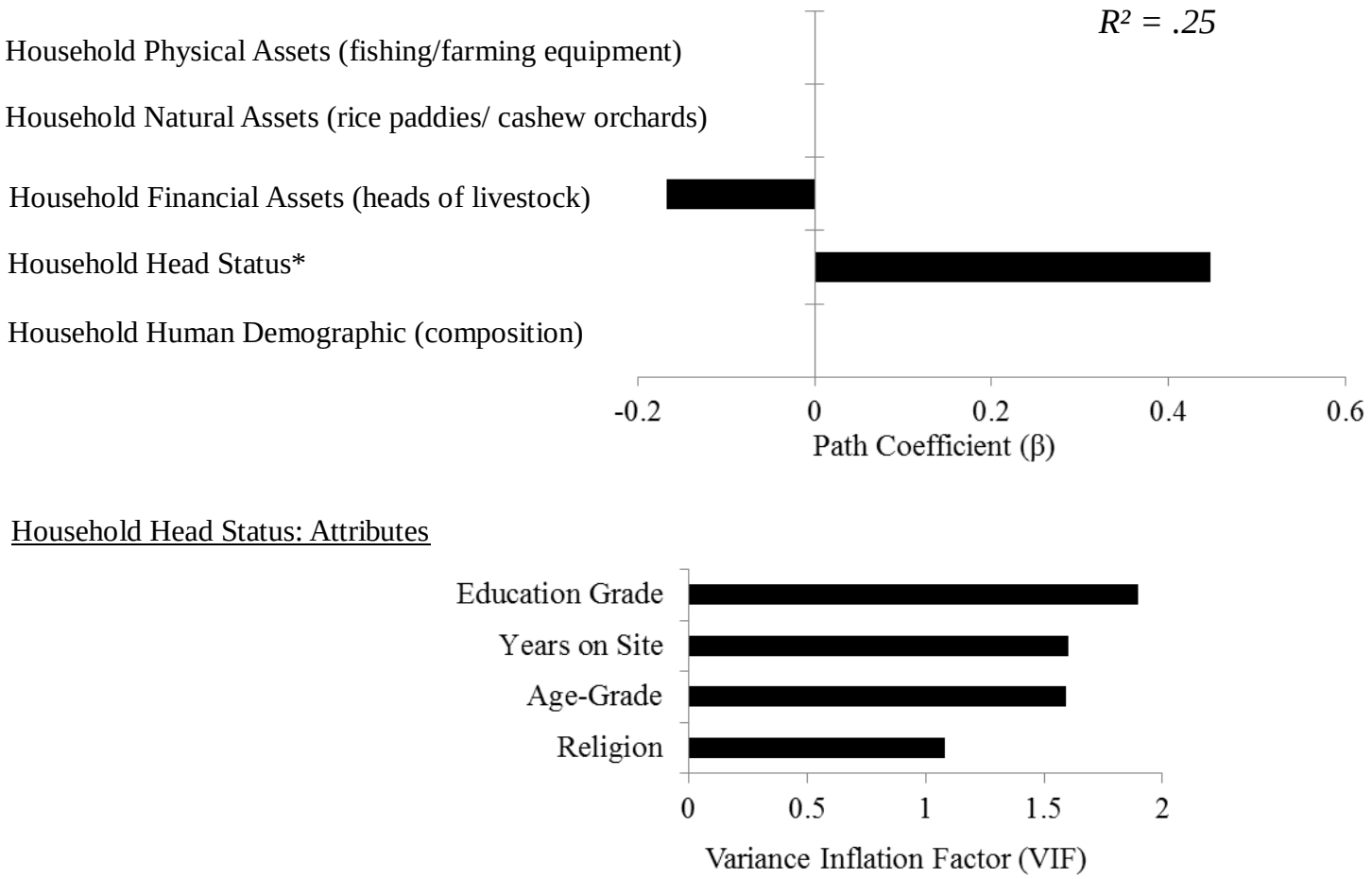


Figure 7.4: (a) TOP: Results of PLS regression analysis for Bijagos households. Latent variables included in model: Estimates of path coefficient (β) for heads of livestock (p = .07) and household head status (p = .04). Attributes of 'household head status'* are analysed in second figure.(b) BOTTOM: Relative importance of attributes of latent variable 'household head status' as defined by education grade (p = .09) years on site (p = .105), age-grade (p = .07) and religion (p = .09)

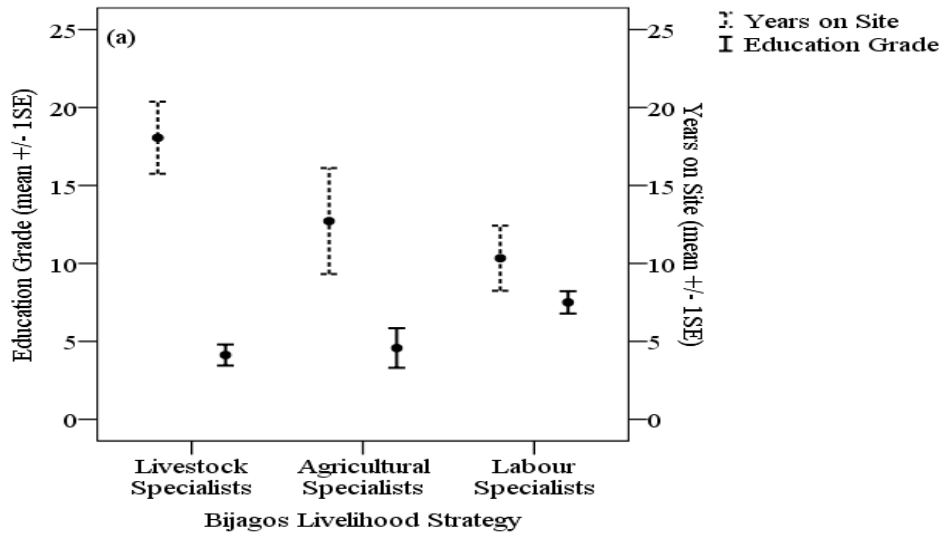
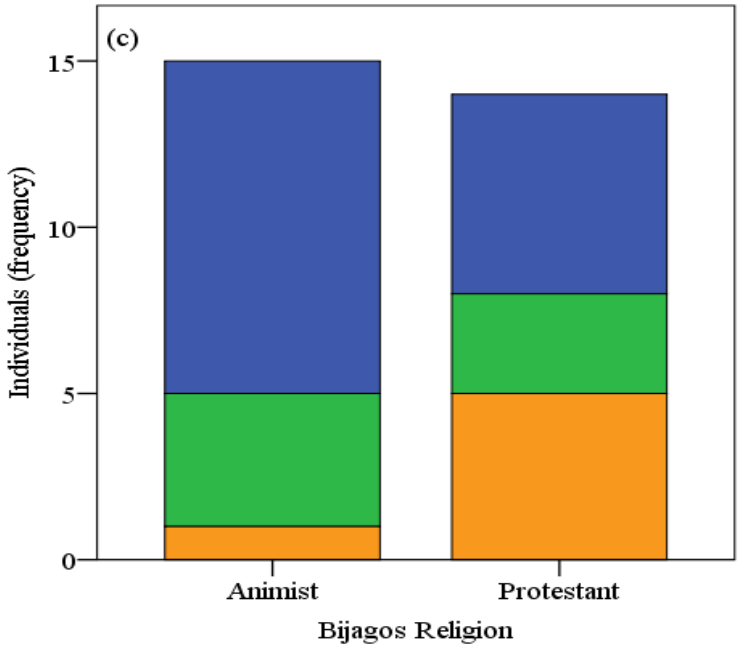


Figure 7.5: (a) Comparative education status and years on site of current household (or approximate age of household) for the three Bijagos livelihood strategy groups. (b) Comparative age grade of household head within the three livelihood groups. (c) Comparative religious affiliation of household heads, for the three Bijago livelihood strategy groups.



7.4.3.2. In-Migrant Households

PLS regression failed to identify significant household asset-characteristics that were associated with household membership in a specific livelihood strategy group[172]. Therefore, in-migrant LS and household-asset profiles were modelled (using PLS regression) to examine their influence against four economic responses: (i) per-capita income, (ii) proportional income generated inside the encampment, (iii) proportional expenditure made inside the encampment and (iv) cash borrowing. No household asset associations could be found to explain per capita expenditure. Each successful model comprised a variety of variables, including household LS, household-head status and household gear ownership. Household demographic composition therefore was not significant[173]. Two latent variables (HH Head Status and HH Gear Ownership) were in all four of the responses. Here, HH Head Status is composite and comprises multiple attributes: namely, status as a fisher or trader, individual age, gender, experience (years) on Uno and nationality. HH Gear Ownership is a simple variable, which differentiates between non-owning, gear owning and boat owning households.

[172] For a description of the PLS regression, model-fitness criteria see Section 5.3.2. The three in-migrant household livelihood strategy clusters did vary however in terms of ownership of material assets. For example, nine of the sampled households owned boats. These all belonged to either the fresh-fish (n = 4) or the smoked-fish (n = 5) livelihood strategy groups. Ownership of 15 HP motors also spanned both these groups, applying to one boat in each of these clusters. Households specialising in salt fish sales only included gear-owning fishers, not boat-or motor-owning households. Traders were present in all three life strategy groups, indicating that some fish-traders also specialise (through preference or default) in sales of the fresh-fish to other traders

[173] See Table 7.3 on page 239 for the attributes this includes

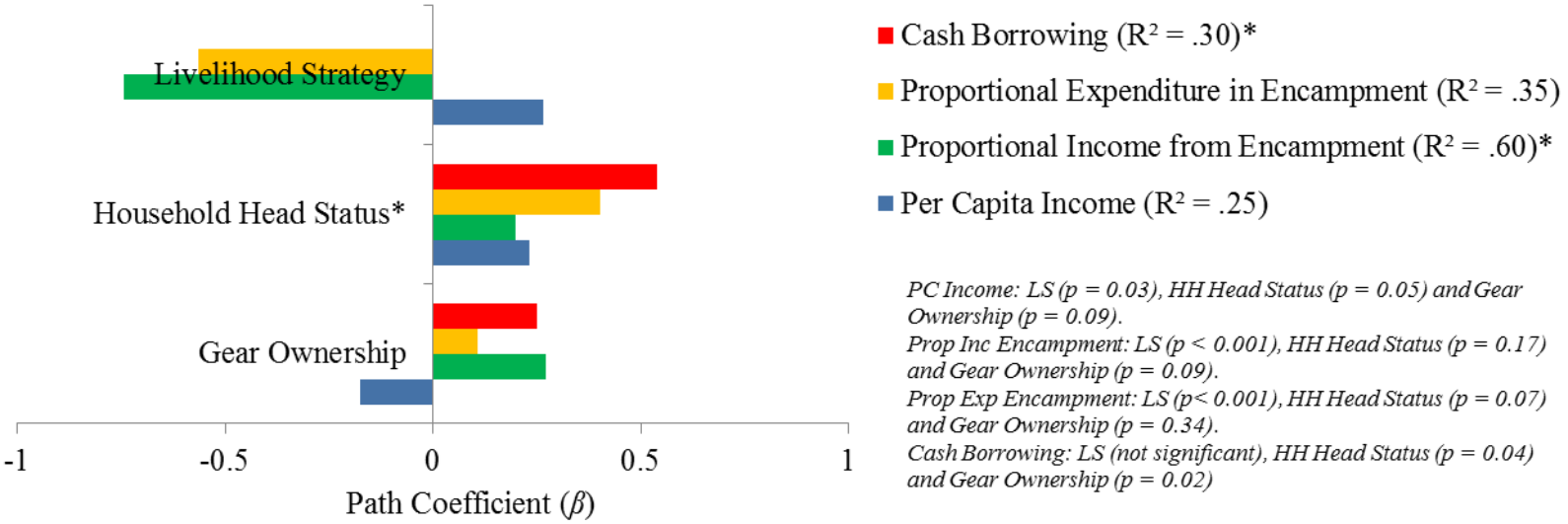
(i) Per Capita Income

As already outlined in Section 7.4.2.2 household LS does significantly influence the economic outcome 'gross *per capita daily income'*. The PLS regression analyses supports this finding (*p = 0.03;* see Figure 7.6a). However, the regression shows that HH Head Status is also significant, but only in terms of one attribute; whether the HH Head is a fisher or trader (*p = 0.05*; see Figure 7.7. Ownership of fishing gear is not significantly associated with higher or lower per capita incomes, in any of the LS groups (*p = 0.09*). This further emphasises the disparities among non-owners of fishing gear, which in this study refers to labourers and also fish traders.

(ii) Proportional Expenditure made inside the Encampment

PLS re-affirms that the '*proportion of household expenditures made inside the in-migrant encampment*', varies significantly between household LS groups *(p < 0.001;* see Figure 7.6a). This declines from fresh fish through smoked fish and salt fish producers. The regression also shows that HH Head Status as a fisher or trader is marginally non-significant (*p = 0.07*; Figure 7.6.a) while gear ownership is completely non-significant[174].

[174] In general, proportional expenditures made inside the encampment are generally higher for the boat owners (although this is not significant *p = 0.34*). To meet costs such as those arising with damage to or loss of fishing boats, the process of selling produce inside the encampment can generate immediate cash.



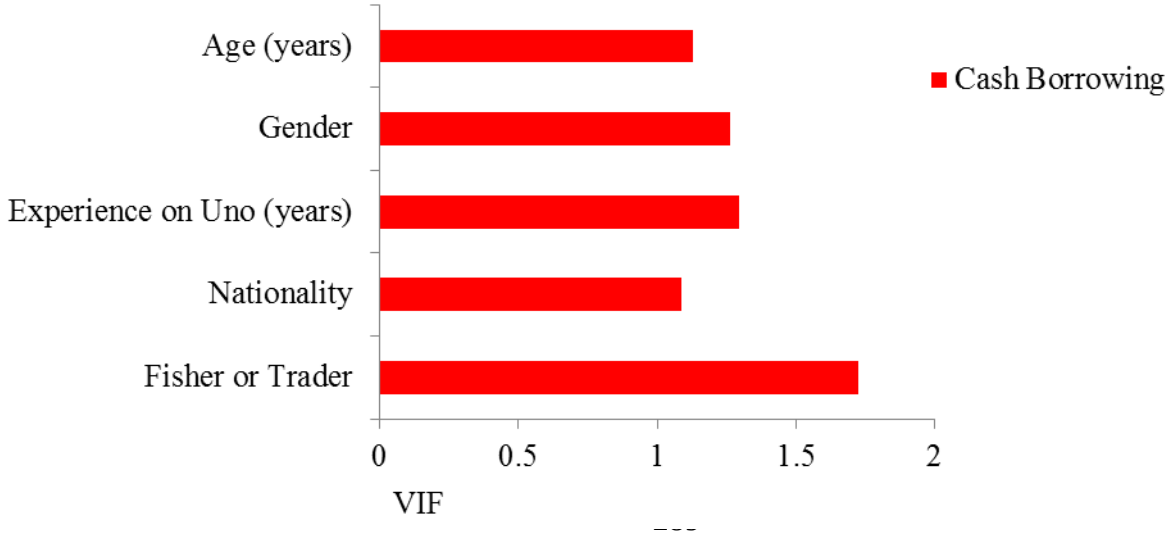


Figure 7.6: (a) TOP: SEM of Four Economic Responses including Livelihood Strategy, Household Head Status and Gear Ownership Status. Figure 7.6: (b) BOTTOM: For responses 'proportional income derived from the encampment' and 'access to cash borrowing' Household Head Status is a composite latent variable, comprising multiple attributes. Here the relative weight of each indicator is illustrated using the variance inflation Factor (VIF) value

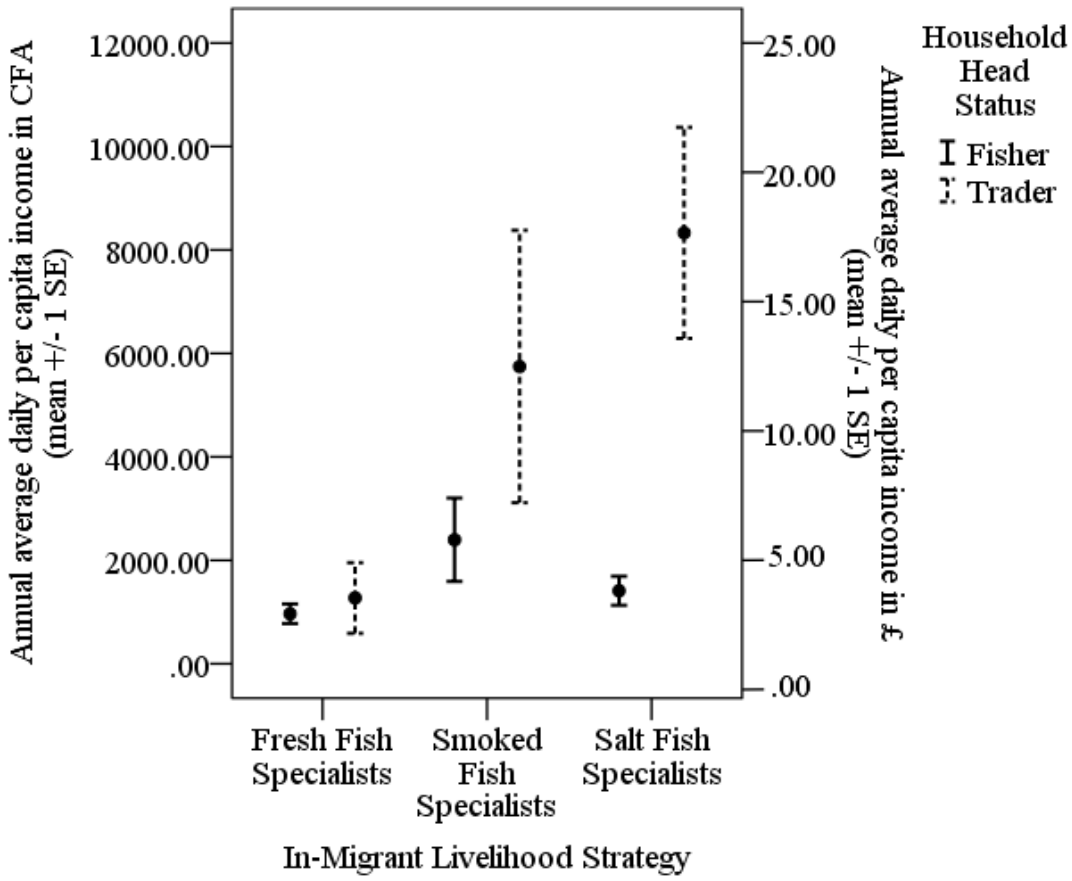


Figure 7.7: Influence of HH Head Status (as a fisher or trader) upon '*per capita daily income*' for the three in-migrant LS groups

(iii) Proportional Income derived from Inside the Encampment

For the outcome '*proportion of household income derived from inside the encampment*' the PLS confirms the association with household LS ($p < 0.001$; see Figure 7.6a) and also reveals that neither HH Head Status, nor gear-ownership have any overall significance.

(iv) Cash Borrowing

Household LS is not a component of the model which explains cash borrowing. This suggests that households inside all three in-migrant LS groups (fresh, smoked and salt fish specialists) may access these loans. HH Head Status does have a strong effect in terms of access to borrowing ($p = 0.04$; Figure 7.6.a). All five attributes defining the household head (fisher or trader, nationality, experience (years) on Uno, gender and age) are found to be influential (Figure 7.6.b). Only fisher households are observed to extensively borrow money. Gear ownership is also significant ($p = 0.02$). Owning gear therefore emerges as providing, both a need for and a mechanism through which, access to cash loans is ensured. Lending cash to a gear owner is considered a safer bet than money lending to a labourer who receives catch shares less frequently. This access mechanism is therefore adopted by the boat gear and boat owners, particularly during the rainy season (Figure 7.8), when damage is more common and conditions are more treacherous; such that both fishing activity and catches decline.

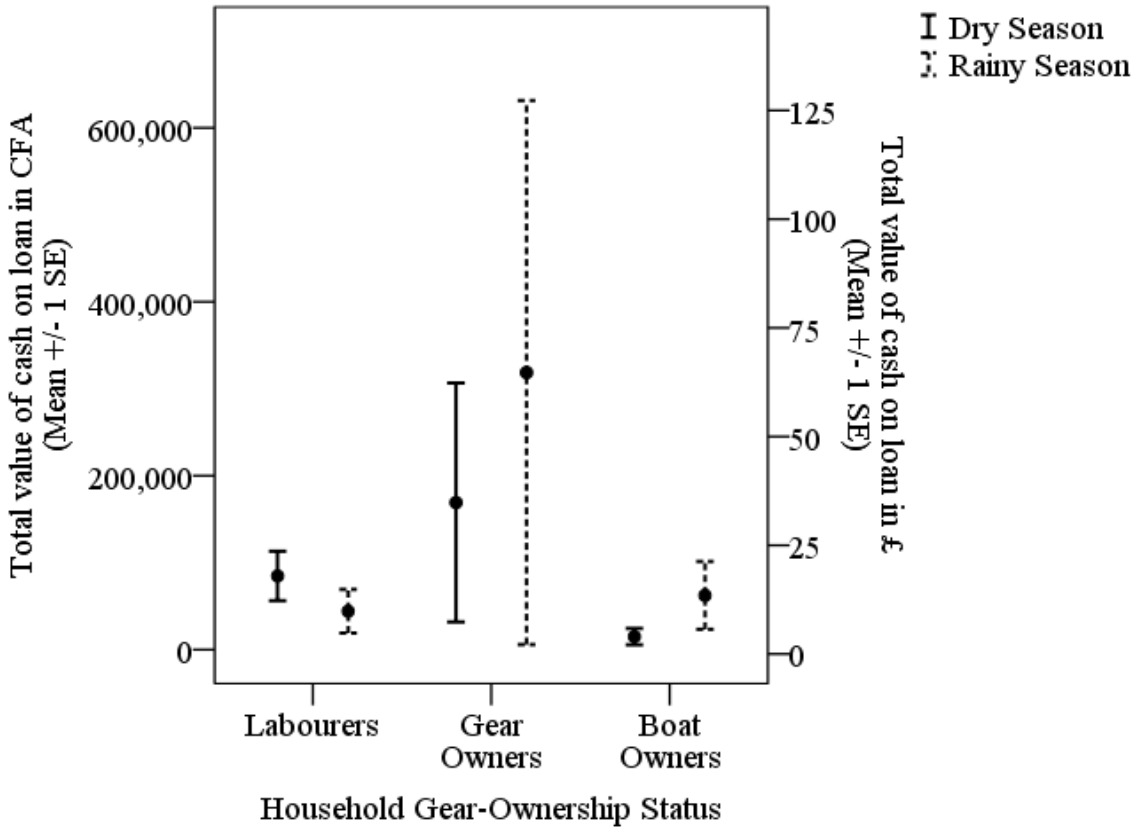


Figure 7.8: Comparative levels of cash borrowing undertaken by in-migrant fishers, characterised as labourers (n=10), gear-owning (n=3) and boat-owning (n=8) households

7.5. Discussion

This final section returns to the three objectives of the data analysis and contextualises the findings in each, relative to wider literature. Before proceeding, four fundamental caveats of this case-study are identified. Firstly, the economic surveys for the Bijagós village communities and in-migrant encampments overlooked the monetary value of goods self-consumed after being produced by the household. For both the Bijagós and in-migrants this included fish. Additional self-

produced and consumed goods within Bijagós households included intertidal cockles, oysters, rice, cashew wine, palm wine, palm-oil. Observed consumption of livestock and small animals was rare and limited to festivals and ceremony. In-migrant households consumed wood supplies for domestic cooking purposes alongside fish that was caught. Omission of the value of goods produced and then consumed by the households is therefore acknowledged. The second caveat concerns donations of gifts or 'offerings' made by individuals. Perhaps most significant here however, are the offerings of fresh fish made by fishers of the in-migrant encampment at landing, to the Bijagós villagers. These were substantial offerings of gifts occurred almost as frequently as an individual Bijagós villager visited the in-migrant enclave. Bijagós villagers even timed their passage through or arrival at the encampment, to sell produce or buy rice from a stall holder, with the landing of fishing canoes. This tactic increased the probability of receiving an offering of fish which included mixed small pelagics (grunts, mullets) separated from the bonga-shad prior to smoking. Other offerings consisted of small (juvenile) elasmobranchs, particularly the 'ground sharks' which were considered too small for salting or smoking and unappetising to the in-migrants due to their high urea content. To the Bijagós shark meat is steamed and prepared with palm oil, and is considered a delicacy. The third notable caveat of the economic survey concerns remittances received by the Bijagós villagers from family members outside the village (notably in Bissau City) and remittances paid out by the in-migrant households to their extended family on the mainland. The fourth limitation of this study is the small size, which is relevant particularly in comparing the effect of fishing gear ownership status upon livelihood strategy outcomes. This sample included only three gear

owners. Further only two households were in possession of motors. This limits the scope for analysis of effect of being motorised.

With these caveats in mind, the discussion turns to the chapter objectives. Small island countries where local populations rely heavily upon marine resources for their food and livelihood security provide a relevant context to investigate aspects of the complexity in human-nature interactions (Hall et al. 2013). The first objective asked what key differences define LS's of the two focal study groups (Bijagós villagers and members of the in-migrant fishing encampment). Rural household income strategies inside island villages of the Bijagós reflect a multiplicity of revenue streams, encompassing farm and non-farm (paid labour) wages. Use of fisheries and aquatic resources do not define a livelihood strategy *per se* inside this study area. Rather, use of these resources infiltrates all livelihood clusters. Similarly the use of the cashew nut crop does not form the foundation for a distinct LS but use of the household cashew nut yield is made by all livelihood clusters. In this way, households able to diversify into non-farm paid labour opportunities do so, by complementing existing farming activities. None of the households therefore rely purely upon non-farm income as a completely alternative strategy.

In contrast, all households in the in-migrant fishing encampment generate most of their income through sales of fish. Three strategies are differentiated among the fishers; those dealing with fresh, smoked or salt fish produce. The use of elasmobranchs is apparent across all in-migrant livelihood strategy clusters and no one group specialises completely in elasmobranch extraction or trade.

The second objective asked how adoption of, a specific LS influences household economic outcomes. The UNDP estimates the gross national per capita income level in Guinea Bissau at £626 per year. This study shows that inside the Bijagós villages in Cabuno sector, gross national per capita income reaches just £0.69 per day or £251.85 per year. This study suggests that the Bijagós villagers are living well below the national average income level. However bearing in mind the recognised caveats in the study, it is acknowledged that the value of subsistence produce and remittances might significantly alter this claim. The findings of this study are not unexpected however, given that 70% of the rural population of Guinea Bissau are predicted to exist below the national rural poverty line[175]. The adoption of multiple income streams, by all Bijagós LS groups illustrates their positions well below this poverty line threshold. For example, households in the less poor labour wage livelihood strategy group complement an existing portfolio of farming activities (including cashew and non-cashew crops and animal husbandry) with non-farm income. This finding is consistent with the wider livelihoods literature that less poor households tend to complement farm activities with non-farm income, but are not altogether free from risk and do not therefore rely solely upon non-farm income as a completely alternative income stream (Brugère et al. 2008; Cinner and Bodin 2010).

This study highlights the channelling of income by all Bijagós LS groups directly back to household food consumption. The World Bank reports that average households in Guinea Bissau dedicate 37% of the total value of food purchases to

[175] http://www.indexmundi.com/facts/indicators (*Accessed 14-07-2013*)

rice (World Bank 2010). On Uno, households invest on average significantly more at around 65% of gross expenditure levels. Chronic food shortages in Guinea Bissau are documented as having emerged during the 1970's when the country was transformed from a net-exporter to a net-importer of rice (Ploeg 1991; World Bank 2010). Reports of declining staple food yields resonate across the West African region, in Mali (Becker 2000) and for the Diola Felupe in north-eastern Guinea Bissau, which Davidson (2009) likens to conditions which have "been affecting Mauritania, Senegal, Chad and Niger for decades".

In general the settled Bijagós villagers who are participating in a multiplicitous livelihood system generate significantly lower incomes than the in-migrant fishing camp residents. This finding supports reports of higher incomes outside the domain of farming in association with fishing (Allison and Horemans 2004). This study highlights the quantities of fish produce shipped not only off Uno Island and the Bijagós archipelago, but over national borders. In particular this case study provides empirical evidence highlighting the importance of small-scale smoked bonga production and shipment to the Guineas Conakry market, described as the largest in West Africa (FAO, 2007). All elasmobranch sales were made to West African nationals and no information regarding shipments to the Far East emerged. This suggests that shark fins, guitarfish fins and croaker swim bladders are traded multiple times by West Africans before shipment off the continent occurs.

In both Bijagós and in-migrant locations, households associated with the LS's yielding lower per capita income, are typically involved in the widest, broadest or

most diverse livelihood portfolios. This phenomenon of diversification is well known (Ellis 2000). For the Bijagós, households specialising as agriculturalists, also undertake paid labour work; and are observed selling basic farming and fishing equipment when necessary to increase income generation. In the in-migrant encampment, households associated with fresh fish sales, also sell wood and fishing equipment discards, found as beach litter along the shore.

In-migrant trading individuals are also observed to specialise in loan-provisioning inside the in-migrant fishing encampment. Similar observations are reported in other studies of SSF communities (Merlijin 1989). Providing loans has been described as a means through which traders assert control over fishing operations (Walker 2002). Increased money lending during the difficult rainy season has also been observed among fishing communities (Crona et al. 2010).

The third objective asked which key household attributes and asset holdings drive adoption of a livelihood strategy and resultant economic outcomes. Two decades ago, Scantamburlo (1991) described the Bijagós, as existing in a society in which everyone has the same rights to riches, equal opportunities to acquire them and where it is considered dangerous to have more. More recently, Kohnert (2009) contradicts this claim stating that village societies in Guinea Bissau, operating under essentially egalitarian conditions still host richer peasants (self-sufficient during bad years by bartering away surplus) and poor peasants (unable to even save seed for the next season).

This study focusing upon a sample of households in Cabuno Sector identifies heterogeneity in terms of income generation. Certainly the extensive use of sorcery among Bijagós residents inside the study area (<*manji*> as described elsewhere in this thesis) seems indicative of 'controlling the uncontrollable' (Nadel-Klein 2003: 141). The case of Uno illustrates the contribution of cash crops (and here the cashew nut crop) as providing an essential tool for generating cash income (Mertz et al. 2005). Access to cashew nuts is crucial for all households in the three LS groups. Access to livestock also provides a means for the Bijagós to increase household per capita income levels and provide access to cash for rice. Livestock have been associated with grain provisioning elsewhere (Becker 2000). Ownership of livestock on Uno is typically associated with older household heads. These individuals tended to specialise in livestock accumulation and were reaping higher income levels as a result.

Ownership of fishing gear did not significantly per capita income inside the in-migrant encampment on Uno. This finding is contrary to other studies (see Mangi 2007 for observations of a Kenyan migrant fishery for example), but perhaps indicative of the nature of most boats in this study being paddle powered rather than motorised vessels. This finding is of significance in considering the incentives for individuals to save or borrow and invest in fishing equipment. Findings from this fishing encampment suggest that workers may not feel incentivised to invest in their own boat, given the start-up costs involved. Rather an ability to access the mainland market places where higher prices can be attained relative to inside the camp might

be more beneficial than boat ownership. This study clearly shows that those able to access the most profitable market arenas particularly for salt fish which is so much more valuable are those households also benefiting the most in terms of income wealth. Findings from the Cabuno in-migrant fishing encampment reveal that cash loans are readily available to in-migrant fisher households, but cash loans were not offered to the Bijagós villages. Loan size was determined by household status in terms of boat and gear ownership. Ownership of fishing material emerges as being beneficial in this study. However, the number of gear owners is too small to reach any conclusions regarding differences in opportunity for gear and boat owners. Furthermore all gear owners were located within the same livelihood strategy group, specialising in salt fish. Nature of the gear owned (for example monofilament nets used to catch bonga or gill nets which catch sharks) could be influential in determining access to loans but the data set presented here cannot answer this query. Whether the target catch is also a feature in the terms of borrowing was not established given the propensity for the fishers to use multiple gear types. The association between debt accumulation and more intense natural resource exploitation in general has been highlighted (Brookes 2008). This study suggests such an association exists inside the encampment, where rainy season debts peak. This coincides with declining fishing conditions which generate an urgent need to catch fish during the following dry season and repay loans as opportunities at sea improve.

Chapter 8

Thesis Discussion

Chapter Overview

This discussion begins by revisiting the overarching themes of the thesis (8.1). Each of the four themes is then summarised in turn and the contributions this study makes considered (8.2). In stepping back from the findings, social research in SSF is framed within the context of two management discourses, namely the wealth and welfare based approaches (8.3). A political and historical critique of the factors constraining commercial SSF management is then presented (8.4). Section 8.5 concludes this thesis.

8.1. Revisiting the Research Questions: An Overview

In the introductory chapter, four key research themes were proposed (Section 1.3). These were identified through a review of existing literature, which presented gaps in our current understanding of the importance of SSF to rural coastal livelihoods in the West African study-region.

The first theme addressed the processes which have shaped decisions to enter into commercial SSF. This, it was argued, had been explored in SSF research within other locales, but the West African literature was still lacking this attention to detail. It was explained that understanding entry into commercial fishing ventures in West Africa is critical, given that unfavourable climatic, land tenure, employment and food security regimes dominate in this area.

The second area of focus involved the importance of fishing in livelihood activity profiles and resulting conflicts which can emerge. It was suggested that examining access arrangements, could inform our understanding of how resource conflicts are formed and how management might proceed in a manner sensitive to the issues raised.

The third research theme drew attention to catch data, which are in general scarce for the West African SSF. The interaction between SSF activities and in particular the higher risk species (with slow life-history characteristics) was identified as a

useful line of enquiry, given that fishing pressure in West Africa is likely to increase on account of unfavourable conditions associated with and external to the sector.

The final research theme focussed upon the association between involvement in SSF and poverty. The persistence of rural poverty in Africa remains largely unexplained. In-depth analysis at the household level among groups exhibiting different livelihood strategies, yet subject to similar geographical constraints, was suggested as a means of investigating this problem.

8.2 Contributions of this Study

8.2.1. The Dynamics of Entry into Commercial SSF

Life-history interview material (presented in Chapter 4) from focal Bijagós village communities and in-migrant fishing encampment residents (in Cabuno area of Uno Island) was used to investigate the dynamics of entry into commercial SSF. Bijagós men reported a tendency to adopt commercial SSF fishing as a temporary occupation, linked to wider economic goals one of which involved participating in Animist initiation. This finding supports an earlier work from Bubaque Island, in which it is written that the Bijagós '*knew how to fish, but did it only occasionally when it suited their needs*' (Baekgaard and Overballe, 1992: 173). This study on Uno Island describes entry into the ultimate Bijagós initiation ceremony as a costly endeavour, requiring the presentation of purchased consumer goods (*mañake)* to elders and initiation teachers. A short-term commitment of pre-initiate male Bijagós

to commercial SSF contracts had, up to 2003 (when the last *fanado* in Cabuno area occurred) supported this goal. Bijagós histories also highlighted the use of shark-capture. Sharks were cited as helpful in attaining these initiation payments as well as paying for healthcare treatment and educational opportunities. Interviews with the Bijagós provide insight into their exit-strategy from commercial SSF, as was evident from their general lack of fishing equipment other than hand-nets. Responses revealed a division between those who had been forced out of fishing and those who had chosen to terminate working contracts. Those forced out, explained that they did not want to stop; but were compelled to do so after rice yields declined to such an extent that a need to buy food over-rode a desire to re-invest in storm damaged equipment repairs. The analysis also revealed that a commitment to the Bijagós *fanado* ceremony required setting aside all employment contracts including commercial SSF. This insight provides a useful accompaniment to wider discussions of exit strategies from commercial SSF, illustrating that traditional ceremony can still, in some places motivate a lifestyle transition, out of otherwise capitalist regimes.

Several decades were described in which Bijagós and in-migrant commercial SSF activities had overlapped and to a degree been integrated. Analysis of the in-migrant life-history interviews however, revealed a diversity of motivations for and methods behind entry into commercial SSF. These included narratives from both early-starters (with no non-fishing occupational experience) and late-comers (or new arrivals) to the sector. New-comers were most prevalent, many of whom had joined after the year 2000. This finding supports the claim made by Chauveau et al. (2007)

that many SSF in West Africa are displaced entrants into the sector. One third of these new-arrivals originated from towns and villages far inland, which also implies that coastal regions can present attractive employment and living opportunities to in-migrants from the continental interior (Brugère et al. 2008).

The degree to which regional political turmoil and conflict influenced the movement of late-comers into fishing is considered crucial here. For some late-comers, SSF was seen as having provided a safety-net or buffer through turbulent periods in individual histories, and as helping avoid long-term chronic poverty. Within the SSF literature, the term 'last resort' is often used to describe individuals whose last-chance effort in a struggle for survival, involves learning how to fish. Yet, data derived from the in-migrant interviews on Uno reveals extensive individual adaptability; as multiple skills were transferred from non-fishing into the fishing arena. As Hannesson (2002) points out, the skills of late-entrants into fishing are generally poorly documented. The present study proposed to address this gap. In so doing, it questions the use of the term 'unskilled' in describing those for whom fishing is a 'last resort'. Acknowledging the safety-net function of SSF implies acceptance that for some, fishing is a 'last-resort'. It does not necessarily follow, however that these individuals arriving into fishing, are otherwise unskilled. As explained, findings from Uno suggest that for late-entrants unemployment problems were commonly associated with political instability. Furthermore, other in-migrant late-entrants described pursuing a deeper financial incentive to fishing, over for example, diamond-mining or non-fish trade. For these individuals, SSF cannot be said to have presented a safety-net and participation was never a 'last resort'. Rather

entry into fishing was a calculated decision which for many involved considerable financial (as well as social and cultural) investment. For some at least this has extended into a longer term commitment which feeds back into a system that evidently can provide a critical opportunity to avoid destitution.

In summary, investigating entry strategies and resultant dynamics of commercial SSF activities in this region re-affirms our understanding of the critical 'safety-net' function which SSF affords. But the analysis also shows that SSF serves numerous additional functions. Whether entry occurred as an early-starter or later in life, because a 'safety net' was needed to escape conflict or misfortune, an initiation payment was required or because SSF emerged as a viable investment, these findings reaffirm a need for SSF to be examined in terms of wider economic and social development opportunities, not purely in terms of the sector itself (Jul-Larsen and van Zweiten, 2004).

8.2.2. Conflict and Commercial SSF

Individual time-allocation observation data (as presented in Chapter 5) for both Bijagós and in-migrant males were used to investigate the variable importance of participation in fishing relative to other activities. Supplementary material from key informant interviews and participant observation was presented in a discussion of the political processes through which access-arrangements to SSF had been negotiated in this study area. The dynamics of SSF must be viewed within a broader framework which factors in external opportunities in the wider economic arena (as outlined in section 8.2.1). Supporting this, it was found that for both the in-migrant

and Bijagós fishers, opportunities outside the realm of fishing (and farming) were rare.

For the Bijagós, activity profiles of younger males (particularly the animists) were more diverse than the elderly. This supports the findings of Baekgaard and Overballe (1992) who explain that among the Bijagós '*access increases while duties decrease with age'* (p. 176). Conversely for the in-migrants, older individuals practiced a greater array of tasks than the young; however, all activities were however, related to fishing. In-migrant age was therefore associated with both wisdom and experience in fishing. Older individuals assumed greater responsibility for fishing-equipment maintenance and reparation. Younger in-migrant fishers operated a broader array of gear types. These findings suggest a process of fisher-specialisation with age, experience and years in fishing.

The negotiation of access to fishing grounds in Cabuno area, on Uno Island emerges as a complicated process which has developed over more than a decade. This interval has been interspersed with periods of conflict between the Bijagós Islander and in-migrant groups. A full-time (permanent) in-migrant contingent was established on the island after a violent eviction from neighbouring Orango Island, shortly after the PNO was formally endorsed in 2000. When in-migrant fishers initially arrived on Cabuno beach they were welcomed. But as the Bijagós observed their full-time commitment to fishing, and the extensive resource-use this commercial routine entailed, a conflict emerged. One episode documented during this study involved the burning of the in-migrant encampment during 2003. Re-

instatement of the in-migrant fishing camp followed which was assisted by the Island State administration and regional fisheries authorities. These events have evoked feelings of disempowerment for the Bijagós.

Today, virtually every coastal country has implemented some form of marine protected area (Agardy et al. 2003). MPA's are commonly promoted as a means of fostering large, rapid and sustained build-ups of fish biomass (Gell and Roberts 2003; Russ et al. 2004). Critics argue that the ecological benefits of MPA's are yet to be proven while claims of successful outcomes are premature. Others state that the *ad hoc* nature of MPAs mean that many are simply insufficient to protect many species in the world's bio-diverse rich regions (Rodrigues et al. 2004; cited in Bhagwat and Rutte 2006). Social, cultural and economic flaws in MPA design have also been identified. Terrestrial protected areas have often been likened to territories or fortresses, which place nature before people, but are designed in effect to control both (Peluso 1993; Brockington et al. 2008). Conventional spatial management, it is argued, fails to engage with the MDG focus of poverty and hunger eradication. As suggested by this case-study and described in existing literature, protected areas established without due consideration of all consequences have been shown to destabilise and limit social and economic opportunities through in-situ restrictions or population displacements (Naughton-Treves et al, 2005; McGregor 2005). The case of Uno Island seems to illustrate a displacement event which occurred after the designation of the Orango National Park. With subsequent relocations of fishing effort a leakage of commercial SSF activities occurred into habitats on Uno Island.

Leakage, as defined here, occurs when activities are displaced or 'spill-over' into neighbouring un-protected areas (Levang et al. 2012). For this very reason it has long been recognised that for conservation (or management) to be effective, efforts must be made outside the boundaries of protected areas, particularly within the marine environment (Allison et al. 1998).

8.2.3. Capturing Data in Commercial SSF

Data from commercial SSF landing surveys (as presented in Chapter 6) were used to investigate spatial and temporal variability in CPUE from five main gear types. The analysis also aimed to interpret the interaction of commercial SSF activities with higher risk groups in this locale. This study documented a tendency for motorised monofilament net (bonga) fishers to fish repeatedly inside the PNO area, from which many fishers had been evicted several years earlier. Fish landings (recorded between 2009 and 2010) highlighted that bonga CPUE could reach up to five times higher inside the PNO. The potential rewards that could be reaped from illegal fishing appeared therefore to outweigh the costs of gear and boat confiscation if caught. These findings bear out with those of other studies, in which resistance to adapt to spatial closures or area-restrictions is greatest for those with few non-fishing employment opportunities, as shown to be the case for the in-migrant fishers on Uno (Section 8.2.2 ; see also McClanahan et al. 2008; Teh et al. 2012).

The high risk elasmobranch group, characterised by slow life histories, were captured by all gear types, and comprised 10% of total fish catch. Elasmobranch

capture was not identified from fishing inside the PNO. This, it was explained could possibly be an artefact of data collection, arising from strategic answers motivated by mistrust towards this research felt by those venturing into the protected area. That said, fine mesh gear (as used inside the PNO) was surveyed outside and found to have a lower impact or produce a lower CPUE of elasmobranchs, compared with both long-lines and gill-nets. Elasmobranch catch included numerous species of sharks, skates, rays and guitarfishes; identification to the species level was problematic due to the commercial nature of fishing operations. However, individuals belonging to an array of size classes were identified and the existence of nursery habitat; an '*area where gravid females deliver their young and where the young spend their first few weeks, months or even years'* supported (Garla et al. 2006). Due to international concern over declining shark populations and the difficulties involved in managing adult sharks, focus has shifted to ways in which areas that young juvenile and neonate age-classes inhabit, such as discrete inshore nurseries, might be better managed (Kinney and Simpfendorfer 2009). The shallow water coastal areas around the Bijagós present an example of a location in which elasmobranch nursery areas might be managed, in light of the wealth of resources remaining in the area and the apparent increasing levels of fishing in the area.

8.2.4. Livelihood Strategies and Commercial SSF

Finally, repeat-round economic surveys (presented in Chapter 7) were used to disaggregate household livelihood strategies within the Bijagós and in-migrant locales. Bijagós households formed three livelihood strategy groups, all of whom were dependent upon commercial cashew-nuts for income generation through a rice

barter system. All clusters used fish and aquatic resources to a marginal extent. Clusters were then aggregated by a specialisation in either, livestock, agriculture or labour wages. Three clusters of in-migrant livelihood strategies were also discerned specialising in sales of either fresh, smoked or salted fish. Fisher and trader households were present in each.

For the Bijagós, livestock specialists earned more (in '*per capita income'* terms) and were shown to frequent the urban marketplace in Bissau City most frequently. These households were headed by older and least educated individuals, under the formal State system. Agricultural specialists earned the least and were by far the most dependent upon trading with the in-migrant fishing encampment. Food expenditure was consistently high across groups, indicating that despite extensive time allocated to rice production, the attainment of self-sufficiency was proving problematic in this area. For the in-migrants specialising in fresh-fish sales, income per capita was lowest. This group also displayed the most diverse strategy and benefitted considerably from sales of cut wood. Smoked fish specialists moved their produce south to Guinea Conakry. Salt fish specialists earned the most predominantly through sales in Senegal. Traders within all three groups earned significantly more than fishers. For the fishers, ownership of gear was critical in determining access to cash loans from the traders.

Understanding the significance of fishery related income is particularly important, given the absolute loss of economic benefits which frequently occurs when coastal marine resource stocks collapse, along with their associated livelihood activities

(Hilborn et al. 2006). Evidence from Uno suggests that both groups (Bijagós and in-migrants) depend upon fish, either directly or by access to a market arena, which on Uno is ensured by the in-migrant fishing camp presence.

8.3. Framing Social Research in SSF

In order to 'frame' social research in SSF two discourses are presented as emerging from the fisheries literature. The dominant narrative originates from so-called 'conventional approaches' also referred to as market or wealth based measures. As described here, these arose during the 1950's in industrialised fishing nations[176] when they primarily aimed to achieve constant fish catches while maintaining stocks for future use. Methods of so doing, focussed upon modelling maximum sustainable yield (MSY) levels, assumed to be sustainable at equilibrium by manipulating fishing effort (Caddy and Seijo, 2005). The rationale behind controlling effort was that a lack of well-defined property-rights over stocks drove superfluous catches through apparent open-access arrangements which encouraged Malthusian over-fishing (Dubbinck and van Vleit 1996). Through conventional approaches various behavioural and spatial control measures have developed designed to restrict fishing activity. This discourse emerged from an era of 'command and control' over resources, from centralised government departments; considered experts in acquiring and compiling fish stock data and capable of self-regulation (Holling and Meffe 1996; Jentoft 1989; Ludwig 2001; Van Hoof 2009; Berkes 2012).

[176] However, Kolding and Jeppe (2011) date the history of catch control through the use of fishing regulations back to the early sixteenth century

The unpredicted, dramatic collapse of conventionally monitored fish-stocks, particularly during the 1990's, was seen as evidence that the complexity of marine ecosystems was too great for control of MSY levels alone to govern the future of fisheries (Berkes 2003). From this emerged an alternative (or populist) discourse seeking to engage with the inter-disciplinary nature of fisheries, of which humans are recognised as a central part (Berkes 2003; Caddy and Seijo 2005). Populist discourse therefore supports the welfare-role that fisheries provide and views access to fish stocks, a "fundamental pillar" upon which livelihoods, particularly of the poor depend. Management for welfare (also known as collaborative, co-management or rights-based) engages with a desire for reform, a transition from management to governance, through collaboration, participatory democracy, de-centralisation and community empowerment (Jentoft 1998; Jul-Larsen 2002; Berkes 2003). It is argued that management for welfare, through community or co-management agendas, could integrate traditional, indigenous and local ecological with conventional scientific knowledge. It is postulated that this could lead to a continual redefining of responsibility among resource-users and government (Gadgil et al., 1993; Berkes et al. 2000; Pierotti and Wildcat, 2000; Carllson and Berkes 2005; Berkes 2010).

Social research in SSF has mobilised the debate between discourses and highlighted a need for management reform. As outlined in in Chapter One however, the ideals of collaborative management (the silver bullet it proposes) as summarised in the populist discourse have been questioned. Instead co-management has been identified in many studies, as mis-management in disguise. Low HDI countries in particular are described as harbouring lower potential for success, due to inherently weak

governance structure (Guiterrez et al. 2011). Co-management measures, it is argued can result in increased marginalization of resource-users; linked with opportunistic behaviour which can exacerbate rather than resolve any resource management issues (Wilson et al. 1994).

Furthermore, whereas collaborative management has been intended to defuse situations of resource conflict, evidence on the ground suggests both positive and negative effects upon both conflict and motivation for collaboration (Brockington 2002, cited in Fabricius 2007). Several authors observe a 'silence' on the subject of migration in the co-management agenda (Crona and Rosendo 2011; Nunan 2013). Where co-management has included migrants, participation is reportedly low (Fulanda et al. 2009; Cinner 2009). It is often hard to evaluate the success of collaborative efforts, given the complete absence of impact assessments in most cases (Béné et al. 2011).

8.4. What are the constraints to existing SSF management? A Case-Study in the Bijagós Islands

This section summarises the history of political processes which frame the current situation for SSF in the study area. These processes are presented in a manner which it is hoped will reveal the constraints SSF management now faces.

Most Bijagós are not full-time fishers. This was first verified by collapse of the artisanal fisheries development project which operated out of Bubaque in the 1980'.

A fishery, explain Baekgaard and Overballe, "*beyond the immediate needs of the individual, family and village was not on the Bijagós agenda*" (1992: 186). Instead, the Bijagós were and remain predominantly agriculturalists specialising in rice cultivation, for which there is no reliable national market such that abandoning subsistence production is not a viable option (Baekgaard and Overballe 1992).

The unique view, Bijagós animists hold of their environment prevails. Animist belief in the *iraan (*spirits upon whom their individual and collective destinies depend, and who are imbued into the physical bodies of animals and trees surrounding them), transforms the village environment into a mosaic of indigenously defined no-take, seasonally-closed and sacred areas. As illustrated, ceremonial masks representing biodiversity itself are carefully made, adorned and paraded in village rituals. Furthermore, the animist initiation cycle is driven by a division between young and old; such that the old have earned knowledge and power; and in return command respect. The young comply, waiting their turn while providing the agricultural labour-force. 'To fish' serves multiple purposes; to make offerings, pay debts, to prove yourself as a capable individual; to provide food for your household as well as to generate income. The acquisition of fish continues to forge a social-bridge between youth and elder, during the *fanado* but also for many years afterwards, as post-initiation payments (*garandesa*) are made. Times have changed on the islands, for numerous reasons including engagement with a modern ideology. The '*Bijagós agenda*' (Baekgaard and Overballe 1992: 186) now extends far beyond the shores of the Bijagós, to Bissau City, Dakar, Europe and Brazil (Bordonaro 2006). Today it is not only the Bijagós islands that are seen as a backwater. Those on the islands are

seen by outsiders as backwards, and see themselves as left behind (Bordonaro 2006). What remains of the 'traditional' way of life for rural Bijagós villagers (at least on Uno) emerges as one in which Animism and Christianity coexist, and appear united in their endeavours to provide social and economic security for today, as exemplified by the systems of labour-sharing such as <*sociedades*> and the <*garandesa*>. Sacred areas and the initiation ceremony are a means through which the animists at least, are asserting this desire. Without fish, there is little animal protein on the islands. A future without fish would have catastrophic consequences for the islanders.

The Bijagós sacred area system is however disregarded by conventional controls over SSF by national fisheries and natural resource management systems, and by wider conservation initiatives. This exacerbates two problems. Firstly it undermines the importance of the Bijagós belief, the cultural identity of initiation, the value placed on sacred lands and the inherent role that initiation plays therefore in protecting social, religious and political beliefs; as well as biological diversity. Secondly, this lack of official recognition reinforces feelings of vulnerability (Urquhart et al. 2011:4) amongst the Bijagós, particularly the initiated (elders) who feel challenged rather than supported by conventional natural resource management measures. This study suggests that the manner in which in-migrant communities can disturb Bijagó sacred sites without risk of condemnation has exacerbated periods of unrest and conflict. New community-based institutions, it is argued, can only succeed if they absorb the tacit knowledge accumulated from historically deep-rooted local institutions, and build upon existing cultural norms and meanings

associated with different types of local leadership, social networks, reciprocity obligations, and the routines of everyday life processes (Cleaver 2002; Jentoft 2005; Russell and Dobson 2011; Guiterrez et al. 2011). Failure to do so in this study area, constrains the political and practical effectiveness of any future management agenda.

In-migrant fishers on Uno Island emerge as originating from numerous occupations and locations. Some started early, such that today they have no occupational experience outside of fishing. These individuals have been involved in full-time fishing work for decades and as a result have accrued extensive knowledge and experience across the wider region. Many were associated with SSF when it was popularised following the severe droughts of the 1970's and then by donor investment programmes responsible for motorisation of the fleet into the 1990's (Binet 2012). These individuals illustrate resilience in navigating years inside the sector. They provide insight not only into the cultural significance of access to fishing, but also into the life-style adaptations required through years of migrating to catch, process, trade and transport fish. Prevalence of individuals following a line of-descent in fishing work, suggests that this way of life continues to retain at the very least a cultural (as well as social and financial) significance inside the wider West Africa region. Their histories indicate that fishing is part of a family history, not only a livelihood.

SSF has also provided a shield against the political disturbances which continue to dominate the West African arena. In some instances it is hard to differentiate between migrant fisher, and political refugee, who happens to fish. In particular the

political crises in both Guinea Bissau and Guinea Conakry render moving off the Bijagós Islands a formidable proposition for many of the in-migrant fishers. Yet their very 'foreignness' exacerbates the vulnerability of migrant fishing communities. Subjected to repeat visits by administrative officials, immigration and customs officers, departments of fisheries and forestry, control teams and inspectorates; they present a hugely lucrative opportunity for officials operating under the guise of a legitimate, conventional national management regime. Behind the official façade, however, the in-migrants are seen as an opportunity through which inadequate, diverted, lost or outstanding salaries are reimbursed or supplemented, in a less official way. Many in-migrant fishers see themselves as actually responsible for paying official salaries. This crisis of management, therefore encourages rent-seeking and resource-rent appropriation, weak institutional performance and political short-termism (Pauly et al. 2002; Kaiser 2005; Béné 2008; Béné et al. 2009; Baggio and Papyrakis 2010; Béné et al. 2010b; Sumaila et al. 2010). Corruption is enhanced both by those looking to capture and those looking to avoid making such payments. Numerous examples were documented during this study, from false identity papers and boat licences, to acceptances of unregistered fines and State confiscations of personal goods.

Fishing licence payments provide one of three critical sources of revenue for the Guinea Bissau government. The foreign exchange generated, is in theory used to reduce debts (Atta-Mills et al. 2004). But not only are the licence payments mis-managed; losses are substantial, as explained for the industrial fleet in multiple articles (Kaczynski and Fluharty 2002; World Bank 2010; MRAG 2010). The

challenges of corruption facing SSF management likely reflect those of the industrial sector and problems outside of fishing also.

From a government perspective, control of SSF is an insurmountable challenge given the mis-management already inherent from within. This might even be seen as a 'losing battle' against which greater top-down control over spatial fishing areas may be prioritised. A recent 'Protected Planet' report (2012) outlines objectives to protect or conserve a further 10% (or 8 million square kilometres) of marine environment globally, by 2020 (Bertzky et al. 2012). In truth, these are quite conservative targets given more extreme views; that 99% of the world's oceans should be completely closed, with only small exceptions remaining; in which fishing, becomes a 'privilege' not a right (Walters, 1998, cited in Jacquet 2009; Russ and Zeller 2003; Zeller and Pauly 2005). Protected area expansion to date has been greatest in developing countries; largely because these hold the highest levels of biodiversity but also because access is easier (Agardy et al. 2003; Naughton-Treves et al. 2005; Fairhead et al. 2012). It is argued however, that if marine reserves are implemented without case by case evaluation, stakeholder engagement and appropriate monitoring programs, there is a risk of unfulfilled expectations, the creation of disincentives, and a loss of credibility of what potentially is a valuable management tool (Hilborn et al. 2004; de Santo et al. 2005; Warner and Pomeroy 2012).

8.5. Conclusion

The importance of the Bijagós archipelago in supporting a hugely valuable commercial SSF industry has been highlighted. This study concludes however that the problems of non-compliance, conflict and non-cooperation in respect to SSF are likely to persist in this area. This, it is expected will continue to harbour negative consequences for the livelihoods of those who are dependent upon fisheries and the resource base itself. A reformation of management is needed, but the political systems involved in managing the fisheries of this area are complex and founded upon multiple conflicting objectives. This study has exposed this, while providing insight into the critical supporting role SSF serves for wider social, economic and cultural systems.

Glossary

Amutai: Sacred site of the Bijago initiation ceremony (fanado) for the villages of Cabuno, Ancoyem and Ankarabe, in Cabuno area, on Uno Island.

Ancomaca: Former sacred site of the Bijago initiation ceremony for the villages of Ankarabe, Ancobara and Ussambar, in Cabuno area, on Uno Island. Now redundant as population largely converted to Christianity

Ancopado: Site of former fishing encampment located inside what then became, Orango National Park

Ancoyem: Name of a study site (hamlet) in Cabuno area of Uno Island

Ankarabe: Name of a study site (hamlet) in Cabuno area of Uno Island

An-Onho: Major (capital) village of Uno Island

Bairro: A suburb (or area of town, village)

Baloba: General name given to a Bijago shrine located within an animist village

Baloberro: Animist Bijago male protector of the baloba and convenor of female initiation ceremonies

Bemba: Household grain store

Blye: Woven basket used to store and carry fish

Bolama: The main administrative Bijagós Island and seat of first capital city of Portuguese Guinea

Bolanha: Lowland rice paddy

Bonga: The surface shoaling (pelagic) bonga shad fish (*Ethmalosa fimbriata*) also referred to as <*djaffal*> and notoriously abundant within the coastal waters of the Gulf of Guinea

Bubaque: The main commercial Bijagós Island

Cabarro: Term used on Uno Island to describe Bijago pre-initiate 'warrior' age grade (males and females)

Cañako: A Bijago spear used for fishing

Camada: An age-grade or cohort (group)

Campaign: A multiple day fishing expedition, more extensive than an over-night fishing trip

Canhocam: Term used on Uno Island to describe the Bijago (male) pre-initiate age-grade, younger than the warrior class

Canhabaque: Bijagós Island in the far east of the archipelago where residents held final resistance stand-off against Portuguese colonial troops

Camabé: Term used on Uno Island to describe Bijago post-initiate age-grade (males and females)

Campuni: Term used on Uno Island to describe the Bijago (female) pre-initiate age-grade, younger than the warrior class (females equivalent to canhocam)

Capitaneer: National document which is required in order to 'captain' a boat on the sea; also known as a boat licence

Casupai: Generic Kriole term for 'guitarfish' a family of sharks which comprise four genera and about 45 species[177]

Caudu: Generic Kriole term for a 'small' shark

Cheben: Kriole term for the palm kernel, used in production of palm oil

Chefi di Chon: Customary land chief of the (village)

Combé: Intertidal cockles

Comite d'Estado: Appointed village administrative (State) representative

Dak: General generic term for a fishing camp

Djaffal: Kriole term for the bonga-shad (*Ethmalosa fimbriata*)

Djoto: Name given to the croaker fish (*Pseudotolithus spp*), which falls into a class known as '*primeira*' or first class catch. The croaker is caught with drifting gill-nets and treated with raw, coarse salt to produce salt fish <*esclada*>

Encampamento: The name of the in-migrant fishing camp described in this case-study in Cabuno area on Uno Island

[177] Florida Atlantic University (http://www.science.fau.edu/sharklab/courses/elasmobiology/families/Rhinobatidae.pdf

Esclada: Generic term used to describe 'salt fish'

Fanado: The initiation ceremony
Fomi: Hunger

Fugon: Fireplace or hearth

Garandi: Elderly, old (wise)

Homen Garandi: Elderly (wise) men

Iraan: The guardian spirits (ancestral and sacred) of the Bijago animist 'other world'. Term also applies to inanimate fetish objects, usually man-made and deemed to possess the supernatural power necessary for contacting the "other world"

Jeu: Kriole generic term for an 'islet' which may be used temporarily but is not permanently inhabited

Jeu di Porcos: 'Pig Island' former site of a fishing encampment located to the north of the Bijagós Islands (adjacent to Caravella) previously used as a safe grazing area for pigs by inhabitants on Caravella

Jeu di Peixe: 'Fish Island' former site of extensive fishing activity by in-migrant settlers on Uno. Island is located outside of (but adjacent to) the Bijagós archipelago in Manjaco territory

Joven: Young, youth

Lambé: Bijago retired post-initiate age grade (term used for males only)

Leme: Elasmobranch fin (including shark and guitarfishes); also known as 'feather'

Mañake: The offerings made by cabarros during the ultimate pre-initiate ceremony to their teachers and elders

Manji: A curse or protective sorcery

Mato di Fanado: Generic term used to describe a sacred area of bush or scrubland normally a rocky headland point (and associated beach and near shore fishing ground) used during the ultimate <fanado> initiation ceremony.

Moranza: Household or homestead

Nhyominka: Also known as the Sere, a group of coastal inhabitants from the Senegal delta region (Sine Saloum) who have a long documented history of fishing in and around the Bijago Islands

Ocanto Cabonga: Elder (female)

Odone: Elder (male)

Ogubane: Bijago matrilineal clan name

Ominca: Bijago matrilineal clan name

Oracuma: Bijago matrilineal clan name

Oraga: Bijago matrilineal clan name

Oronho: Village spiritual leader (Bijago); see Regulo

Ospri: Visitor

Pagamento di Garandesa: Generic term used to describe an offering of payment from Bijago youth to their elders. This may be associated with a specific ceremony, as applies to pre-initiate <cabarro> prior to initiation ceremony and to post initiate <camabé> as payment of gratitude for the initiation.

Pan: A ten kilogram measure (metal pan) used for quantifying wet weights of bonga and catfish inside the in-migrant encampment

Pescarte: Document required in order to catch and remove fish from the sea; also referred to as the fishing licence

Pis espada: Kriole term for the 'swordfish'

Poilão: The name of the Sacred Bijagó Island which is guarded by residents of Canhabaque and which hosts the largest green sea turtle nesting beach in West Africa. This is also the generic name for the Java Silk Cotton tree, which is also considered sacred by the Bijagos

Primeira: Generic term used nationally to describe higher value fish catch, typically of 'white' fish including snappers, jacks, croakers and Atlantic emperors. Term is also used locally inside the encampment to describe a 'first class' grade of croaker or shark

Produit: A 'product' used for treating salt fish to prevent microbial infection.

Regulo: Village spiritual leader; responsible for communicating with <iraan> and souls of the ancestors

Ronia: A sacred meeting in which gifts are presented (including palm-wine) to the <iraan> by the village priest

Sociedade: Name used to describe the non-ceremonial working parties of the Bijagós villagers

Tabanca- Bijago village

Tiburão: Generic Kriole term for a large shark

Udate: Sacred site of the Bijago initiation ceremony (fanado) for the village of Bruce, on Uno Island.

Yagu subibo: The period of 'live water' when the sea is alive with fish, after the new and prior to the full moon
Yago sumorto: The period of 'dead water' when the sea is dead and no fish can be seen; between the full and the new moon.

Vietnam: Site of former fishing encampment located inside what then became, Orango National Park

Appendix

Part 1: Data-Sheets

BIJAGÓS HOUSEHOLD SURVEY

Appendix

Recenceamento das Casas- Bijago na Area Cabuno

Data 02-10-2001 Hora (de manha / de tarde) Nome Trabalhador Helena

ID Tabanca ANE ID Casa 02-005 formerly ANE 7

P1: Quem moram na casa? E qual caracteristicas tem estas pessoas?

ID	Nome	M / F	Raca[1]	Relg	Class de Idade[2]	Grupo do Fanado[3]	Llugar do nacamento	Tempo morava na tabanca	Tempo morava na casa	Rel. mais prox. na casa[4]	Ger. (ind)[5]	Ger. de Pai	Nivel de Escola[6]	Trabalho Principais	Pessoa ficava aqui anoite	Pessoa ficas aqui normal-emente	Onde que pessoa ficas	Qual trabalho ela/ele fez	Quando foi ultimo visita pa pessoa na casa
01	Samara	M	Bij	Pt	Cabono	—	Ancarabe		2		Oracuma	Oraga	6	labrador	/	/	—	—	—
02	Rosaltina	F	Bij	-	Canabé	Russo	Ancarabe		2		Oracuma	Oraga	3	Mindjer di casa	-	-			
03	Victoria	F	Bij	-	Canabé	Chinese	Cabuno		11 mes		Oraga	Oraga	2	mindjer di casa	-	-	-	-	-
04	Anisio	M	Bij		Cadene	—	Ancarabe				Oracuma	Oracuma	(1)	-	✓				
05	Messiel	M	Bij		Cadene	—	Ancarabe				Oracuma	—		-	✓				
06	Naum	F	Bij		Ongba	—	Ancarabe				Oracuma	—		-	✓				

Data: 02-10-2009 Hora (de manha / de tarde)

Nome Trabajador: Helena ID Tabanca: ANE ID Casa:

P2: Aqui ha uma lista do materiais/ animais?Qual coisas voces tem? (Punta cada pessoa)*
*Voces recebeu salario de trabalho este ano (2009)? (*Punta cada pessoa)*

Formerly ANE 7

Materiais/ Animais	ID do Pessoa na Casa:									
	01	02	03							
Arma										
Caretta										
Gerador										
Bateria										
Panel Solar										
Lampeda	1	1	1							
Telephono										
Radio	1									
Bicicletta										
Vaca	4									
Vitelo	3									
Cabra	2(1 pq)									
Ovelha	-									
Porco	3	2								
Descricao do trabalho										
Valor do pagamento (CFA)										
Llugar do tarbalho										
Trabalho pa qual pessoa										

(1) Raca: BIJ= Bijago, FUL= Fula, MAN=Mandinga, PAP= Papel, BAL= Balanta
(2) Class de Idade : Matcho: *Non= Non'hocam, Can= Can'hocam, Cab=Cabarro, Cam= Camabe, Od=Odone,Oc=Ocoton*
Femia: *Num= Num'pune, Camp= Campuni, Cab=Cabarro, Cam=Camabe Od=Odone, Oc=Ocanto*

(3) Group do fanado: CUB= Cubanos *(2000's) JAP= Japanese (1990's-2000) CHI= Chinese (1980's-1990's) RUS=Russians (1970's-1980's) AM=Americans (1960's-1970's) FOU=Fouloupes (1950's-1960's)*

(4) Geracao (para djuente Bijago): ORA= Oraga OM=Ominca ORC=Oracuma OGU= Ogubane

(5) Relacao mas proximo na casa: *Ch=Chefe di kasa M=Mindjer di Chefe di Kasa (1,2,3,4) P= Pai (di chefe o di minjer) M= Mai FA= Filha FO= Filho HF= Hermon Femia HM=HM*

(6) Nivel Escola: si uma pessoa esta na escola todovia, pone um circulo por nivel-
(7) Repuestas d' estas dos preguntas sao- SI o NAO: Si esta pessoa ficava na outra llugar a noite, e tambem normalemente ficas afuera continuar can tres ultimas preguntas

Data 02-10-2009 Hora (de manha / de tarde)

Nome Trabajador Helena ID Tabanca ..... ID Casa .....

P3. Quantos bolanhas voce tem? (punta todas pessoas na casa) ANE formerly ANE 7

ID Pessoa	Numero Bolanha	Tamanha (peq/ med/ grande)	Onde	Quem manda	(i) bolanha plantava esta ano (si/nao)	Variedade do arroz voce plantava	Voce applicava adoube (si/ nao)	Quantos kilos de arroz produzido	(ii) Ano do ultimo trabalho na bolanha
01	2	peq.	Ancobesa	José Cruz Pimpam	Si.	Rovrante	não		
			(filha)	Erencia Cruz Pimpam		(patki)			

Data 02-10-2009 Hora (de manha / de tarde)

Nome Trabajador Helena ID Tabanca ANE ID Casa

formerly ANE 7

P4: Voce tem llugar na Amutai? (punta cada pessoa na casa)

ID Pessoa	Llugar -Peq/ Med/ Grande	Onde? quem tem llugar cada lado	Variedade do arroz voce plantava	Voce applicava adoube (si/nao)	Quantos kilos do arroz produzido esta llugar
01	medium	Praia - Manu (hermon grande Armando Pappa) (Caburo)	Merengue Patti	Não	
02 03	dividido				

P5: Quantos quintales do cajeu voce tem? (punta cada pessoa na casa)

ID Pessoa	Numero Quintal	Tamanha (Peq/ Med/Grande)	Onde	Quem Manda	Quantos anos tem estas arvoles na quintal
01	1	peq.	Lado di casa	Papé	1988
01	3	grande	Fua di Ancobara	Papé	1989

IN-MIGRANT HOUSEHOLD SURVEY

Recenceamento di Kasas Estrangeiro- na Area Cabuno

Data: 24-10-2009 Hora (di manha / di tarde) Nomen Tarbajador: Helena

ID di Tabanca: ENC ID di Kasa: 19

Mohammed Wow

P1: Kin moras na kasa alinli? I kal characteristicos tene estas djinti-

ID	Nomen	M / F	Idade	Llugar di Nacamento	Raca	Relig	Tempo ke mora na kasa	Relacao mas proximo na kasa	Ditaba alinli anoite	Dita alinli cada dia	Nonde fica	Ke ki faci	Ultimo bias bin ali	Nivel di Eskola	Tarbajo na Uno (1)	Tarbajo afora di Uno (1)	Llugares di kasas di familia principal	Relacacao di otra kasas	Tempo di ultimo visita di otra kasa
01	Mohammed "Wow" Kamara	M	35	FreeTown	TM SL	Mus	2 months	married net Caravella	✓	✓	—	—	—	Arabic	farming	—	Sierra Leone mother	1	15 years
02	Meamona Kamara	F	22	FreeTown	TM SL	Mus	"		✓	✓	—	—	—	—	drying	—	Mother house Braemer Father – Sierra Leone		5 years
03	Omar Kamara	M	2 7months	Caravella	GB	Mus	"	filho 01/02	✓	✓	—	—	—	—	——	——	Here		—

Data 24-10-2009 Hora (di manha / di tarde)

Nomen Tarbajador Helena ID di Tabanca ENC ID di Kasa 19

P.2: Kal individais na kasa tene estas kusas?- ali e uma lista di kusas/ materiales/ animais Kin na kasa faciba tarbajo pa salario esta ano (2009)?

Kusa	Numero di ID di Pessoa na Kasa						
	01	02					
Motor (cavallo)	X						
Canoa (tamanha)	✓ + 1 anchor						
Rede (lego)	/						
Rede (bonga)	5 big						
Armadilla: kantos ansol)	5 packets = 500 (no. 6)						
Anchora	x 2 (for line)						
Vella	1						
Balanca		1					
Pans		1					
Banda		1					
Kofu	X	X					
Arma							
Gerador							
Bateria							
Panel Solar							
Lampeda	1	X					
Telephono	X	X					
Radio	X	X					
Bicicletta							
Vaca							
Cabra							
Ovelha							
Porco							
Galinha		1					
Tipo di tarbajo ku salario							
Valor di salario(CFA)							
Lugar di tarbajo							
Tarbajo pa kin							

LIFE HISTORY

46. Respondent X (born 1964)
Makeni- SL
Ft. Non-Ed. Malian, Painter (arrived with his father in SL)
Mt. Non-Ed. Trader (rice/palm oil), Ss
1966- Lunsar. Family moved
1970- Lunsar. Primary School.
1977- Lunsar- entered 2nd School. Passed Selective Entrance exam.
1979- Makeni. Sent back by Ft.
1980- Lungi. Stayed Mt. Elder sister. Farm work.
1984- Makeni. Staying with a soldier (friend Ft).
Continued at school- but pressure to join army. Ran away.
1984- Lungi. Ran to Mt. Started fishing bonga.
1984- Moved to GC (bolbine) with SL's.
Joined a 6 man crew and fished snapper. They were making 1 week campaigns.
He began as a novice (bailing), 3 months later was given a line (7 hooks)
Met Fatumata (in Kassa). During the 2 years he saved money
- invested 50,000 FG on a line and hooks

1986- SL. Returned back but had no work.
1987- Returned to Kassa. Fishing snapper.
Pay- 3 way split (i) Petrol, Ice, Chop (ii) boat owner (iii) workers
Could receive 30-40,000 FG per trip to sea (campaign 3 days)
1990- Conakry- joined Korean Trawler ($200/ month)
1992- Sierra Leone. Moved back to check family. War started.
Intervention of army, briefly stayed in Lungi. No work.
"But i had saved money- anything I wanted i could buy it. Amongst all my friends- i was the top one"
1993- Conakry. Bonga fishing.
Anchored Bolbine (Conakry)- they were 2 workers and 7 packets bonga chain.
They were paid using a % of individual head count (not pans)
In Kassa- smoked catch 1 fire, then wife crossed to Conakry to sell.
1996- Ma(r)iembe. Met Rugi while on a fishing campaign and carried her back to Kassa.
Fatu delivers- Biga born.
1998- Conakry/Kassa. Built a boat.
With 14 boards(7,000 FG each). His brother (a carpenter) did the building.

"it was more work than the fishing I had been used to as an apprentice, but what i caught was my own even if it's only worth 100 CFA"

1999- Maiembe. All move back and continue fishing.

2001- Maiembe- sell boat to a man from GC. Hears that GB good for fishing.
Receives 350,000 FG for boat and 400,000 FG for the chains.
Anta- Kamsar. All family travel by car.
Kamsar- Cacheque- Bubaque-Orangozhino- Vietnam- Jeu di Porcos.

2001- Jeu di Porcos (arrive 27th September).
Starts bonga fishing with Bakar. Begins using the measurement "pans"
Pay was 2:1.

2001- Jeu di Porcos. Built banda.

2004- Jeu di Porcos. Bought board from Kamsar and built own boat. Obai made it.
"he's my brother"
600,000 FG for the board, 13kg nails (1,000 FG each),
paints and other small goods.

2005- Leave Jeu di Porcos- Uno

"the bidongs used to band against the walls inside the flooding houses, the place was swamped and really dirty"

2006- Uno. PESCARTE confiscated his boat as he could not pay 130,000.

"the tied many boats together with a line and trailed them out of the encampment and into the open water, round the island to their base at Uracane. They were leading more than 10 boats behind them"

Mh. Caravella offered a loan of 120,000 CFA to buy back the boat, but his worker Miller refused the deal and so the boat rotted in the police headquarters.

2006- Ancamona- travelled to fish with Amarra. But...

" the tabanca people they started protesting"

2008- Uracane. Worked 4 months but catch small and problems many. Became despondent and returned to Uno. When I arrived.

2009- Working with Mh Kamara, Kuyate, Foday...

TIME ALLOCATION

mocata mocob
i na rema –

Recenceamento di Tempo ANC - Domingus (Sabado)

Data..18 - 10 - 2009..... Hora (de manha / de ta

Nomen Trabalhador..Helena..... IDTabanca .....ANC.....

Domingus Gomez

P1. Qual actividades voce fez- (i) hoje - de manha/ de tarde (ii) Ontem – de manh
(sim voces pode explicar, como que voce passava tempo, onde, con quem e

** si pessoa foi pesca- escribe na otra folha-*

Dia	Actividade de Manha	Actividade de Tarde
~~Hoje~~ Sabado	baba Ancobara - (Banabé) faciba puta pa casa	es : faci todo dia
Ontem 6°	Na quintal di manha ku Sabado - sincar arroz- Depois i baiba Ancobara (Bolanha) pa planta	ficaba ta di noite.
Antes de Ontem 5°	Bolanha di el - da ancobara - i lavra (i son) -	- i faciba todo dia la.

CATCH LANDING SURVEY

Hoolas are mentioned in the Koran - "It's the oldest way of fishing" "fish buying the bait" God made fish for humans being; God told all men not to go on Saturday (it's a sin) - ALL fishing

Reçenceamento di Pis Capturada (1) A*R SAMOU '2009' MAMATA –

Dia Quarta Feira Data 03-02-2010 - 18 day of the moon. Nomen Tarbajador

Nomen Pescador(es): (i) Mohammed Kamara (ii) Abakar Kamara ENDO Congres Nacional Democracy + Development (iii) (iv)

(v) (vi) (vii) (viii)

Canoa (Si) / Nao) Motor: 40 C / 15 C / 8 C / Nada 6 Cav - Vella: (Si / Nao) @ Gasolina : 15 litres

Nomen di CAPITAN Old man - strange face Mohammed Kamara - knows/likes All types of Nomen di PROPRIATARIO di Canoa Kindu

1: Kanto tempo i faciba no mar? Dia di Saida Terça Feira Hora di Saida di tarde

2: Ke ke bu faciba no mar?

(i) Busca pis na ridia i fica ridia no mar (ii) Busca pis na ridia i tira ridia (iii) otra kusa

3: Kantos dias / mareas ridia tene no mar? (1) 2 3 4 5 6 7 Bu poneba ridia no mar- di manha o di tarde di esta dia atras?

4:Kal tipo i tamanha di materias abo usaba? @ Kanto ikika- 1 @ ~~Kantos bias ishka~~ Kal hora : 11 pm.

Kantos REDES		Propriatario di Ridia	Kantos ARMADILLAS			Propriatario di Armadilla
Tipo di Ridia	Tamanha di Ridia		Tamanha di Armadilla	Numero di Ansois	Tamanha di Ansol	
			✓	1,500	(7) (8)	Mr Kindu

5: Nunde ke bu baiba pesca?

Tipo di Area: perto di praia, perto di banco, fora di banco, mar baixo, mar profundo, ku arrea,

Nomen di Llugar di Pesca: Orango canal

At this time (day 18) (Hoon Calendar-) you can see many canals - incl one which is closer than Orango. { water full - earlier you have to wait. When water dry - you can put line

Reçenceamento di Pis Capturada (2)

Dia Quarta Data 03-02-2010 Nomen Tarbajador [illegible] Nomen Pescador (i)

5: Kantos pis ke bu tene? (6)

*Medida di Pis (scribi)	Nomen di Pis - Creolou	Kilo di Medida di Pis	*Medida di Pis (scribi)	Nomen di Pis - Creolou	Kilo di Medida di Pis
Bañeras	Bhagoé	1			
	Cardinalmus	3 (60 cm)			
	Cazupai	–			
	Torpedo mackayana	~1 (put it back)			

HOUSEHOLD ECONOMIC SURVEY

B : Reçenceamento Economico (1): Dia Quinta Data 01/07/2010
Hora (di manha / di tarde) Nomen Tabanca Ancoem Nomen di Homen Albino Ebiquine

1.1 Kal kusas bu **bindiba** aos/ aonti ? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Recibiba	Llugar di bindi	Kin kumpraba: Nomen/ Nacionalidade i Race
Domingas	Padja	30 minto	1500 CFA	Camfama	Diferentes
Emilia	nada	—	—	—	—
Albino	nada	—	—	—	—

1.2: Kal kusas bu **bindiba** aonti/ antordia ? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Recibiba	Llugar di bindi	Kin kumpraba: Nomen/ Nacionalidade i Race
Domingas	nada	—	—	—	—
Emilia	Padja	2 fis	1000 CFA	Camfama	Mohamed
Albino	nada	—	—	—	—

1.3: Kal kusas bu **bindiba** antordia/ antordias passado? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Recibiba	Llugar di bindi	Kin kumpraba: Nomen/ Nacionalidade i Race
Domingas	nada	—	—	—	—
Emilia	mangos	7 minto	700 CFA	Camfama	Diferentes
Albino	nada	—	—	—	—

2.1: Kal kusas bu **kumpraba** aos/ aonti ? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Pagaba	Llugar di kumpra	Kin bindi- Nomen/ Nacionalidade i Race
Domingas	Peixe	2 minto	500 CFA	Ancoem	Hitiler
Emilia	Sebola	1	100	Cabuno	Suco
~~Albino~~	Gusto	3	100	"	"
Albino	nada	—	—	—	—

2.2: Kal kusas bu **kumpraba** aonti/ antordia ? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Pagaba	Llugar di kumpra	Kin bindi- Nomen/ Nacionalidade i Race
Domingas	nada	—	—	—	—
Emilia	ARROZ	2 Kgs	600 CFA	Ancarabe	Zecarias
~~Albino~~	Peixe	1 Kgs	250 CFA	Cabuno	Tino
Albino	nada	—	—	—	—

B : Reçenceamento Economico (2): Dia Quinta Data 01/07/2010
Hora (di manha / di tarde) Nomen Tabanca ...Ancoem... Nomen di Homen ...Albino...

2.3: Kal kusas bu **kumpraba** antordia/ antoridias passado ? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal kusa	Kantos	CFA Pagaba	Llugar di kumpra	Kin bindi- Nomen/ Nacionalidade i Race
Domingas	nada	—	—	—	—
Emilia	nada	—	—	—	—
Albino	nada	—	—	—	—

3: Kal kusas bu trocaba (faci intercambio) aos/ aonti (na 24 horas atras)? * Punta todo djinti (individuais) na kasa

Nomen Pessoa	Kal Kusa i Trocha	Kantos	Pa Kal Kusa	Kantos	Llugar di Troka	Kin: Nomen/ Nacionalidade i Race
Domingas	nada	—	—	—	—	—
Emilia	vinho	5 litros	Caichu	5	Ancoem	Tino
Albino	nada	—	—	—	—	—

4: Kal **OTRA KUSAS** bu **bindiba** na semana passada (7 dias) pa mas ke 500 CFA? * Punta todo djinti

Nomen Pessoa	Kal kusa	Kantos	CFA Recibiba	Llugar di bindi	Kin Kumpraba : Nomen/ Nacionalidade i Race
Domingas	Pasta/batat	40 minto	2000 CFA	Campama	diferentes
Emilia	Pasta	3 minuto	1500 CFA	Campama	Mohamed, Alassana
Albino	nada	—	—	—	—

5: Kal **OTRA KUSAS** bu **kumpraba** na semana passada (7 dias) pa mas ke 500 CFA? * Punta todo djinti

Nomen Pessoa	Kal kusa	Kantos	CFA Pagaba	Llugar di kumpra	Kin bindi : Nomen/ Nacionalidade i Race
Domingas	ARROZ	3 Kgs	900 CFA	Ancarabe	Zecarias
Emilia	ARROZ	2 Kgs	600 CFA	Ancarabe	Zecarias
Albino	nada	—	—	—	—

6: Kal **OTRA KUSAS** bu **bindiba** na mis passada (desde ultimo visita) pa mas ke 2, 500 CFA? * Punta todo djinti

Nomen Pessoa	Kal kusa	Kantos	CFA Recibiba	Llugar di bindi	Kin kumpraba : Nomen/ Nacionalidade i Race
Domingas	Cuco	20 Kgs	5000 CFA	Punto	Zecarias (AKA)
Emilia	Cuco	30 Kgs	7500 CFA	Punto	Zecarias
Albino	nada	—	—	—	—

B : Reçenceamento Economico (3): Dia. Quinta Data. 01/07/2010
Hora (di manha / di tarde) Nomen Tabanca ..... Nomen di Homen .....

7: Kal **OTRA KUSAS** bu **kumpraba** na mis pessada (desde ultimo visita) pa mas ke 2, 500 CFA? * Punta todo djinti

Nomen Pessoa	Kal kusa	Kantos	CFA Pagaba	Llugar di kumpra	Kin bindi : Nomen/ Nacionalidade i Race
Domingas	ARROZ	12 Kgs	3600	Punto	Zecarias (AKA)
Domingas	ARROZ	14	4200	Punto	Zecarias
Albino	nada	—	—	—	—

8: Si **abo bo baiba busca credito** na mon di otra pessoa- esta semana (7 dias) atras? * Punta todo djintis (individuais) na kasa

Nomen Pessoa	Tipo di credito (moneda/ produkto) bo pista	Kanto	Na mon di kin (nomen/ nacionalidade/ raça)	Pabia di ke	Kuma ke bo na paga
Domingas	não	—	—	—	—
Emilia	não	—	—	—	—
Albino	não	—	—	—	—

9: Si **otra pessoa i bin busca credito** na bo mon - esta semana (7 dias) atras? * Punta todo djinti na kasa

Nomen Pessoa di Kasa	Tipo di credito (moneda/ produkto) pessoa pista	Kanto	Kin pista (nomen/ nacionalidade/ raça)	Pabia di ke	Kuma ke i na paga
Domingas	não	—	—	—	—
Emilia	oléo palmo (sita)	meio litro	Quinta N'Coto	pa mafé	Sita
Albino	não	—	—	—	—

Commentario:

Part 2: Photographs

Photo 1: Funeral of the Baloberro of Ussambar, Uno

Photo 2: Female initiated elders, responsible for guarding the souls of uninitiated deceased, Anocyem, Uno

Photo 3: A typical Bijagós ceremonial mask, here depicting the form of a hammerhead shark, Cabuno, Uno

Photo 4: The offices of the 'administration' on Bubaque Island

Photo 5: At the tiller of the transport canoe en-route to Uno, in the waters outside Bissau Port

Photo 6: Pindjikiti Port, Bissau City

Photo 7: Data collection in Ankarabe, Uno

Photo 8: Beach front of the in-migrant fishing encampment, Uno

Photo 9: Pre-initiate Bijagó animist <*canhocams*> dance during the 'camenenje' ceremony in Cabuno, Uno

Photo 10: Pre-initiate Bijagó animist warriors <*cabarros*> as part in the ceremony 'gunu', Bruce, Uno

Photo 11: Hand-net fishing, Ankarabe, Uno

Photo 12: The ceremonial ploughing event <*paga cajur*> undertaken by the pre-initiate warriors <*cabarros*>, Ancoyem, Uno

Photo 13: The sacred initiation site at <*amutai*>, Uno

Photo 14: Cultivation of upland rice at <*amutai*>, Uno

Photo 15: A transport canoe service bound for Kamsar (Guinea Conakry) arrives at the in-migrant encampment on Uno to collect fish cargo

Photo 16: A wood cutting load destined for fish smoking on the beach at <*amutai*>, Uno

Photo 17: Bonga (*Ethmalosa fimbriata*) in-migrant encampment Uno

Photo 18: Bijago female pre-initiate <*cabarro*> warriors in ceremony, Cabuno, Uno

Photo 19: Fish landing, in-migrant encampment Uno

Photo 20: Measuring a ground shark specimen, in-migrant encampment Uno

Photo 21: Guitarfish (Rhinobatus spp.), in-migrant encampment Uno

Photo 22: Crumbling Bijagós grain stores <*bembas*>, Ancoyem, Uno

Photo 23: Bijagós villagers barter cashew nuts for rice, in Ankarabe Port, Uno

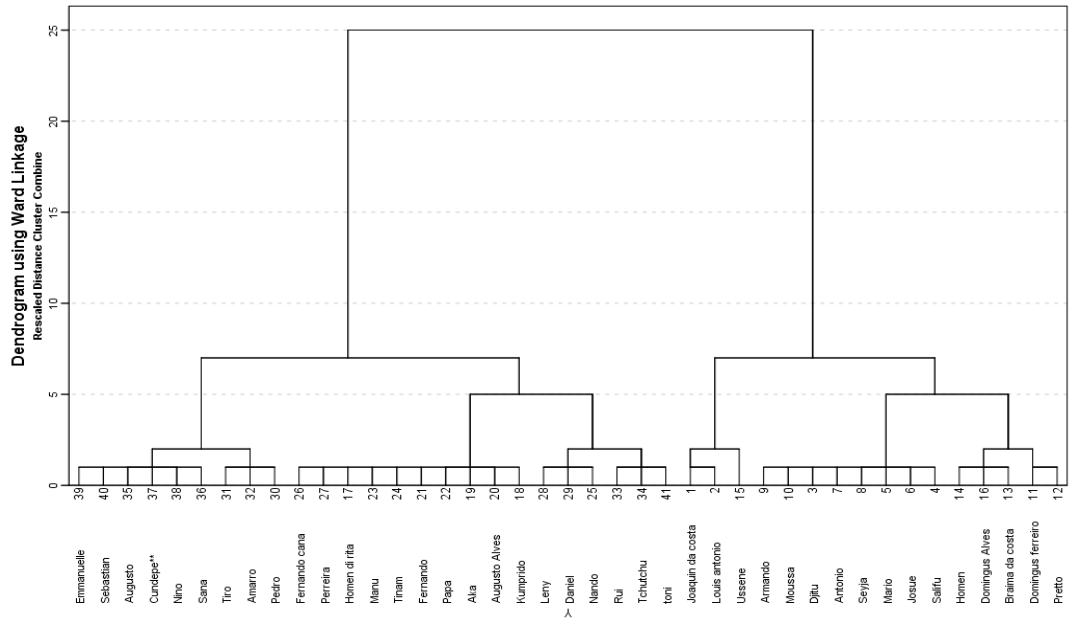
Photo 24: Salt fish inside the in-migrant encampment, Uno

Photo 25: Loading *blyes* of smoked fish onto a transport canoe bound for Kamsar, Guinea Conakry, from the in-migrant encampment, Uno

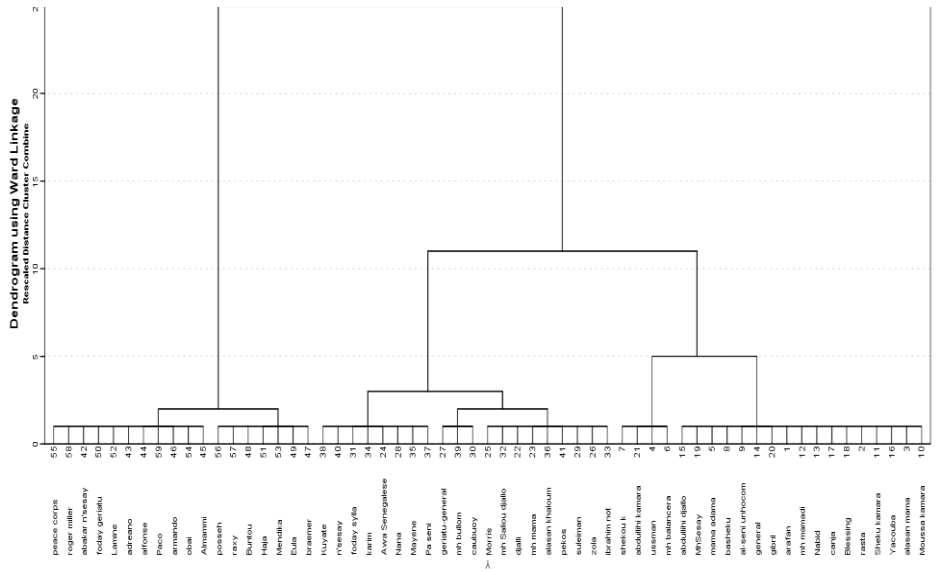
Part 3: Supplementary Calculations

3.1 Chapter 4: Growth of Commercial SSF

3.1a Dendogram of Bijagos Entry Clusters



3.1b Dendogram of In-Migrant Entry Clusters



3.2. Chapter 5: Conflict and Commercial SSF

3.2a. Binary Logistic Regression: Livelihood Diversity Bijagós Males

Dependent Variable Encoding

Original Value	Internal Value
3 or 4 activities	0
5 or 6 activities	1

Categorical Variables Codings

		Frequency	Parameter coding
			(1)
VILLAGE	1.00 Ancoyem	18	.000
	2.00 Ankarabe	16	1.000

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Live_Div		Percentage Correct
			3 or 4	5 or 6	
Step 0	Livelihood Diversity	3 or 4	23	0	100.0
		5 or 6	11	0	.0
	Overall Percentage				67.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.738	.367	4.048	1	.044	.478

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	AGE by VILL(1)	7.956	1	.005
	Overall Statistics		7.956	1	.005

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	9.395	1	.002
	Block	9.395	1	.002
	Model	9.395	1	.002

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	33.411[a]	.241	.337

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.339	5	.275

Contingency Table for Hosmer and Lemeshow Test

		Live_Div = 3 or 4		Live_Div = 5 or 6		Total
		Observed	Expected	Observed	Expected	
Step 1	1	3	2.907	0	.093	3
	2	2	1.905	0	.095	2
	3	2	2.848	1	.152	3
	4	2	1.847	0	.153	2
	5	3	2.681	0	.319	3
	6	3	2.498	0	.502	3
	7	8	8.313	10	9.687	18

Classification Table[a]

Observed			Predicted		
			Livelihood Diversity		Percentage Correct
			3 or 4	5 or 6	
Step 1	Livelihood Diversity	3 or 4	15	8	65.2
		5 or 6	1	10	90.9
	Overall Percentage				73.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE by VILL(1)	-.067	.028	5.762	1	.016	.935	.885	.988
	Constant	.153	.469	.107	1	.744	1.165		

a. Variable(s) entered on step 1: AGE * VILLAGE

3.2b. Binary Logistic Regression: Livelihood Diversity In-Migrant Males

Dependent Variable Encoding

Original Value	Internal Value
3 or less than activities	0
more than 4 activities	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Livelihood Diversity		Percentage Correct
			3 or less than activities	more than 4 activities	
Step 0	Livelihood Diversity	3 or less than activities	0	7	.0
		more than 4 activities	0	14	100.0
	Overall Percentage				66.7

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.693	.463	2.242	1	.134	2.000

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Yrs_Fishing	7.032	1	.008
	Overall Statistics		7.032	1	.008

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	7.981	1	.005
	Block	7.981	1	.005
	Model	7.981	1	.005

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	18.753[a]	.316	.439

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.433	6	.376

Contingency Table for Hosmer and Lemeshow Test

		Livelihood Diversity = 3 or less than activities		Livelihood Diversity = more than 4 activities		Total
		Observed	Expected	Observed	Expected	
Step 1	1	2	1.721	0	.279	2
	2	1	1.594	1	.406	2
	3	2	1.453	1	1.547	3
	4	0	1.077	4	2.923	4
	5	1	.451	1	1.549	2
	6	1	.307	1	1.693	2
	7	0	.289	3	2.711	3
	8	0	.108	3	2.892	3

Observed			Predicted		
			LivelihoodDiversity		Percentage Correct
			3 or less than activities	more than 4 activities	
Step 1	Livelihood Diversity	3 or less than activities	4	3	57.1
		more than 4 activities	1	13	92.9
	Overall Percentage				81.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Years Fishing	.237	.105	5.072	1	.024	1.267	1.031	1.557
	Constant	-2.314	1.411	2.692	1	.101	.099		

a. Variable(s) entered on step 1: Years in Fishing.

3.2c. Time Allocation Regression (PLS)

LOCAL TIME ALLOCATED TO FISHING (ANNUAL)
APC=0.219, P=0.002 ARS=0.522, P<0.001; AVIF=1.391, Good if < 5

IN-MIGRANT FISHER: TIME AT SEA (ANNUAL)
APC=0.416, P=0.004; ARS=0.303, P=0.178; AVIF=1.502, Good if < 5

IN-MIGRANT FISHER GEAR REPAIRS:
APC=0.360, P=0.003; ARS=0.349, P=0.078; AVIF=1.122, Good if < 5

3.3. Chapter 6: Capturing Data

3.3a. Seasonal Transition in CPUE for MN-M and LL-SH

Levene's Test of Equality of Error Variances[a]

Dependent Variable: CPUE (Log_{10})

GEAR	F	df1	df2	Sig.
MN-M	.186	1	14	.673
LL-SH	.042	1	27	.839

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SEASON

Tests of Between-Subjects Effects
Dependent Variable: CPUE (Log_{10})

GEAR	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
MN-M	Corrected Model	1.848[a]	1	1.848	15.590	.001
	Intercept	9.565	1	9.565	80.693	.000
	SEASON	1.848	1	1.848	15.590	.001
	Error	1.660	14	.119		
	Total	18.609	16			
	Corrected Total	3.507	15			
LL-SH	Corrected Model	.708[c]	1	.708	4.916	.035
	Intercept	31.576	1	31.576	219.268	.000
	SEASON	.708	1	.708	4.916	.035
	Error	3.888	27	.144		
	Total	45.787	29			
	Corrected Total	4.596	28			

3.3b. Lunar Periodicity of Bonga CPUE for MN-M and MN-P

Levene's Test of Equality of Error Variances[a]

Dependent Variable: CPUE bonga (Log_{10})

GEAR	F	df1	df2	Sig.
1.00	2.687	3	12	.094
2.00	2.500	3	78	.066

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + MOON

Tests of Between-Subjects Effects

Dependent Variable: CPUE bonga (Log_{10})

GEAR	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
MN-M	Corrected Model	3.872[a]	3	1.291	8.888	.002
	Intercept	7.831	1	7.831	53.930	.000
	MOON	3.872	3	1.291	8.888	.002
	Error	1.742	12	.145		
	Total	18.520	16			
	Corrected Total	5.614	15			
MN-P	Corrected Model	4.073[b]	3	1.358	8.958	.000
	Intercept	13.813	1	13.813	91.144	.000
	MOON	4.073	3	1.358	8.958	.000
	Error	11.821	78	.152		
	Total	131.362	82			
	Corrected Total	15.894	81			

Pairwise Comparisons

Dependent Variable: CPUE bonga (Log_{10})

GEAR	(I) MOON	(J) MOON	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
MN-M	1.00	2.00	-.282	.319	.950	-1.284	.719
		3.00	.326	.223	.672	-.375	1.027
		4.00	1.471*	.319	.004	.469	2.472
	2.00	1.00	.282	.319	.950	-.719	1.284
		3.00	.608	.306	.352	-.352	1.568
		4.00	1.753*	.381	.004	.556	2.950
	3.00	1.00	-.326	.223	.672	-1.027	.375
		2.00	-.608	.306	.352	-1.568	.352
		4.00	1.145*	.306	.017	.185	2.104
	4.00	1.00	-1.471*	.319	.004	-2.472	-.469
		2.00	-1.753*	.381	.004	-2.950	-.556
		3.00	-1.145*	.306	.017	-2.104	-.185
MN-P	1.00	2.00	-.961	.402	.110	-2.046	.125
		3.00	-.757	.393	.301	-1.818	.305
		4.00	-.313	.401	.969	-1.396	.771
	2.00	1.00	.961	.402	.110	-.125	2.046
		3.00	.204	.115	.388	-.105	.514
		4.00	.648*	.140	.000	.271	1.026
	3.00	1.00	.757	.393	.301	-.305	1.818
		2.00	-.204	.115	.388	-.514	.105
		4.00	.444*	.112	.001	.142	.746
	4.00	1.00	.313	.401	.969	-.771	1.396
		2.00	-.648*	.140	.000	-1.026	-.271
		3.00	-.444*	.112	.001	-.746	-.142

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Sidak

3.3c. CPUE Variation between Habitats for MN-P and LL-LH

Levene's Test of Equality of Error Variances[a,b]

Dependent Variable: CPUE (Log_{10})

GEAR	F	df1	df2	Sig.
MN-P	2.318	2	98	.104
LL-LH	1.867	2	9	.210

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Test is not computed for one or more split files because there are less than two nonempty cells.

b. Design: Intercept + HABITAT

Tests of Between-Subjects Effects

Dependent Variable: CPUE (Log_{10})

GEAR	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
MN-P	Corrected Model	1.666[b]	2	.833	4.223	.017
	Intercept	6.413	1	6.413	32.514	.000
	HABITAT	1.666	2	.833	4.223	.017
	Error	19.328	98	.197		
	Total	174.859	101			
	Corrected Total	20.994	100			
LL-LH	Corrected Model	1.200[d]	2	.600	5.132	.033
	Intercept	5.088	1	5.088	43.502	.000
	HABITAT	1.200	2	.600	5.132	.033
	Error	1.053	9	.117		
	Total	23.198	12			
	Corrected Total	2.253	11			

Parameter Estimates

Dependent Variable: CPUE (Log_{10})

GEAR	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval

						Lower Bound	Upper Bound
MN-P	Intercept	1.258	.045	27.888	.000	1.168	1.347
	[HABITAT= Rocks]	-.081	.446	-.182	.856	-.967	.804
	[HABITAT= Shallows]	-.756	.260	-2.903	.005	-1.272	-.239
	[HABITAT= Banks]	0[a]	.	.	.	.	.
LL-LH	Intercept	.286	.342	.836	.425	-.488	1.060
	[HABITAT= Rocks]	1.298	.484	2.685	.025	.204	2.393
	[HABITAT= Channels]	1.112	.359	3.101	.013	.301	1.924
	[HABITAT= Shallows]	0[a]	.	.	.	.	.

3.3d. CPUE Variation between Fishing Grounds for MN-M

Levene's Test of Equality of Error Variances[a,b]

Dependent Variable: CPUE (Log_{10})

GEAR	HAB	F	df1	df2	Sig.
MN-M	Shallows	.975	3	12	.437

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + AREA

b. Test is not computed for one or more split files because there are less than two nonempty cells.

GEAR	Habitat	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
MN-M	Shallows	Corrected Model	2.254[a]	3	.751	7.182	.005
		Intercept	4.140	1	4.140	39.566	.000
		AREA	2.254	3	.751	7.182	.005
		Error	1.256	12	.105		
		Total	18.608	16			
		Corrected Total	3.510	15			

GEAR	Habitat	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
MN-M	Shallows	Intercept	1.249	.102	12.213	.000	1.026	1.472
		[Jeu di Porcos]	-.643	.213	-3.019	.011	-1.107	-.179
		[Udate]	-.534	.339	-1.574	.141	-1.273	.205
		[Vietnam]	-.991	.251	-3.955	.002	-1.537	-.445
		[Camp Sands]	0[a]	.	.	.	.	.

Pairwise Comparisons[c]

Dependent Variable: CPUE (Log_{10})

GEAR	HAB	(I) AREA	(J) AREA	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
							Lower Bound	Upper Bound
MN-M	Shallows	Jeu di Porcos	12.00	-.109	.373	1.000	-1.282	1.064
			14.00	.348	.295	.838	-.580	1.276
			16.00	-.643	.213	.062	-1.312	.026
		Udate	11.00	.109	.373	1.000	-1.064	1.282
			14.00	.457	.396	.850	-.788	1.701
			16.00	-.534	.339	.599	-1.600	.532
		Vietnam	11.00	-.348	.295	.838	-1.276	.580
			12.00	-.457	.396	.850	-1.701	.788
			16.00	-.991*	.251	.011	-1.778	-.204
		Camp Sands	11.00	.643	.213	.062	-.026	1.312
			12.00	.534	.339	.599	-.532	1.600
			14.00	.991*	.251	.011	.204	1.778

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Sidak.

c. This pairwise comparison table cannot be constructed because AREA, the factor being compared, has one level.

3.3e. Elasmobranch CPUE between Gears

Levene's Test of Equality of Error Variances[a]
Dependent Variable: Elasmobranch CPUE (Log_{10})

F	df1	df2	Sig.
1.332	3	66	.271

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + GEAR

Tests of Between-Subjects Effects
Dependent Variable: Elasmobranch CPUE (Log_{10})

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.619[a]	3	1.206	4.571	.006
Intercept	29.977	1	29.977	113.603	.000
GEAR	3.619	3	1.206	4.571	.006
Error	17.416	66	.264		
Total	48.248	70			
Corrected Total	21.034	69			

Parameter Estimates
Dependent Variable: Elasmobranch CPUE (Log_{10})

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	.534	.101	5.305	.000	.333	.736
[GEAR MN-P]	-.077	.158	-.487	.628	-.391	.238
[GEAR: LL-SH]	.083	.163	.506	.614	-.243	.409
[GEAR: LL-LH]	.629	.191	3.292	.002	.248	1.011
[GEAR: GN]	0[a]	.	.	.	.	.

Dependent Variable: Elasmobranch CPUE (Log_{10})

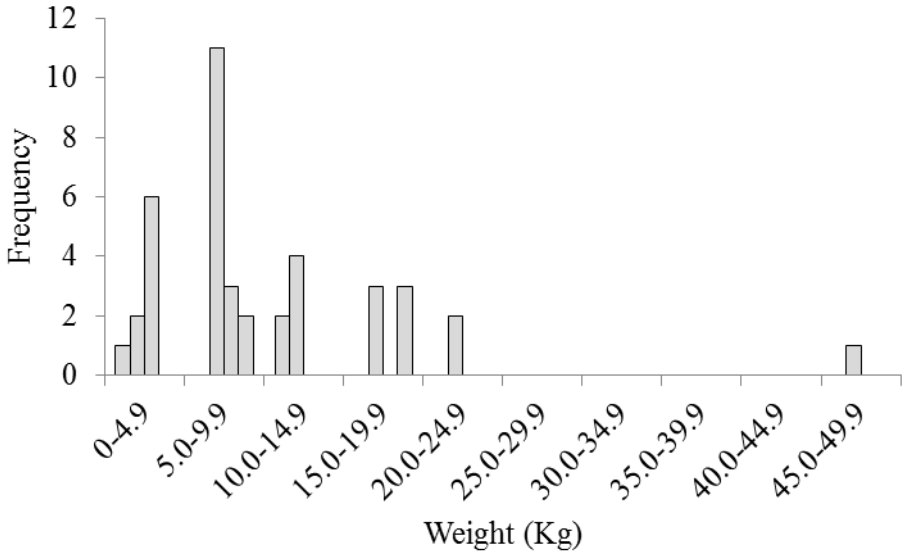
(I) GEAR	(J) GEAR	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
	LL-SH	-.159	.176	.938	-.638	.319
MN-P	LL-LH	-.706*	.203	.005	-1.255	-.156
	GN	-.077	.158	.997	-.504	.351
	MN-P	.159	.176	.938	-.319	.638
LL-SH	LL-LH	-.547	.207	.061	-1.108	.015
	GN	.083	.163	.997	-.360	.525
	MN-P	.706*	.203	.005	.156	1.255
LL-LH	LL-SH	.547	.207	.061	-.015	1.108
	GN	.629*	.191	.010	.111	1.148
	MN-P	.077	.158	.997	-.351	.504
GN	LL-SH	-.083	.163	.997	-.525	.360
	LL-LH	-.629*	.191	.010	-1.148	-.111

Based on estimated marginal means

*. The mean difference is significant at the .05 level

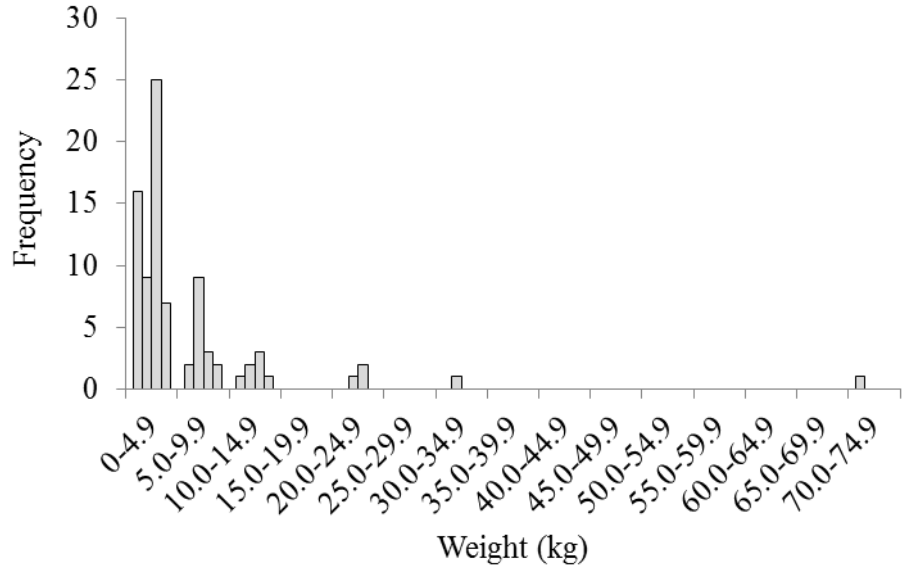
b. Adjustment for multiple comparisons: Sidak

3.3f. Weight Distributions of Elasmobranch Specimens Skates and Rays



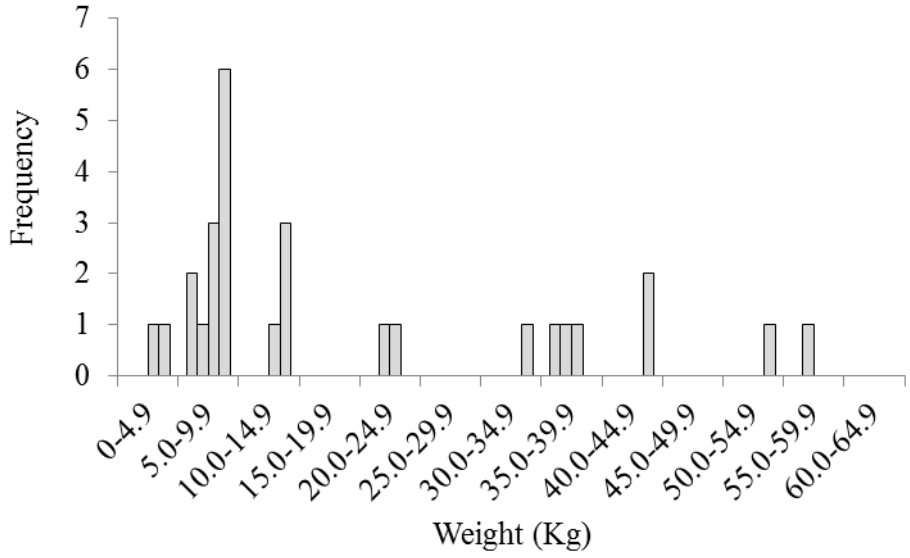
Weight distribution of captured skate and ray specimens (n = 40 individuals)

Sharks



Weight distribution of captured ground shark specimens (n = 85 individuals)

Guitarfish



Weight distribution of captured guitarfish specimens (n = 28 individuals)

3.3g. Gear Selectivity in Shark Capture (kg)

(i) Test for significant difference weigtht (kg) of captured individual, by gear-type

Kruskal Wallis Chi Square:

Test Statistics [a,b]

	Weight (kg)
Chi-Square	13.004
df	3
Asymp. Sig.	.005

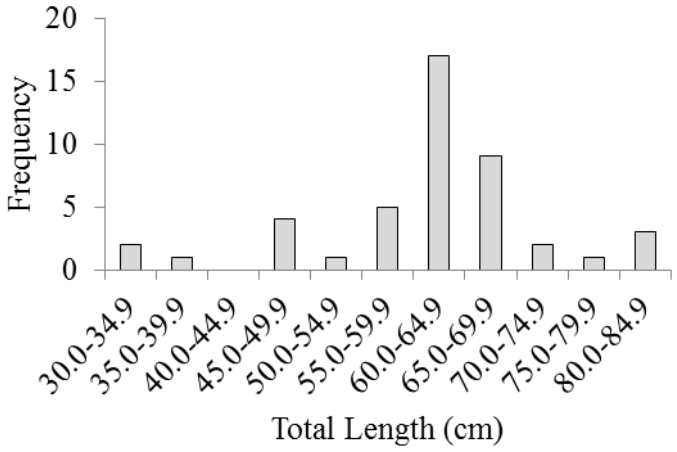
a. Kruskal Wallis Test

b. Grouping Variable: Gear

Ranks

	Gear	N	Mean Rank
Weight (Kg)	MN-P	20	33.63
	LL-SH	33	40.62
	LL-LH	10	35.50
	GN	22	58.50
	Total	85	

3.3h. Gear Selectivity in Shark Capture (cm) Sharks



Total length distribution of captured ground shark specimens (n = 45 individuals)

Kruskal Wallis Chi Square:

Test Statistics[a,b]

	Total Length (cm)
Chi-Square	8.405
df	3
Asymp. Sig.	.038

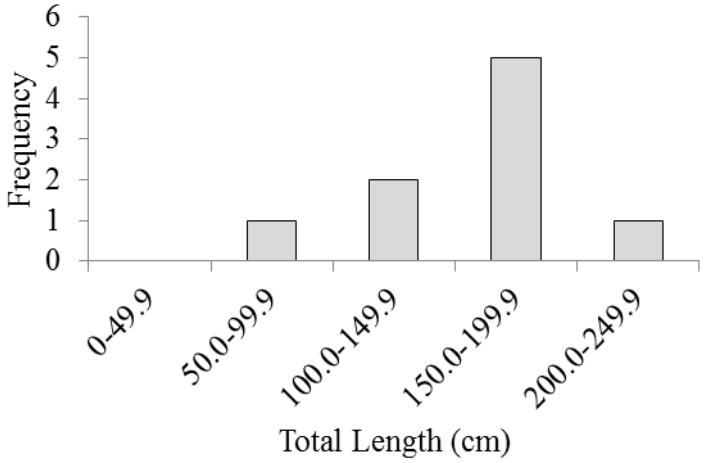
a. Kruskal Wallis Test

b. Grouping Variable: Gear

Ranks

	Gear	N	Mean Rank
Total Length (cm)	MN-P	10	13.45
	LL-SH	25	25.66
	LL-LH	7	22.50
	GN	3	33.83
	Total	45	

3.3i. Total length distributions of Guitarfish Specimens



Total length distribution of captured guitarfish specimens (n = 9 individuals)

3.4. Chapter 7: Livelihood Strategies and Commercial SSF

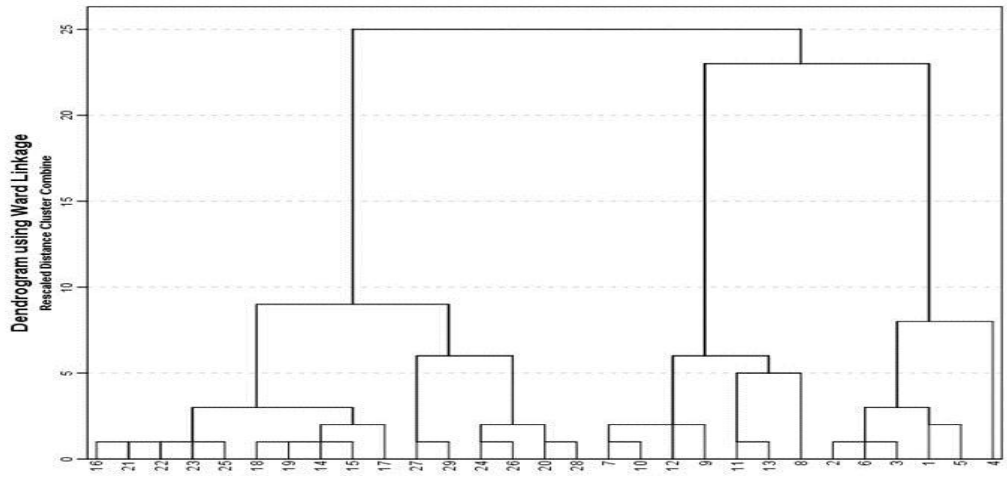
3.4a. Bijagós Household, Inventory of Goods

Agricultural Produce	Palm wine, palm oil, palm nuts, cashew wine, cashew fruit, cashew nuts, fresh chilli pepper, mango, lemon, banana, papaya, lettuce, potato, potato leaf, cassava, cassava leaf, pumpkin, spring onion, beans, groundnuts, squash, yam, cucumber, tomato, okra, papaya
Animals	Cow, goat, pig, piglet, chicken, chicken eggs, beef, goat meat, pork
Fish-Aquatics	Mullets, croakers, cockles
Building Materials	Woven mats, grass thatch, nails
Equipment	Mullet net, machete, hand plough
Fees	Primary school, secondary school
Food Items	Rice (kg measure), Plain Bread, Sugar, Cigarettes Juice , Vegetable Oil, Salt , Stock cubes, Margarine, Garlic, Spaghetti, Sardines, Rum
Non-Food Consumer Goods	Soap, toothpaste, nappies, hair extensions, moisturiser, razor blades, candles, matches, batteries, medicine, school notebooks; plastic buckets, cups, cooking pots, pestle and mortar

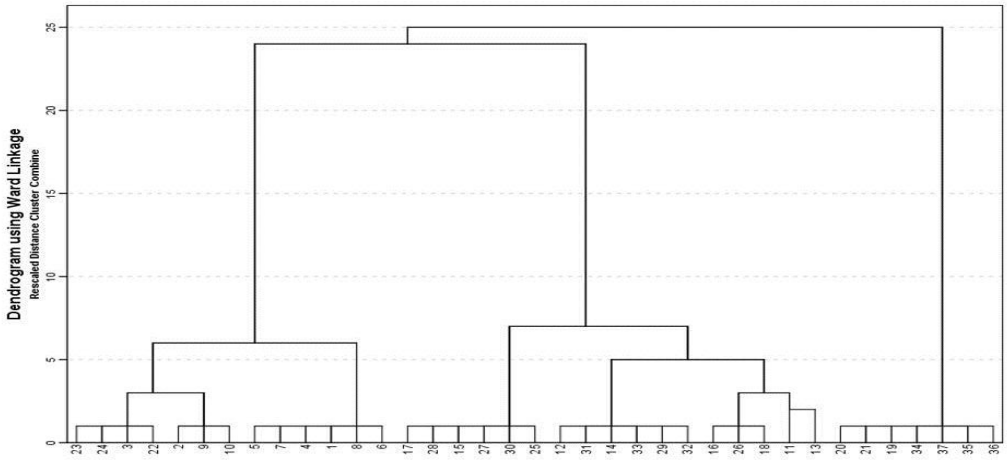
3.4b. In-Migrant Household, Inventory of Goods

Building Materials	Woven mats, grass thatch, Plastic sheets; Bamboo Cane reeds, smoking wood, Fish basket (large or small)
Equipment	Canoe (dugout), Canoe (board/timber), Board, Timber, Nails, Glue, Sacking, Tar, Paint, Paintbrushes, Anti-Os, Produit (for esclada), Petrol, Motor Oil, Gloves, motor plug, motor plug lights, Machete; Monofilament Net, Gill Net, Twine for Fixing Net, Lead weights, Floaters /Cork, Anchors, Buoys, Rope, Hooks
Non-Food Consumer Goods	Medicine, Cannabis, Perfume, Cloth, Clothes, Shoes (men), Shoes (women), Batteries (small packs), Torchlight, Knife, Padlock, Radio, Watch, Cell-phone, Phone Credit, Coat hangers, Gas Canister, Soap, Candle, Hair relaxer, Football, Gas cigarette/fire lighter
Fees/ Licences	Boat licence, Fishing licence, Fish smoking licence, Wood cutting licence, Customs duties and Carpenter Wages

3.4c Dendogram of Bijagos Livelihood Strategy Clusters



3.4d Dendogram of In-Migrant Livelihood Strategy Clusters



3.4e. Regression Analysis (PLS)

BIJAGOS ASSETS AND LIVELIHOOD STRATEGY GROUP MEMBERSHIP:
APC=0.307, P=0.001; ARS=0.253, P=0.038; AVIF=1.028, Good if < 5

IN-MIGRANT PC INCOME:
APC=0.225, P<0.001; ARS=0.251, P=0.049; AVIF=1.529, Good if < 5

IN-MIGRANT PC EXPENDITURE:
APC=0.400, P<0.001; ARS=0.160, P=0.093; AVIF=1.000, Good if < 5
MODEL DISCARDED AS DOES NOT MEET FITNESS CRITERIA

IN-MIGRANT PROP INCOME IN ENCAMPMENT:
APC=0.406, P=0.003; ARS=0.588, P<0.001; AVIF=1.720, Good if < 5
AVERAGE VARIANCE EXTRACTED: HOUSEHOLD HEAD STATUS (ATTRIBUTES) = 0.541

IN-MIGRANT PROP EXPENDITURE IN ENCAMPMENT:
APC=0.358, P=0.019; ARS=0.351, P=0.009; AVIF=1.818, Good if < 5

IN-MIGRANT BORROWING:
APC=0.225, P<0.001; ARS=0.251, P=0.049; AVIF=1.529, Good if < 5
AVERAGE VARIANCE EXTRACTED: HOUSEHOLD HEAD STATUS (ATTRIBUTES) = 0.475

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