



Coastal Fisheries in Fiji

Resources, Issues, and Enhancement of the Role of the Fisheries Department



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Executive Summary

This Study	<p>This study reviews the status and management of coastal fisheries in Fiji, with the objective of providing ideas to enhance the Fisheries Department's performance to a level similar to their accomplishments in offshore fisheries. Information on Fiji's key coastal fisheries resources were reviewed, including estimates of production, current status, financial and other benefits, and the likely challenges faced in the future. The structure and role of the Fisheries Department in coastal fisheries management was examined. Links with NGOs and other agencies who are also active in this area, and the degree to which their activities link with those of the Department, are discussed. Based on this review, the study draws out the major governance issues associated with the management of coastal fisheries that need to be addressed to enhance the performance of Fisheries Department in coastal fisheries. The study excludes any consideration of aquaculture and offshore fisheries, other than for comparative or illustrative purposes.</p>
Limited information on coastal fisheries	<p>Fiji has a wide range of coastal fishery resources, including finfish, invertebrates, and plants. Estimating coastal fisheries production and status of these resources, at a level that is useful for informing or monitoring management effectiveness, is a complex, expensive and challenging process. The statistical system that is used to provide coastal fisheries data in Fiji is now no longer functional, primarily due to the prioritisation of scarce government resources. This has resulted in a shortfall of fisheries information, such that the success (or otherwise) of management is hard to determine. This also contributes to the inadequate recognition of the economic and social value of coastal fisheries.</p>
Fully exploited with limited potential for expansion	<p>The limited information available suggests that the finfish and invertebrates in many areas of Fiji, in common with many other reef fisheries in the Pacific, are overexploited. It is therefore unlikely that coastal fisheries production can increase markedly, creating a potential clash with those that favour the development of infrastructure for fisheries to stimulate economic growth. The key challenge is to maintain, and where possible increase, the large existing benefits from coastal fisheries.</p>
Importance of coastal fisheries	<p>There is no doubt that coastal fisheries production produces extensive benefits to Fijian communities, including employment and nutrition. The direct contribution of coastal commercial and subsistence fishing to the GDP of Fiji is about F\$73 million (almost eight times greater than from offshore fishing) with around 27,000 tonnes of fish produced. Export data are questionable but suggest that coastal fishery exports in 2007 and 2008 were FJ\$25 and FJ\$46 million respectively. There is also a range of benefits that is difficult to quantify and include social and recreational values.</p>
Future challenges to coastal fisheries	<p>While there are considerable challenges facing coastal fisheries today, the future is likely to add more pressure, which will provide additional threats. Current trends of overexploitation and habitat degradation provide some insight into what the future may look like unless action is taken. Increases in population and urbanization are likely to lead to the following impacts, which, in turn have the potential to dramatically reduce the substantial benefits from coastal fisheries:</p> <ul style="list-style-type: none">• Coastal fisheries accessible to urban residents will probably decline through

over-exploitation and habitat destruction.

- Expanding urban populations fishing intensively will increase levels of overfishing close to those populations.
- A growing proportion of the urban population will not be able to catch sufficient fish to provide for household consumption.
- Many of the above points will contribute to more expensive fish and the incentive for members of poorer households to go fishing and exacerbate the problem.

Focus of the Fisheries Division

Around 280 staff work in the Fisheries Department, 57 of which are dedicated to offshore fisheries. Staff responsible for coastal fisheries management are spread across the most of the six technical divisions and four geographical areas. While the Division is deeply involved in coastal fisheries management, the focus and nature of this work is not directed to achieve specific management outcomes. The Fisheries Department focuses significantly more attention on offshore fisheries than coastal fisheries, the latter having a dedicated management Division, which has ensured adequate attention to key priorities.

Management vs. development

Appropriately, the early focus of the Fisheries Department was on increasing production of coastal fisheries and surveys of new resources. Over time there has been a growing recognition among stakeholders and the Fisheries Department that the over-exploitation of coastal resources is the major threat to fisheries in Fiji. Despite this, there continues to be emphasis on increasing production through direct assistance and subsidies to the fishing industry to encourage more fishing to meet demand. Ironically, in the long term and without adequate management in place, this assistance is likely to result in less rather than more fisheries production.

NGOs and FLMMA

There are large numbers of NGOs and other agencies involved in coastal fisheries, including the FLMMA network, which has been recognized as very effective. The network encourages coordination between agencies that work with communities to better manage traditional fishing grounds, using a well-established and documented process. Over 20 NGOs and agencies have significant involvement in coastal fisheries in the country with a focus on conserving fisheries resources. These NGO activities, while not well coordinated nor necessarily aligned with government priorities, have gradually assumed a number of government-type functions. While there is a strong case for the Fisheries Department to take on some of the FLMMA/NGO roles, there is also a need for NGOs and donors to accept and assist such a transition. The recent establishment of conservation officers within the i-Taukei Affairs Board does not appear well-coordinated with the Fisheries Department.

Improving governance

This report suggests a number challenges that need to be addressed by the Fisheries Department if it is to be more effective in management and ensuring the benefits of coastal fisheries are not further eroded. Currently, the Department addresses the major issues by default rather than design and a new approach is needed.

Dealing with over-exploitation

Few Department staff appear dedicated to dealing with over-fishing mostly due to a continuing focus on development and increasing production. Distractions such as reef ranching and alternative activities such as continuing experimental aquaculture are unlikely to be effective in addressing over exploitation.

Declining capacity	Key elements of Fiji's coastal fisheries management programme have degenerated over the years. Coastal fisheries management services that have declined include: fisheries statistics, enforcement of coastal fisheries regulations, effective management tools, formulation/implementation and updating of management plans and consultation with stakeholders.
Addressing the management /development balance	Currently there is no lack of high-level directives to focus urgent action on improving the management of coastal fisheries. There is however no clear national policy or plan which lays out a clear pathway to implement these high level directives at different levels or re-focus the work of the Department.
Improving resource knowledge	To address gaps, it will be first necessary to determine the additional information required for achieving management objectives and reconciling those needs with the current programme of Marine Resource Inventories. Updating the existing resource profiles with more recent information might serve as a catalyst for such prioritization.
Consolidating services	One reason for the strength of offshore fisheries management has been a dedicated division within the Department. Given that coastal fisheries produce far more food, jobs and contribution to GDP it seems logical to create a division for coastal fisheries. Such a division would focus, consolidate and coordinate the supply of fisheries management services to that sector. It would also provide impetus for achieving adequate funding and staff. An appropriate level of decentralisation of the new division to the provinces will need to be determined.
Improving communication	Stakeholders have reported that there is very limited interaction between Departmental staff and NGOs and coastal fishers/communities. There are many ideas for improvement of the current arrangements and increased communication would have multiple benefits.
Other actions	<p>Fisheries legislation has not kept pace with the changing requirements of coastal fisheries, and in particular community-based approaches for fisheries management. A review, update and revitalization of regulations and their enforcement would be an important action to underpin improved coastal fisheries management.</p> <p>Fiji is not unique in its challenges with coastal fisheries; advantage should be taken of the many good examples of successful re-orientation to coastal fisheries management.</p>
Fundamental change required	<p>Simply creating a new Division in the Fisheries Department will be insufficient to meet current and future challenges. Two fundamental changes must also occur:</p> <ul style="list-style-type: none"> • Acceptance by senior government leaders that i) landings from coastal fisheries are approaching their limits in other than isolated areas and ii) urgent management action is required to safeguard existing production. Where stocks are heavily depleted, reduced fishing may well increase production. • Fisheries staff must be committed to the suggested new, more focused, approach to coastal fisheries management. This will not be easy given the decades of efforts to increase and subsidise production through development initiatives.

This study represents the best professional judgment of the authors – and any errors in the report are theirs alone. This project was supported by the David and Lucile Packard Foundation.

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Introduction

Background

It is generally recognized that the management of offshore fisheries¹ in Fiji has improved considerably during the last decade. This extends to attributes such as the observer program, surveillance/enforcement, reporting, statistics, consultation with stakeholders, legislation, and management plans. Much of this progress is due to the increased, and more focused, efforts of staff of the Offshore Fisheries Division of the Fisheries Department and the senior leadership of the Ministry of Fisheries and Forests.

The management of Fiji's coastal fisheries has not been as successful. While the coastal fisheries are undoubtedly more complex than the offshore fisheries, there has been a reduced emphasis on management. Other factors such as the amount of government attention and the priorities of the Fisheries Department are likely to be important determinants in management effectiveness.

In mid-2014 the Ministry of Fisheries and Forests expressed interest in a review of coastal fisheries in Fiji, with the objective of enhancing the Fisheries Department's performance to a level similar to their accomplishments in offshore fisheries. The David and Lucille Packard Foundation provided a grant to enable this review.

This Study

The study began in mid-August 2014. From that time to mid-October a single fisheries specialist interviewed 31 Fisheries Department staff and 43 additional stakeholders from other government departments, NGOs, other agencies, and communities (Appendix 1). Most of the time was spent in the Suva area, but visits were made to selected fisheries stations in Savusavu, Labasa, and Wainikoro in Vanua Levu.

The findings of this report were presented to a group of Fisheries Department staff at the Ministry of Fisheries and Forestry on 19 November, 2014.

To avoid this study from being largely the views of a single person, two additional fisheries specialists with extensive Pacific and international experience and considerable knowledge of Fiji were employed. Their role was to review the information collected, determine if additional research should be carried out, consider/agree on conclusions reached, and jointly present the results to officials of the Ministry of Fisheries and Forests.

Some description of the conventions used in this report is necessary. The review concerns coastal capture fisheries and does not include aquaculture, mariculture, freshwater fisheries, offshore fisheries, or the deep-slope/seamount fisheries, other than examples where they may have been used to augment coastal fishery production or divert effort from heavily fished coastal resources. To clarify the nomenclature used:

- The terms "coastal", "inshore", and "nearshore" are considered to be equivalent.
- "Small-scale commercial fishing" equates to "artisanal fishing", while "small-scale non-commercial" equates to "subsistence".
- To avoid problems associated with the blurring between subsistence and small-scale commercial fishing, in using these terms the focus is on the disposal of the catch (i.e. the catch that is sold is commercial).
- "Fish" covers finfish, invertebrates, and edible marine plants.

¹ Generally defined as fisheries for tuna and related species in deep oceanic water beyond the outer reef slope, typically more than 3 nautical miles offshore

- “Fisheries development” is considered to be the increasing of fishery-related tangibles, usually catches of fish but also items like the building of infrastructure (docks, ice-plants), and boats.
- “Fisheries management” is considered to be what is done to attain objectives that have been set for a fishery, such as maintaining or increasing productivity, protecting resources, production of food, or generation of employment.
- “Over-exploitation” equates to overfishing, i.e. a situation where more biomass is removed from the stock by fishing than is being replaced by new fish joining the population (recruitment) or growth. Overexploitation may not be apparent in the early stages of a fishery, but inevitably leads to stock decline in the long term unless remedial action or stock rebuilding is undertaken.

Fisheries management can be seen by some to be a restriction on activities and, at times, counter to the objective of development and increased catches. In fact, management, in the case of rebuilding stocks, can be as or more effective in the long term in increasing production from a fishery than the more traditional development options such as building more boats and supplying ice, or by attempted stock enhancement by reseedling.

This report is divided into two main sections. First, an overview of Fiji’s coastal fisheries is presented, which is intended to provide an overview of the situation and key challenges based on available data, previous reviews and studies, and interviews with stakeholders. The second section deals with suggested next steps to address the challenges, with an emphasis on governance. This section of the report uses a candid discussion to support suggestions for the way forward and is written in the spirit that the Fisheries Department will ultimately benefit from a review of what are usually sensitive governance topics.

The report and its findings are aimed primarily at government agencies and current and future donors. Regional agencies, including SPC, may find the report of interest in terms of areas where future support may be required and could be better targeted.

It was agreed between the Ministry of Fisheries and Forests and the review team that it would not be appropriate nor especially productive for the review to become mired in inherently political subjects, such as the status of the Inshore Fisheries Management Decree.

Part One

1.1 The Major Coastal Fishery Resources of Fiji

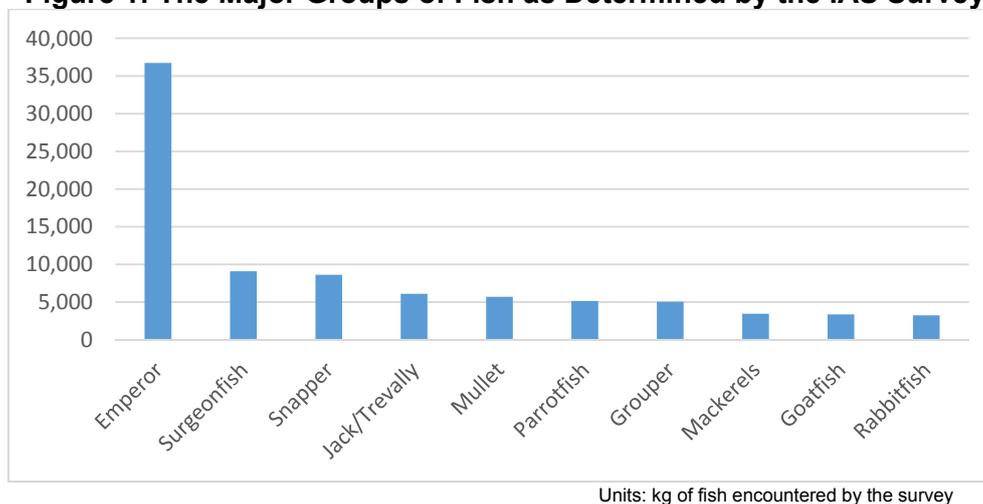
Fiji has a wide range of coastal fisheries resources, including finfish, invertebrates, and plants. The groups of fisheries resources covered in the Fiji Fisheries Resource Profiles (see below) could be considered the most important coastal fishery resources of the country - with some modification to eliminate the offshore and freshwater resources. The resultant list of important resources is shown in Table 1.

Table 1: The Important Coastal Fishery Resources of Fiji²

inshore fish	sea urchins	trochus
mullet	sea cucumbers	black-lip pearl oyster
reef fish	coconut crab	giant clams
emperors	mangrove crab	ark shell
small pelagics	other crabs	other edible molluscs
chub mackerel	lobster	collectors shells
aquarium fish	banded prawn-killer	cephalopod molluscs
sharks	shallow marine prawns	ornamental coral
turtles	mangroves	black coral
large pelagics	edible seaweeds	live reef food fish

The “inshore fish” category in the table covers many types of finfish. IAS³ (2009) in a survey in 2008/2009 of the finfish fishing of 46 villages in 22 districts of 10 provinces in Fiji involving 2,802 fishing trips offers some insight into the types of finfish that are especially common (Figure 1).

Figure 1: The Major Groups of Fish as Determined by the IAS Survey



For many reasons the Fiji Fisheries Resource Profiles deserve additional attention. In the mid-1980s an officer of the Fiji Fisheries Division compiled information on 21 of the major fishery resources in Fiji into a 90 page document (Lewis 1985). For each resource, there was a summary of information relevant to development and management. The booklet was so useful that fisheries officials in other Pacific Island countries saw the value of such a publication - and eventually the Forum Fisheries Agency (FFA) produced similar resource

² This table includes items that range from a single species to large categories and has some overlaps. The purpose of the table is to show the large range of coastal fishery resources.

³ Institute of Applied Science, University of the South Pacific, Suva, Fiji.

profiles for most Pacific Island countries. In 1994 FFA updated the Fiji resource profiles and produced a 194-page publication: *Fiji Fisheries Resource Profiles* (Richards 1994). That document can be thought of as a book with 45 chapters, each dedicated to an important fishery resource (e.g. giant clams, lobsters, aquarium fish) with each chapter sub-divided into information on the resource, the fishery, stock status, management, and references.

Although now somewhat dated, the fishery resource profiles are arguably one of the most useful documents ever produced to support the development and management of coastal fisheries in Fiji. From discussions with stakeholders it is clear that few people working with fisheries in the country (either in NGOs or in the Fisheries Department) are aware and make use of the document. Another feature of the situation is that since the publication of the profiles, there has not been much new information available on specific fishery resources on a Fiji-wide basis. In the last two decades there only appears to be new information on a few groups of resources (Section 1.4). The apparent scarcity of new studies tends to reinforce the value of the *Fiji Fisheries Resource Profiles* and the usefulness of updating them with all available information collected in the past 20 years.

1.2 The Major Coastal Fisheries in Fiji

A “fishery” is simply an activity leading to the harvest of fish. Complexities arise in the grouping of those activities: putting boundaries around small-scale multi-species fishing activity is inherently difficult. Nevertheless, the major fisheries in Fiji have been grouped and defined in a variety of ways:

- By resource category, such as the trochus fishery
- By fishing method, such as the gillnet fishery
- By area, such as a qoliqoli⁴ fishery
- By disposal of catch: subsistence or commercial
- Some combination of the above

On reflection, the most appropriate way to define a fishery is likely to be determined by the purpose of doing so. For estimating the value of fisheries, fisheries have been defined by the disposal of the catch (i.e. home use, marketed). For regulatory purposes, fisheries have been defined by resource category (e.g. beche de mer fishery) or fishing method (e.g. gillnet fishery). For statistical purpose a hybrid has been used. For example, for many years the annual reports of the Fisheries Department listed six fisheries: (1) tuna pole and line fishery, (2) tuna longline fishery, (3) finfish artisanal fishery, (4) non-finish artisanal fishery, (5) subsistence fishery, and (6) sports fishery.

In terms of important fisheries as defined by resources, the 30 types given in Table 1 are probably the most significant. Beche de mer is likely to be the single most valuable (i.e. in terms of revenue generated) coastal fishery in Fiji (as defined by resources). Pakoa et al. (2013) states that the export value reached a maximum of F\$16.5 million in 2005. The beche de mer fishery is also important in terms of the extent of illegal activity. The Fiji Navy reports that the second most common fisheries offence detected on their patrols is the use of underwater breathing apparatus (UBA) without an exemption in the beche de mer fishery.

IAS (2009) in the large-scale survey mentioned above, found that the most prevalent village-level fisheries as defined by method were (in descending order): handlining, day spearfishing, netting, and night spearfishing. Similarly, Cakacaka et al. (2010) shows that in Bua Province the speargun and hook/line fisheries are by far the most important in terms of finfish biomass harvested by villagers.

⁴ Fishing area subject to traditional custodianship and exercise of fishing rights – over 400 defined in Fiji.

The important export-oriented coastal fisheries include beche de mer and trochus. Information on exports from other fisheries in this category is more elusive. The Customs Department uses a detailed international system for classifying exports⁵, including fishery exports, but the fish categories that are actually declared by exporters and used by Customs are often not very informative (such as “other dried fish” and “fish fillet fresh or chilled”) or there is misclassification (such as “trout live”, or “other flat fish”). The CITES export database shows that the export of various types of hard corals from Fiji is quite large. Data from the Fisheries Department’s export permit system is given in the 2013 Annual report – and shows that live rock, ornamental fish, and beche de mer are significant exported coastal fishery commodities.

Other information that provides insight on the important coastal fisheries in Fiji includes the following:

- In a study of six qoliqoli across Fiji (World Bank 1999), the residents were asked to nominate their three most important coastal fisheries as defined by resources. The seven most often cited were: finfish, beche de mer, octopus, seaweed, lobster, mud crab, and various bivalve molluscs.
- The live grouper fishery was a very important fishery in the past, as judged by the controversy it generated.
- The lobster, crab, and octopus fisheries are very important in terms of sales of coastal fishery resources to hotels and resorts in Fiji as determined by a survey of the major suppliers (Raravula 2013).
- The statistical system of the Fisheries Department does not allow meaningful conclusions to be drawn from the limited data available. From the “2014 “Quarter 1 Statistical Figures” it appears that the fisheries for live rock and aquarium fish could be quite significant relevant to other resources.

1.3 Statistics and Current Estimates of Production

1.3.1 The Fisheries Department Estimates

Some background on the outputs related to coastal fisheries from the Fisheries Department’s statistics system can be obtained from the Department’s annual reports:

- For several decades the Department surveyed municipal, non-municipal markets, other outlets and roadsides in the Central, Western, and Northern Divisions for the sales of finfish and non-fish and published estimates of those sales in the Department’s annual report. Detailed reporting of catches ceased in 2004 and summary reporting continued to 2013, with a gap for 2011 and 2012. Although there is summary production information in the 2013 annual report, the alleged 37% drop in finfish production between 2012 and 2013 in that report casts doubt on the credibility of the estimates.
- Subsistence fisheries production information is contained in the Department’s annual reports up to 2007 where it was stated: “The Department estimated a total removal of 19,000 tonnes by subsistence fishery in 2004”. For the 2008 report an estimate made by a Canadian student research project was used. No estimates of subsistence production have been made in the subsequent annual reports.

A report by the Asian Development Bank (ADB) gives some background on the methodology formerly used by the Fisheries Department for estimating subsistence production (Box 1).

⁵ The Harmonized Commodity Description and Coding System, which is an international system for classifying products for customs and trade statistics purposes.

Box 1: Estimating Subsistence Production in Fiji

The Fisheries Division estimates of subsistence catch are based on a 1979 small-scale fishing survey which covered only Viti Levu, and used the ability of a single respondent in each village to recall landings over the previous 12 months (G.Preston, personal comm.). For the past 28 years, the estimate of small-scale production for all of Fiji (the largest component of the domestic catch) has been made simply by adding 200 mt of fish to the questionable 1979 figure. The results of an extensive small-scale fisheries survey in 1993 (Rawlinson et al. 1993) were not used to modify the 1979 estimate. Similarly, the results of a 1995 survey of the Northern District were not written up nor used to modify the 1979 estimate.

Source: Gillett (2009)

Table 7 in Section 1.7.11 gives insight into some of the difficulties associated with Fisheries Department's collecting and compiling coastal fisheries statistics. Interviews with staff of the Planning Division of the Ministry of Fisheries and Forests indicate that there has been no enumerator in the Central Division for a recent period spanning three years, and there are different systems for collecting data in Fiji's four divisions. Presently there is one junior staff at the Ministry headquarters with no statistical expertise who is in charge of compiling statistics from the divisions. Unlike the well-functioning system for offshore fisheries statistics to meet prescribed international standards, little technical expertise in coastal fisheries monitoring and statistics is provided by the regional organisations.

The latest estimates by the Fisheries Department of coastal commercial fisheries production are given in Table 2.

Table 2: Fisheries Department Estimates of Commercial Coastal Fisheries Production

	2012	2013
Finfish (volume mt)	4,440	2,710
Finfish (value F\$)	23,560,000	20,105,000
Invertebrate (volume mt)	3,091	2,876
Invertebrate (value F\$)	12,650,000	13,100,100

Source: 2013 Annual Report

1.3.2 Other Estimates of Fisheries Production

Estimating coastal fisheries production at a level that is useful for informing or monitoring management effectiveness is a complex, expensive and challenging process

In comparing estimates of fishery production in Fiji, it is important to know what is being compared. With respect to coastal fisheries, some studies have considered the production of only the country's two main islands, some only considered "coral reef fisheries", some only considered production for domestic consumption, and others lumped marine and freshwater subsistence components together. With respect to the value of coastal fisheries production, some studies consider the market value, while others use the price paid to fishers.

A study of fish catches for the island of Viti Levu was carried out between June and October 1993 (Rawlinson et al., 1993). The study estimated that the total catch made by subsistence fishers from rural Viti Levu to be 3,515 tonnes and the artisanal catch to be 6,206 tonnes.

The Asian Development Bank sponsored a study in 2008 to estimate fisheries production in Pacific Island countries and territories, including Fiji, for 2007. That study considered several past estimates (including those by the Fisheries Department and Rawlinson) and included all relevant marine fisheries (including coral and other export fisheries), but excluded freshwater subsistence fisheries. Values estimated were the price paid to the fishers, or (for

subsistence catches) the estimated market values minus the estimated costs of getting the catches to markets.

**Table 3:
Estimates of Fiji Coastal Fisheries Production by the ADB Study, 2007**

Harvest Sector	Volume (mt)	Value (F\$)
Coastal Commercial	9,500	54,000,000
Coastal Subsistence	17,400	54,100,000
Total	26,900	108,100,000

Source: Gillett (2009)

The ADB study stated: “making an estimate of fisheries production, however crude, may encourage others to improve the estimate”. Accordingly, there have been several more recent estimates. The most thorough by far has been Starkhouse (2009). That study considered the above ADB work, but was confined to only coral reef species and non-exported products – which is a subset of the “coastal commercial” and “coastal subsistence” of the ADB study. Starkhouse stated:

- The total annual catch volume of reef-associated finfish by artisanal fishing is estimated to be 6,401 tonnes, while reef-associated invertebrates and marine plants contribute an additional 1,342 tonnes. Together, reef species are estimated to have a gross market value (60% of which is the price paid to the fisher) of US\$ 33.4 million (or US\$20 million paid to the fishers).
- The annual subsistence catch comprised of reef-associated species is estimated to be 10,034 t (\pm 2,373 t). The finfish portion of the catch is 8,893 t (\pm 2,096 t), while the invertebrate portion of the catch is 1,141 t (\pm 578 t). The gross value of Fiji’s subsistence catch (value to the fishers) is estimated to be US\$ 31.0 million (\pm US\$ 7.3 million). Finfish account for US\$ 21.3 million (\pm 5.1 million), while invertebrates account for US\$ 9.7 million (\pm 2.5 million).

The total for the artisanal and subsistence fisheries for reef associated species from the Starkhouse study is therefore about 17,777 tonnes worth US\$51 million (F\$94 million) to the fisher. The study did not consider exports (it involved only domestically sold reef products) nor did it consider catches of species not considered to be associated with coral reefs. Considering these exclusions, the Starkhouse survey results and those of the ADB study are not very different.

Zylich et al. (2012) (with regards to subsistence and artisanal fishing) used information from the Rawlinson and ADB studies to establish per capita catch and consumption rates, which, in conjunction with population changes, were used to “reconstruct” subsistence and artisanal catches over the period 1950 – 2009. Because of the sources of information for catches for recent years, it is not surprising that the Zylich estimate of about 27,000 tonnes for subsistence and artisanal catches in 2009 is very close to the ADB estimate.

In the IAS study described in Section 1.1 above, catches from 2,802 fishing trips were sampled (IAS 2009). The study did not make an estimate of the total national catch, but did produce information on catch disposal. Unlike the ADB and Starkhouse surveys, the IAS survey indicated that, averaged across Fiji, 71% of fish and invertebrate catch is sold, 22% is used for subsistence, and 7% is given away. However, on a provincial basis, in only four out of the ten provinces sampled is a majority of fish sold.

1.3.3 Some Observations

From the above it can be concluded that information on overall coastal fisheries production in Fiji is inadequate for management purposes, with that for the subsistence fisheries being especially poor. Estimates of production by the Fisheries Department come from a statistical system that is no longer functional in terms of its practical use. To some degree, the Starkhouse and ADB work is based on information generated by the Fisheries Department – and consequently the resulting estimates could be quite inaccurate.

In Fiji there is considerable use of information on the fishing contribution to GDP. For example the Ministry of Fisheries and Forests Annual Report 2013 gives the fisheries contribution to GDP (to one-tenth of a percent) for each of seven years. Considering that the fishing contribution to GDP is calculated from production information, it is easy to see how inaccurate the estimates of GDP contribution could be.

The situation of coastal fisheries statistics in Fiji is not remarkably different from that in other Pacific Island countries. Typically, Pacific Island government fisheries agencies give low priority to estimating the total amount of domestic catches. In general, the smaller the scale of the fishing, the less is known about the production levels, with quantitative information being especially scarce for the subsistence fisheries in most countries. Despite the importance of such data, the reality is that in the prioritization of scarce government funding, the on-going routine collection of fisheries statistics does receive much priority.

What is different between Fiji and other Pacific Island countries with respect to coastal fisheries statistics, concerns the use of alternative ways to obtain fisheries production information. Neighbouring countries have shown that it is possible to obtain estimates of subsistence and artisanal fish catches outside of a formal fisheries statistical system – and sometimes at very low cost to the government fishery agency. These include:

- A one-off “snapshot” survey: in Samoa about a decade ago a nationwide household fisheries survey was undertaken during two months. The survey covered 20% of villages and 5% of Samoa’s households and was able to make an annual estimate of both artisanal and subsistence catches. Another such survey was done in 2014.
- Agriculture surveys have been carried out in Vanuatu and Tonga that gave information on annual fisheries production.
- Household income and expenditure surveys (HIES) are regularly carried out in most Pacific Island countries, including Fiji. If the HIES questionnaire includes a well-designed fisheries component, estimates can be made of annual fish production, even down to the species level. HIES work has been especially effective at obtaining estimates of coastal fisheries production in Niue and Tuvalu.
- A national nutrition survey in which attention is paid to obtaining accurate per capita fish consumption data can be used to estimate annual coastal fishery production, with the Kiribati situation being an example (Nube 1989).

The conclusion of the present examination of statistics on coastal fisheries in Fiji is similar to that reached by the Packard Foundation’s workshop in Fiji in April 2014:

Information about the status of inshore fisheries and catch (species, volume, value) is lacking which translates into poor management as well as poor recognition of the overall value of inshore fishing to Fiji.

As an example of the above, the high-level policy document “Roadmap for Democracy and Sustainable Socio-economic Development” erroneously states that the offshore fisheries

produce 67% of Fiji's fish catch⁶ – and in the policy objectives section of the roadmap there is considerable focus on improving the management of offshore fisheries.

It may be worthwhile to mention that a Secretariat of the Pacific Community (SPC) study on the long-term future of Pacific Island fisheries (Gillett and Cartwright, 2010) commented on the need for simple mechanisms to measure change in coastal fisheries. That report suggested that government fisheries agencies:

- Develop and use simple and clear reporting structures that give information relevant to identifying trends in benefits and impacts of management & development
- Monitor the impacts of climate change
- Work with other agencies to obtain fisheries data in non-fisheries surveys like HIES and censuses
- Develop and use indicators for fisheries management success in community based fisheries
- Provide incentives for data provision

1.4 The Status of Coastal Fisheries Resources

1.4.1 Historical Assessments

Much research was done on the status of Fiji's coastal fishery resources in the 1980s and early 1990s. This included Fiji-wide appraisals for:

- Emperors (Dalzell et al. 1992).
- Giant clams (Lewis et al. 1998)
- Eels (Beumer 1985)
- Squids (Brown 1979)
- Penaeid prawns (Choy 1982)
- Green mussels (Hickman 1987)
- Coastal pelagic fish (Lewis et al. 1983)
- Tuna baitfish (various annual reports of the 1980s)
- Pearl oysters (Murray 1992)
- Specimen shells (Parkinson 1992)
- Edible seaweeds (South 1993)
- Corals (Viala 1992)

This and much other similar work has been compiled into the Fiji Fisheries Resource Profiles discussed earlier in this report (Richards 1994). Although the information on many resources in the profiles is not very detailed, in many cases it is sufficient to give an impression of the general status of a fishery resource – and is far better than having no information at all. As an example of the level of detail given, the stock status sections in the profiles for two resources are:

- Giant clams: Because giant clams are sedentary, large and easily collected, the resource is very vulnerable to exploitation. Giant clams are comparatively fast growing, but there appears to be low recruitment of juveniles to the fishery. Fiji's stocks of *T. gigas*, the largest species, have been wiped out, and stocks of *T. derasa* are depauperate. Lewis (1985) states that due to low level but continuous artisanal harvesting of *T. derasa* over hundreds of years, and estuarine influences creating unsuitable habitats, this species is scarce around the larger inhabited islands. "In the Eastern Division, poaching and commercial harvesting have decimated the stocks on some reefs. These may recover, but *T. derasa* takes at least four years to reach

⁶ In the ADB study (Gillett 2009) the domestic fishery production of Fiji by volume was estimated to be 30.5% offshore, 59.7% coastal, 9.2 freshwater, and 0.5% aquaculture.

reproductive capability, and perhaps seven years to reach average size, so it will take at least five years of non-exploitation before these reefs again become fishable.” Lewis *et al.* (1988) provide detailed information on the status of giant clam stocks in Fiji, including a new giant clam species (tevoru clam) described from Fiji and Tonga.

- Emperors: Dalzell *et al.* (1992) used length-frequency data collected from 1982 to 1987 to make some preliminary estimates of population parameters of Fijian lethrind stocks, based on comparative studies. Exploitation ratios calculated from these parameters showed that, in the late 1980s, stocks may still have been approaching the point of optimal exploitation. However, the gradual decline in catches since then may indicate that stocks are presently over-exploited.

1.4.2 Recent Assessments

Little assessment work on coastal fishery resources has been carried out on a Fiji-wide basis since the early 1990s. Although much surveying of resources has been done at the qoliqoli level by the Fisheries Department (196 sites) and NGOs/IAS (about 135 sites), possibly on different spatial scales, there has been virtually no work from those surveys oriented towards examining the stock status of specific resources across all sites (e.g. the status of trochus in Fiji).

The only new assessments of specific coastal fishery resources across the country in the last decade appear to be on pearl oysters (Passfield 1995), bumphead parrotfish (Dulvy and Polunin, 2004), corals (Lovell and Whippy-Morris, 2008), beche de mer (Pakoa *et al.* 2013), and (in a non-compiled form) groupers (Sadovy, *per.com.*). The following is a summary of the results of those assessments:

Beche de mer: From the fishery-dependent information, it is apparent that the sea cucumber fishery in Fiji has experienced ‘boom-and-bust’ cycles, as commonly experienced elsewhere. In-water assessments indicate that densities are low across all sites and for some species they are critically low. Average sizes for sea cucumbers are smaller than the common size observed in the Pacific Island region as a whole. A few species such as lollyfish, prickly redfish, sandfish and black teatfish are no longer present in some sites. These findings highlight how fishing pressure has had a serious impact on the resources and how, without effective management, there is a risk that stocks for some species will be severely depleted or collapse. Although most species of sea cucumber are present in many sites, and pre-fishery baseline information is absent, it is clear that densities are significantly lower than healthy density levels. In sites protected from fishing by communities, such as marine protected areas, some species were somewhat more abundant. Yet these few protected stocks are also exposed to the impact of fishing, which distorts their population so that it contains exclusively young stocks. (Pakoa *et al.* 2013). There have also been qualitative changes in the harvest, with a wider range of species exploited as stocks of more valuable species have declined.

Pearl oysters: Western Vanua Levu, Beqa Is., Totoya Is., and Makogai Is. were chosen as survey sites for stocks of pearl oysters. Two species of commercial importance were noted, the black-lipped oyster *Pinctada margaritifera* (Fijian name *civa*) and the giant winged oyster *Pteria penguin* (Fijian name *melamela*). The abundance of *P. margaritifera* was low at all the survey sites, with parts of W. Vanua Levu having the highest densities. *P. penguin* could be considered locally abundant in W. Vanua Levu and parts of Totoya lagoon. Based on the survey results, present stock numbers of *P. margaritifera* were considered too low to support an expansion of pearl farming in the areas surveyed. (Passfield 1995)

Hard corals: The coral numbers estimated within the reef flat portion of one company's collecting area varied from 1,042,404 for *Mycedium elephantotus* to 73,300,336 colonies of *Acropora*. Comparing these field stock numbers with the numbers of corals exported provides a measure of the percentage of genera and species categories that are being removed. The amount of removal varied from 0.23% for *Tubipora musica* to 0.001% for *Porites spp.* Overall, the survey showed the percent of extraction with regard to colony numbers is 0.0085% of the total estimated colonies on the reef flat. This equates to 8.5 colonies being removed per 100,000. These figures are of a similar magnitude to from the survey of another company's collecting area and to the surveys done in 2002 and 2003. The total living coral cover reduced by coral collection is minimal. The total living coral cover in the collecting areas averaged 51% with 18% *Acropora* and 33% non-*Acropora*. The mean abiotic substrate was 49%. The maximum reduction of living coral cover removed due to one company's 2007 coral collection was 0.0014%. (Lovell and Whippy-Morris, 2008)

Giant bumphead parrotfish: A survey at several locations in remote islands of Fiji indicate that the giant humphead parrotfish has often been over-exploited to the point of local extinction. (Dulvy and Polunin, 2004)

Groupers: Although not formally compiled into a document, much research has been carried out on groupers in Fiji in the past decade, including obtaining data through interviews, miscellaneous reports and anecdotal information. This information indicates that a number of medium to larger size grouper species have undergone marked declines over the last several decades. This is reflected by reduced catches, including reduced catches from spawning aggregations, the loss of some aggregations entirely (such as that at Mali Passage), the scarcity of formerly abundant species such as *E. cyanopodus*, and the small sizes of some species being caught/sold. Fishing on aggregations, the sale of undersize fish and unrestricted exports (live/chilled) represent particularly acute threats for vulnerable grouper species. (Y.Sadovy, per.com.)

It is unclear why the assessment of coastal fishery resources dropped off so remarkably in the early 1990s. One explanation could be that such research actually took place but there was less attention to obtaining/preserving the survey reports. Other reasons could be a refocussing of research efforts of the then Fisheries Division on offshore fisheries, or an orientation to surveys that do not produce publically available reports (such as that for environmental impact statements), or the changing preferences of donors and academic institutions. There was also a considerable loss of, or turnover in staff, in the late 1980s.

In the early 2000s the Fisheries Department began a new wave of research: the marine resource inventory surveys (MRIS), which were undertaken at the qoliqoli level - and were not involved with producing national-level resource information but rather local inventories.

1.4.3 General Indications of Resource Status

With the scarcity of recent information on the status of specific coastal fishery resources, most understanding of the degree of exploitation of the resources is obtained from more general indications. Some of the more readily available references are presented here.

The IAS conducted a study in 2008/2009 of the finfish fishing of 46 villages in 22 districts of 10 provinces in Fiji involving 2,802 fishing trips and 11,340 catch records (Section 1.1 above). In one aspect of the study the percentage of fish in the catch smaller than the length

at first maturity was determined: emperors (74% of the combined catch of the villages consisted of immature fish), surgeonfish (19%), snapper (88%), tunas/mackerel (35%), mullets (15%), sweetlips (44%), and rabbitfish (43%). The large proportion of immature fish in the catch (especially for emperors which make up the largest share of the finfish catch) is taken as evidence of impaired capacity to reproduce, suggesting an over-exploited condition but may also be associated with gear selectivity (e.g. use of smaller mesh nets).

Some other general indicators of resource status are:

- Sumaila (2007) indicates that statistics of artisanal catches from 1996-2002 show a declining trend that is attributed to high fishing pressure.
- To date, 194 qoliquoli surveys have been completed by the Fisheries Department. Although the information from those surveys has not been analysed at a level higher than the individual qoliquoli, the researchers carrying out those surveys indicate that about 70% of the qoliquoli of Viti Levu and Vanua Levu are overfished (A.Batibasaga, per.comm.)
- With respect to inshore finfish, the Fiji Fishery Resource Profiles use a large number of references and state: "There is a general impression that the inshore fin-fish resources have been over-exploited, due to the dependence on it of an increasing population" (Richards 1994). Presumably that trend has continued in the 20 years since then.
- In the Asian Development Bank's study of Fiji's fisheries sector the fishery resource situation was reviewed. The report of the study stated: "Generally, areas that are not fully exploited are those where it is not economic to fish due to the distance from markets" (Hand et al., 2005).
- In 2006 the workshop "Reef fisheries: Now and for the Future" was held in Fiji as a collaborative effort between the Fiji Fisheries Department and the Society for the Conservation of Reef Fish Aggregations (Sadovy and Batibasaga, 2006). More than 50 participants from a wide range of communities from throughout Fiji were invited to represent their respective institutions and communities, and to bring their experiences and concerns to the meeting. One of the major conclusions of the workshop was "there was a broad consensus that there were widespread declines in Fiji's reef fisheries, with negative consequences for poverty alleviation, social stability and food security in coastal areas."
- If the data were available, it would be good to look at any change in trophic structure of the catch (e.g. herbivores, omnivores, higher level predators, etc.).

In the present study a large number of staff from the Fisheries Department, other government departments, NGOs, other agencies, and communities were interviewed. When questioned on the condition of inshore fisheries resources, the vast majority indicated there has been over-exploitation of the important resources.

To some degree the status of coastal fishery resources in neighbouring Pacific Island Countries is relevant to a discussion of the condition of Fiji's resources. In reviews of the status of coastal fishery resources across the region (SPC 2008, SPC 2013) it is concluded that current levels of fishing for reef resources in many locations is unsustainable.

1.4.4 Some Observations

From the sections above on the status of coastal resources in Fiji, a number of observations can be made. The most salient feature of the information presented is that it points to the fully or over-exploited condition of finfish and invertebrates in many areas in Fiji.

The fully/over exploited nature of many of the resources in the country offers insight into the on-going debate over the potential for continued development of the coastal fishery resources of the country (Box 2).

Box 2: Development Potential

There are two very different views on the development potential offered by coastal fisheries resources in Fiji:

- On one hand, some people feel that there are considerable under-exploited coastal fisheries resources, especially in the more isolated areas of the country and that the key to development is “unlocking” access to markets. There is also some feeling that new products and subsequently demand could be developed for species that are not presently utilized. Other individuals feel that by re-seeding over-exploited reefs or by the use of marine protected areas, coastal production can be increased.
- On the other hand, some people feel that Fiji’s coastal resources are either fully exploited or very much over-exploited. They point out that nowhere in the Pacific Islands can the relatively fragile coastal resources support major commercialization for extended periods and the fact that most studies looking specifically at coastal resources in Fiji have concluded that resource levels are declining. As far as unlocking markets, it is noted that recent studies of communities that are relatively isolated from markets show there is the perception of declining catches due to over-exploitation.

Source: ADB Fisheries Sector Review

It should be noted that, of the 74 stakeholders interviewed for the present study, very few people thought there are substantial under-exploited coastal fisheries resources in Fiji ripe for development by the Fisheries Department.

Leaving aside the question of whether the resources can sustainably support much additional harvesting, there is the view that any fisheries development projects for isolated locations (e.g. “bringing the markets to the fishers”) must be accompanied by management measures to prevent over-exploitation – something that has not been a feature of several past initiatives in Fiji.

In reviewing the Fiji situation (including information in the sections above) and the experience of neighbouring countries, an important feature is evident. In the long run, despite any increases in fish catches from niche opportunities, it is not likely that coastal fisheries production can increase markedly. SPC, with its vast experience researching coastal fisheries in the region, has made a similar statement:

Coastal fisheries are “mature” in fishery development terms, and the main focus with reef fisheries is on consolidation and protection of current benefits. If anything, the main prospects for economic and livelihood development from reef resources, over and above maintaining current levels of production, lie not in fisheries, but in tourism and other non-extractive uses. (SPC 2008)

The fact that there is little potential for expansion of coastal catches should not equate to less government backing. Substantial support in the form of fisheries management interventions by the Fisheries Department is required to maintain the (large) existing benefits from coastal resources. This presents a major challenge to the Fisheries Department: senior government leaders of the Ministry of Fisheries and Forests or higher level planners often liken coastal fisheries to agriculture in which through various interventions production can be increased. CCIF (2013) expresses the challenge in a slightly different form:

The political economy in Fiji ultimately favours the development of infrastructure for fisheries that aims to stimulate economic output. Clear arguments linking sustainable nearshore fisheries and coastal marine resource management to food security and rural livelihoods have yet to be made.

To summarize this discussion, the leading problem in coastal fisheries in Fiji appears to be over-exploitation of important resources, accompanied by rising threats from various sources - as judged by both research and opinions of informed stakeholders.

1.5 The Benefits from Coastal Fisheries in Fiji

The issue of benefits from fisheries to Pacific Island countries was the subject of a book by the Asian Development Bank in 2009 (Gillett 2009). The relevant benefits from coastal fisheries can largely be placed in four categories: contributions to GDP, employment, nutrition, and exports. Newer information for these four types of benefits than that given in the ADB study is generally not readily available for most benefit categories, and/or it is not partitioned so that the benefits from coastal fisheries can be distinguished from that of other fisheries.

Table 4 shows that the direct contribution of coastal commercial and subsistence fishing to the GDP of Fiji is about F\$73 million (US\$39 million) or almost eight times greater than from offshore fishing, and four times greater than offshore, freshwater, and aquaculture combined. Both in volume and in value, the production from Fiji's coastal fisheries is greater than that of any other Pacific Island country – with the exception of Papua New Guinea.

Table 4:
Fishing and Aquaculture Contribution to GDP⁷ in 2007

Harvest Sector	Value of catch (F\$)	Contribution to GDP (F\$)
Coastal Commercial	54,000,000	29,700,000
Coastal Subsistence	54,100,000	43,280,000
Offshore Locally-based	46,870,000	9,374,000
Freshwater	6,860,000	6,174,000
Aquaculture	2,799,000	1,399,500
Contribution to GDP	164,629,000	89,927,500

Starkhouse (2009) appears to be the most methodical study of employment in Fiji's coastal fisheries. That study estimates the number of (a) subsistence fishers in the country to be about 23,000, (b) full-time artisanal fishers to be about 5,000, and (c) part-time artisanal fishers to be 12,000. By contrast, an ADB study (Hand et al. 2005) estimated the number of subsistence fishers in Fiji to be "3,000 full-time equivalents" and the number employed in offshore fishing to be "510 full-time equivalents". If some assumptions are made about the data from the two sources (i.e. 3 part-time artisanal fishers equals one full-time equivalent, 23,000 part-time subsistence fishers equals 3,000 full-time equivalents), then there are (full time equivalents) 9,000 artisanal coastal fishers and 3,000 coastal subsistence fishers. These 12,000 people employed in coastal fishing represent over 23 times the number employed in offshore fishing and 1.5% of the total population.

Nutrition is an important aspect of the benefits from fisheries. The coastal commercial and subsistence fisheries produce about 27,000 tonnes of fish per year (Section 1.3). The amount of food produced in Fiji for domestic consumption is that amount, less the fish exports. The 2013 Annual Report of the Ministry of Fisheries and Forests gives "inshore commodity exports" but there appear to be major errors in the data (e.g. no food finfish

⁷ Valuation is done in accordance with the internationally standardized System of National Accounts which uses landed value or (for subsistence fisheries) imputed market prices less imputed costs to transportation to markets.

exports for any of the seven years covered). Alternatively, there are the export data from the Customs Department. That dataset is difficult to use for determining the exports from coastal fisheries due to the way exports are classified. For example, it is not possible to know whether such categories as “Other fish whole or in pieces prepared/preserved” are from coastal fisheries, offshore fisheries, or aquaculture. Nevertheless, examining the export data from a few years and making some educated guesses as to the composition of some of the export categories, a crude estimate of the amount of coastal fisheries production that is exported is about 2,500 tonnes annually in recent years. Subtracting this amount from the 27,000 tonnes of coastal fisheries production above gives about 24,500 tonnes for domestic consumption. Offshore tuna fishing produces about 12,000 tonnes of tuna and bycatch per year. Discussions with local tuna companies indicate that about 12.5% of the production from Fiji’s locally-based offshore fisheries is not exported, but marketed domestically (R.Dunham, D.Lucas, pers. comm.). From this information on coastal and offshore fisheries production that is consumed domestically, it can be seen that coastal fisheries produce more than 16 times the food for local consumption than the offshore fisheries. Aquaculture is often promoted by the Fisheries Department for food security purposes. The ADB study estimates that the amount of food produced by aquaculture in Fiji during the study year was 179 tonnes, or 0.7% of that of coastal fisheries. 179 tonnes equates to 0.19 kg per person per year for the Fiji population.

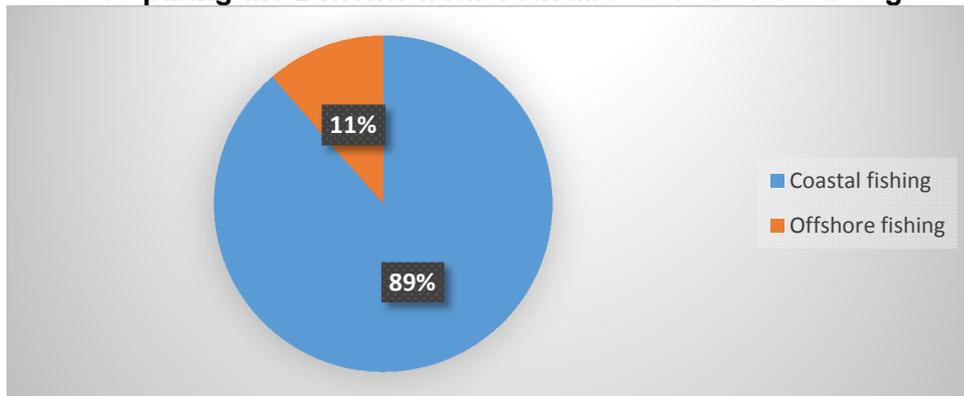
Determining the benefits from coastal fisheries in terms of exports is difficult – because of the above mentioned errors in the Fisheries Department export reports and the categories of the Customs Department data. Numerous (possibly dubious) assumptions must be made to get even a crude idea of the value of exported coastal fishery products. The following information is relevant to making an estimate.

- According to Customs Department data, in 2007 and 2008 Fiji exported about F\$93.5 million and F\$134.8 million worth of fishery products, respectively. These are the last years for which export data are available in the Ministry of Fisheries and Forestry annual reports.
- According to the annual reports, exports of aquaculture products (mostly pearls but some seaweed) are about F\$1.6 million annually in recent years.
- Inspection of the Customs Department data shows that exports of offshore products were about F\$67 million and F\$87 million in 2007 and 2008, respectively.

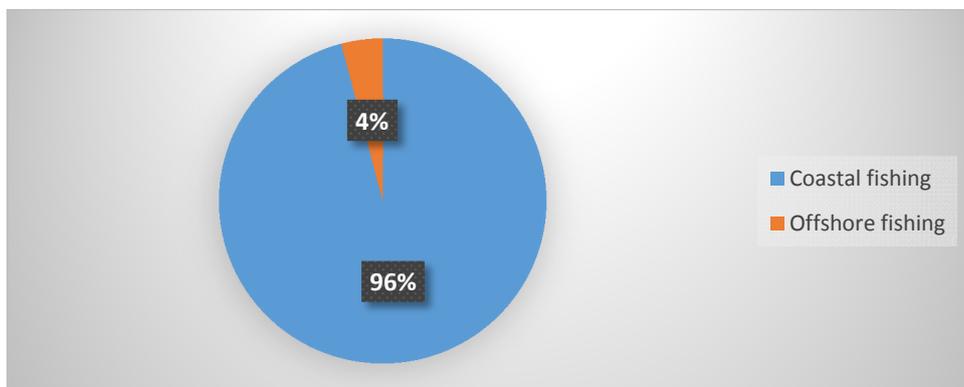
From the above information, it appears that in 2007 and 2008 the value of coastal fishery product exports was about F\$25 million and F\$46 million, respectively. It should be stressed that due to the problems with the data, these amounts do not have much credibility – but are given for indicative purposes.

Figure 2 compares the four types of fishery benefits above (contribution to GDP, employment, nutrition, exports) between coastal and offshore fisheries – with the objective of showing the relative importance of the two fisheries. Data are from the ADB study (Gillett 2009). It appears that for the types of benefits that touch the lives of ordinary people in Fiji, coastal fisheries are relatively very important.

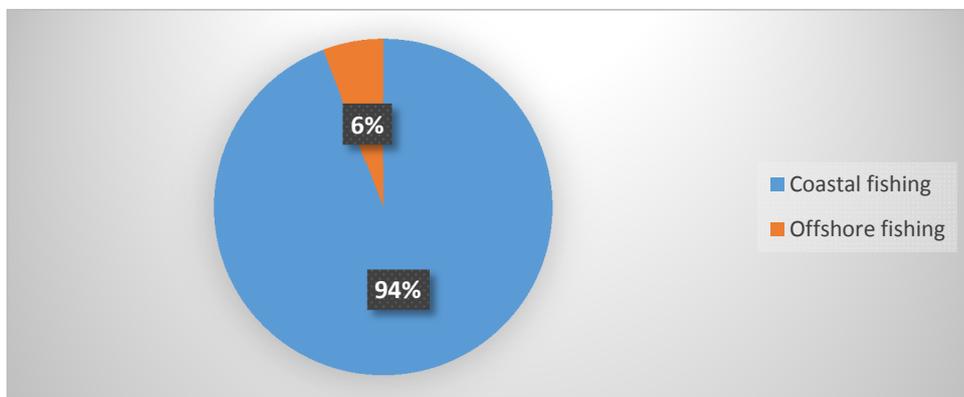
**Figure 2:
Comparing the Benefits from Coastal and Offshore Fishing**



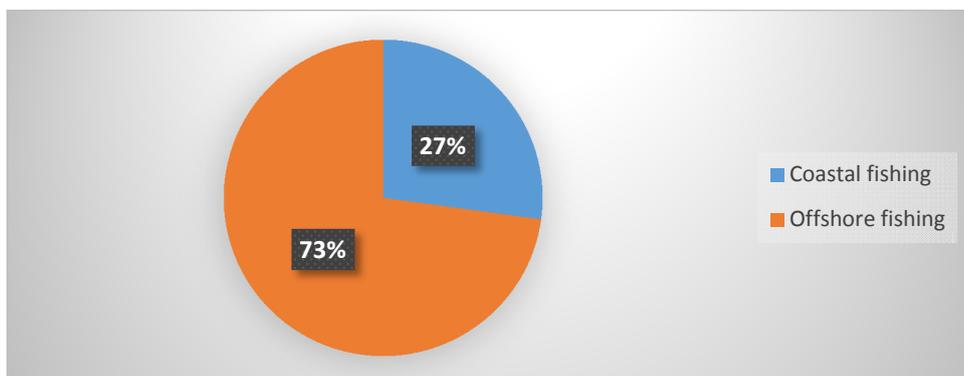
Contribution to GDP



Contribution to Employment



Contribution to Nutrition



Contribution to Exports

There are other types of benefits from fisheries. Contribution to government revenue is one, but with the information available it is not possible to determine for the different categories of Fisheries Department income what is a net gain in revenue income and what is a reimbursement for a service.

There are also types of benefits from fishing in Fiji that are difficult to quantify. For example, recreational and social values are associated with various types of coastal fishing activity – but it is not possible to easily assign a monetary value.

The above discussion deals with benefits from fishing activity, but also to be considered are the benefits obtained from the coastal ecosystem which provides a variety of goods and services. There have only been a few studies in Fiji that have attempted to quantify the value of those services at specific sites (e.g. O'Garra 2011, Pascal and Seidl 2013) but none have attempted to do so across the whole country. Taking the O'Garra study:

An estimate was made of the economic value of the main goods and services provided by the coastal ecosystems of Navakavu, a traditional Fijian fishing ground near Suva. The value of fisheries, bequest value and the coastal protection function provided by the coral reefs and mangroves within this area are estimated to provide net benefits of just over F\$3 million (US\$1,795,000) per year. The coastal protection provided by the coral reefs and mangroves makes up the largest component of the total economic value (55%) followed by fisheries (44%) and bequest value (1%), the latter being the value attached to preserving an ecosystem for use by future generations.

1.6 The Future of Fiji's Coastal Fisheries: likely changes

Predicting the future is inherently difficult. For Fiji's coastal fisheries, probably the best that can be done is to project some of the current trends into the future – but this involves much uncertainty.

SPC recently commissioned a study on the long-term future of Pacific Island fisheries (Gillett and Cartwright, 2010). In this section some of the relevant information from that study is presented, followed by some fisheries-relevant information on climate change, and then some Fiji-specific considerations on the future.

1.6.1 The SPC Study on the Future of Pacific Island Fisheries

The SPC study considers the future of fisheries over a 25-year timeframe (2010-2035). It examines the main types of fisheries (i.e. coastal, offshore, freshwater, aquaculture), but has special relevance to the likely future changes in coastal fisheries.

The study identifies the major drivers of change in coastal fisheries:

- **Population and urbanisation:** With a large population increase in the next 25 years, there is likely to be a growing gap between what coastal fisheries can produce and the demand for production from coastal fisheries. Urbanisation will exacerbate the situation.
- **Overfishing:** Inability to control fishing effort, especially on high value species and in areas close to urban centres.
- **Ineffective management processes:** Centrally-based management of most coastal resources is ineffective, and lower levels of management often suffer from lack of technical knowledge and/or legal foundations. Situations of massive over-fishing near urban areas are often not amenable to fisheries management solutions. There is near-insatiable demand for some inshore commodities from rapid growing Asian economies which is often matched with a low conservation ethic leading to depletion of key species.

- **Fisheries governance:** Low priority for government fisheries agencies to address threats to coastal fisheries. In general, quality of management is far better for offshore fisheries than for coastal fisheries.
- **Development challenges:** Perception by government of the potential for economic development vs. the reality of limited available resources. Inability of most coastal resources to support fisheries for both domestic consumption and for export. Development activities could lead to local area depletions that threaten the supply of marine foods to adjacent villages.
- **Other challenges/threats outside the fisheries sector:** Habitat destruction, pollution, and siltation. Increased pressure to reduce the negative impacts of fisheries on tourism. On the horizon are problems with effects of climate change and associated sea level rise and possible impacts of ocean acidification

It is likely that many of the current trends in the condition of coastal resources will continue into the future. Although any such forecasts are quite speculative, some insight may be obtained by projecting three of the major current trends into the future in three specific areas: (1) overexploitation near urban areas, (2) overexploitation of export invertebrates, and (3) reduction in abundance of resources due to degradation of coastal habitat.

The degree of exploitation of coastal finfish and edible invertebrates is generally related to the distance to urban areas, or more precisely the range of vessels that feed into urban markets. In the future because small towns will evolve into urban areas, and because higher prices and improved technology will allow fishing vessels to range further, the condition of coastal fishery resources that are used for domestic consumption will deteriorate in ever-growing areas of the coasts around cities. In those areas:

- Catch per unit effort will fall and sizes of individual fish will get smaller as biological limits for target species are approached. As biological limits are surpassed, total production will fall.
- Larger and more sought-after species will decline to the point of local extinction – as has already occurred to the humphead wrasse and some species of giant clams. The impending disappearance of the larger iconic species has implications for recreational dive tourism.
- While coastal commercial fisheries can range further afield, the fisheries resources available to the relatively sedentary urban subsistence fishers will fall remarkably in terms of catches and desirability of species. Catches are increasingly likely to be dominated by herbivores as coral reefs are degraded by more intense land use and climate change and the important reef /tidal flat gleaning activities will be disrupted.
- The declining resource condition of species used for domestic purposes will be exacerbated where exports of those same species occur.

The products of much of the commercial invertebrate fishing are non-perishable exports (e.g. beche de mer, trochus). This non-perishable nature of the products dictates that not even remote areas are insulated from over-fishing. Extensive field research by SPC shows that most sites surveyed in the Pacific Islands are currently “seriously depleted of commercial invertebrate resources” (SPC 2008). There are indications that this trend will continue and the abundance of these resources will decline further, with some local extinctions likely without management action.

- Many of the invertebrate exports are in high demand in Asia, especially China. In normal circumstances economics compel fishermen to switch gear or locations before the resource population nears local extinction. In the future, an increasingly high export value will be placed on many coastal resources by Asian economies which will encourage effort, often after the targeted species is too rare to sustain a viable reproductive population (Birkeland 1997).

- Given the probable declining state of the economies of many countries of the region (as discussed in the SPC study of the long-term future of Pacific Island fisheries), in the future there will be greater numbers of people without jobs or access to remittances who will be seeking income and food from harvesting coastal resources. Unlike the situation for coastal finfish, increasing pressure on non-perishable resources and subsequent declines will occur country-wide and the effects on coastal communities will be far reaching.

A third major trend affecting the condition of coastal fishery resources is the reduction of their abundance due to degradation of coastal habitat. This occurs by destructive fishing practices, pollution, siltation from mining/logging/agriculture/dredging, mangrove clearing, reclamation and competing uses of the coastal zone. The resulting problems will be exacerbated by climate change, particularly where coastal fisheries depend heavily on coral reefs.

With respect to coastal fisheries, the SPC study on the future of fisheries concluded: "In the future there will be an increasing number of Pacific Islanders eating a reduced amount of domestically produced fish – a situation caused by population, fisheries productivity, urbanization, climate change, and lack of effective management."

1.6.2 The Impacts of Climate Change

The build-up of carbon dioxide and other greenhouse gases in the atmosphere due to human activities is acting in two major ways that will ultimately affect fisheries in the Pacific: global warming and ocean acidification. There is broad concern around the world about the impacts on fisheries of these changes. Preliminary assessments indicate that the coastal and offshore fisheries of the Pacific Islands, including Fiji, will be as equally subjected to the direct and indirect effects of climate change as comparable areas elsewhere in the world. An extensive study of the impacts in the region was carried out by SPC: "Vulnerability of Pacific Fisheries and Aquaculture to Climate Change" (Bell et al. 2011) which added considerably to the understanding of the situation.

More recently SPC issued policy briefs (SPC 2012, SPC 2014) which summarize the causes and impacts of climate change on coastal and on offshore fisheries in the region. For coastal fisheries there are likely to be warmer air and sea surface temperatures, ocean acidification, rising sea levels and higher rainfall. These changes are expected to cause significant losses of the coral reef, mangrove, seagrass and intertidal habitats that provide shelter and food for coastal fish and shellfish. This is expected to cause progressive reductions in the productivity of coastal fisheries. SPC makes a range of suggestions for mitigating the threats from climate change to coastal fisheries:

Manage and restore vegetation in catchments, foster the care of coastal fish habitats, provide for landward migration of coastal fish habitats, sustain production of bottom-dwelling fish and shellfish, diversify catches of bottom-dwelling fish and shellfish (i.e. catching fish and shellfish in proportion to their altered abundance under climate change), increase access to tuna for coastal communities, develop coastal fisheries for small pelagic species, and improve post-harvest methods.

In examining the above threat reduction suggestions, it can be seen that most of them are actions that should be taken to maintain healthy fisheries even if there were to be no climate change. This is consistent with a statement on climate change by the then head of the SPC fisheries programs "The best strategy is to get fisheries in the region in the best possible shape to cope with the stresses coming our way..." (M.Batty, quoted in PNC 2012).

1.6.3 Fiji Coastal Fisheries in the Future

In Section 1.6.1 above, population and urbanization are shown to be major factors influencing coastal fisheries – and there are enough data available in the Fiji case to speculate on their future impact. The results from the latest Fiji national census show a population of 837,271 in 2007. Projections by SPC indicate that the population of the country will increase to 936,200 in 2030. Currently the country is 56.1% urbanized, and this is expected to rise to 64.4% in 2030. These data indicate significantly more people will be crowded into growing cities.

These increases in population and urbanization in Fiji are likely to lead to the following fisheries impacts:

- The production from coastal fisheries that are accessible to urban residents will probably decline to over-exploitation and habitat destruction.
- There will be an increase in overfishing conditions due to expanding urban populations fishing intensively close to those populations.
- A growing number of people in the cities will result in a higher proportion of the population not being able to catch sufficient fish to provide for household consumption.
- Many of the above points will contribute to more expensive fish and the incentive for members of poorer households to go fishing and exacerbate the problem.

The above sections indicate that in the future the benefits that flow from coastal fisheries will be negatively affected. It appears that the most crucial impact with respect to the future of Fiji's coastal fisheries concerns food. SPC has carried out a very large amount of research on the productivity of coastal areas in the region and has combined some of the results with data from the SPC's demography work. Table 5 (from SPC 2008) shows the expected capacity of sustainable production from coastal fisheries to meet forecast needs for fish in Pacific Island countries and territories, based on predicted population growth and estimated sustainable catches of 3 tonnes per square kilometre of coral reef per year.

Table 5: Capacity of Coastal Fisheries to Meet Forecast Needs for Fish

Sustainable production from Coastal Fisheries <u>EXPECTED</u> to meet future needs	Sustainable production from Coastal Fisheries <u>NOT EXPECTED</u> to meet future needs	Sustainable production from Coastal Fisheries <u>ADEQUATE</u> but distribution difficult
Cook Islands Marshall Islands New Caledonia Palau Pitcairn Tokelau	American Samoa CNMI Fiji Nauru Niue PNG Samoa Solomon Islands Vanuatu Wallis and Futuna	Kiribati FSM French Polynesia Tonga Tuvalu

Source: SPC (2008)

Quite simply, the production Fiji's coastal fisheries will not be able to meet future needs. This shortfall can be reduced by effective fisheries management, including interventions at the national and community levels. On the other hand, efforts to increase production that are based on resources that are over-exploited would be counter-productive – and the amount of fish produced would fall even further.

1.7 The Fiji Fisheries Department

In this section various aspects of the Fisheries Department are examined, with an emphasis on those factors that may affect the Department's effectiveness in coastal fisheries. From the resources section above (Section 1.4 above) one of the most important issues in coastal fisheries is over-exploitation of resources. Accordingly, special attention is paid below to the Fisheries Department's interaction with coastal fisheries management. There is also some emphasis on topics that are not immediately apparent to fisheries stakeholders from outside the Department.

1.7.1 History

The British Colonial Office sponsored a visit of the fisheries specialist James Hornell to Fiji in 1939 to make recommendations on the development and protection of fisheries. He commented that "fisheries was looked after by no government officer and no person was deputed to see the enforcement of the few fisheries regulations which are on the Statute Book". He recommended a fisheries service within the Department of Agriculture consisting of a Superintendent of Fisheries, three Fisheries Officers and a clerk/statistician, assisted by "trustworthy persons" to collect statistics (Hornell 1940). H. Van Pel of the South Pacific Commission visited Fiji in 1954 and recommended the establishment of a fisheries service within the Department of Agriculture, staffed by a biologist, a technical fisheries officer, and three local assistant fisheries officers (Van Pel 1954). In the mid-1960s a single fisheries officer position was created within the Department of Agriculture and in the late 1960s a Fisheries Division was organized to be located in the new Ministry of Agriculture and Fisheries. That ministry became the Ministry of Primary Industries in 1985 and in 1994 it was re-named the Ministry of Agriculture, Fisheries and Forests. In 2001 Fisheries became a Department within the new Ministry of Fisheries and Forest.

1.7.2 The Structure and Role of the Ministry of Fisheries and Forests

The Ministry of Fisheries and Forests is headed by a Minister who was appointed in mid-September 2014. The ranking civil servants in the ministry are the Permanent Secretary and the Deputy Permanent Secretary. Historically, few Ministers or Permanent Secretaries have had technical backgrounds in fisheries prior to their association with the ministry responsible for the fisheries sector. This is not an unusual situation in Pacific fisheries departments.

The Department of Fisheries has six functional activities namely: General Administration, Offshore Fisheries Management, Research and Development, Aquaculture, Extension and Advisory Services, and Fleet and Technical Services. According to the 2013 Annual Report, these six functions are "divisionalized" geographically into its four operation centres - Central, Eastern, Western and Northern.

Some important fisheries-related functions occur in the Ministry of Fisheries and Forest but outside the Fisheries Department. The Economic Planning Division is charged *inter alia* with the formulation/analysis/review of current and proposed policies for the development and management of fisheries, compilation of fisheries statistics, monitoring/evaluation of fisheries projects, facilitating fisheries stakeholder consultations, and production of the annual report.

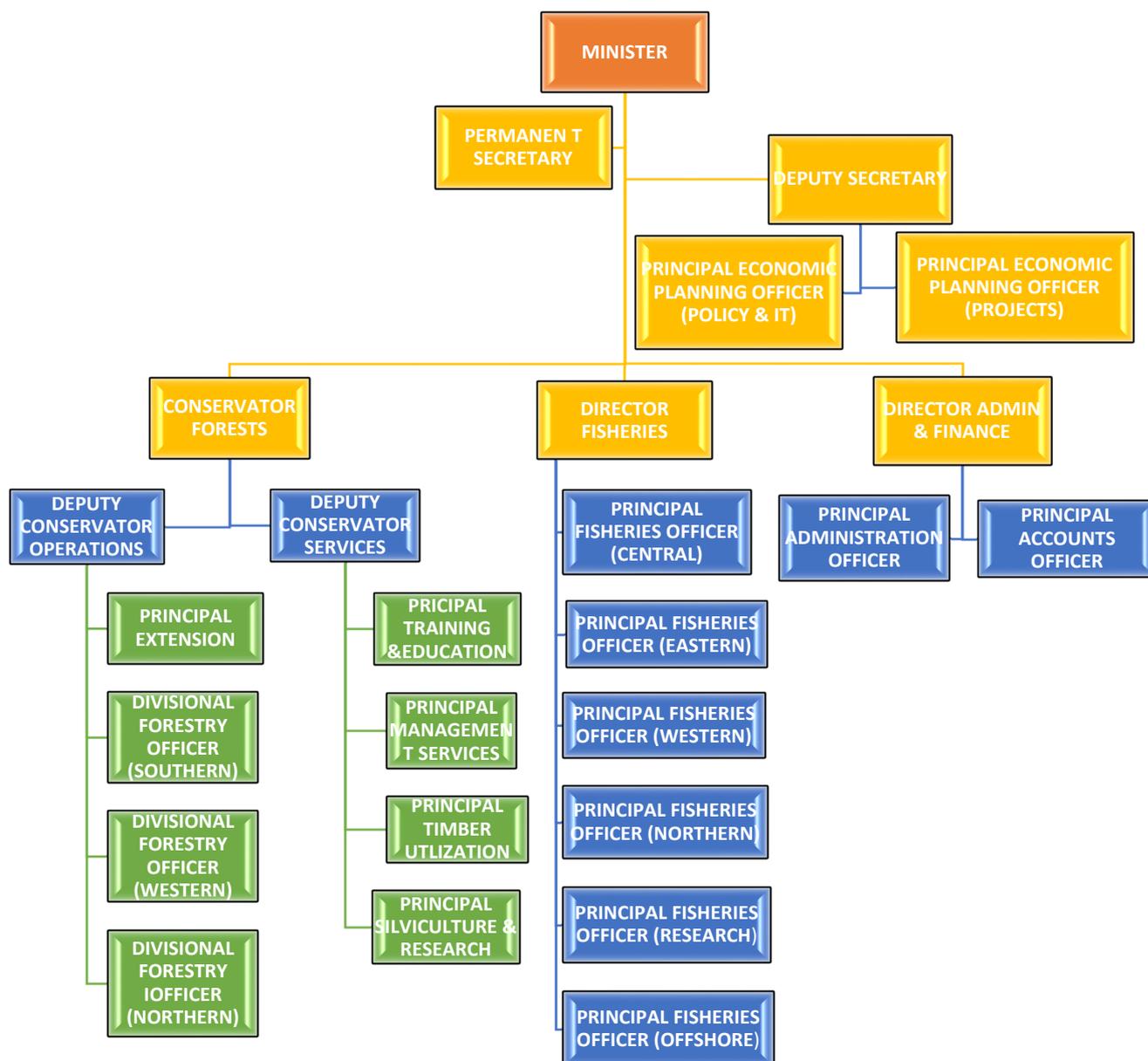
According to the Ministry's 2014 Annual Corporate Plan (ACP), the role of the Fisheries Department is to:

- Administer and enforce fisheries legislation
- Ensure conservation, sustainable utilization and management of fisheries resources
- Approve and issue fisheries-related licenses
- Provide training, extension services and research
- Coordination with key stakeholders including fisheries resource owners

- Alignment of fisheries related activities to international, regional and national standards

There is very limited reference in the Ministry's Annual Corporate Plan to coastal fisheries management target outcomes (e.g. those that addressing overfishing), or meaningful performance indicators, despite a key pillar of the Plan being to "Achieve Higher Economic Growth While Ensuring Sustainability". This is surprising, given the widespread appreciation of over-exploitation of coastal fisheries resources discussed in Section 1.4 above.

Figure 3: The Organization of the Ministry of Fisheries and Forests



1.7.3 Staffing

Information on staff numbers as given in the 2014 government budget is shown in Table 6.

Table 6: Staffing Numbers by Functional Activity

Functional activity	Established staff (filled)	Established staff (total positions)	Government wage earners (filled)	Government wage earners (total positions)
General Administration	18	18	14	14
Offshore Fisheries Management	33	57	1	1
Research, Resource Assessment and Development	13	14	12	12
Fleet and Technical Services	28	41	4	4
Extension and Advisory Services	30	30	3	3
Aquaculture	15	15	11	11
TOTAL	137	175	45	45

Source: 2014 budget

In addition to the above staff, there are “project officers”. The 2013 Annual Report of the ministry indicates that 119 project officers worked in the Fisheries Department in that year. The Ministry of Fisheries and Forests Planning Division staff indicate that in October 2014 there were about 100 project officer positions in the Fisheries Department, of which 95 were filled. Therefore the staffing of the Fisheries Department (including established staff, government wage earners, and project staff) was about 277 people in late 2014.

In terms of staff at the divisional level, information on staffing numbers was obtained from the four division heads. About 70 Fisheries Department staff are located in Lami, the headquarters of the Eastern Division – but this includes some staff with national responsibilities (e.g. research, aquaculture). The Western Division has 39 staff, the Central Division 22, and the Northern 42.

The Offshore Fisheries Management Division of the Fisheries Department is responsible for the management of the tuna fisheries and related activities. That division has 53 personnel, of which 49 are technical officers, and 4 are under administration. In addition to this, there are 26 staff that come under the Regional Observer Program and 2 SPC funded project officers (OFD 2014). By contrast there is no division dedicated to coastal fisheries management, but rather responsibilities and staff related to coastal fisheries management are spread across most of the technical divisions and across the four geographic divisions.

Although the Department is deeply involved in coastal fisheries, the key issue is the focus and nature of the work, specifically the attention given to management.

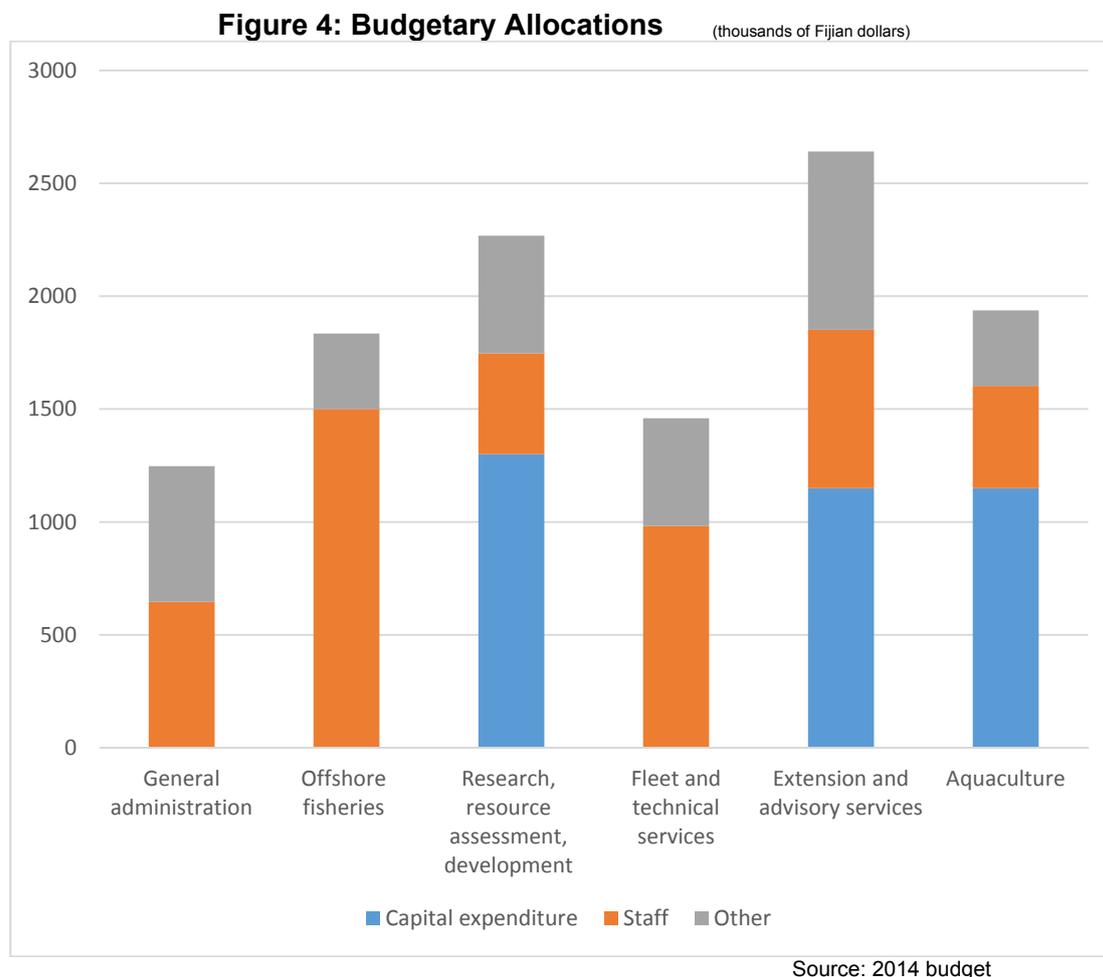
1.7.4 Infrastructure

The Fisheries Department maintains four divisional offices: Eastern (Lami), Central (Nausori), Western (Lautoka), and Northern (Labasa), plus several smaller offices around the country. According to the 2013 Annual Report, there are a total of 23 fisheries stations nationwide. The Department has 19 ice plants (3 in Lautoka alone), including those at the rural fisheries service centres. Two sea-going vessels are also operated by the Fisheries

Department: the Tui ni Wasabula (over 30 years old) and the larger Bai ni Takali (arrived in 2010).

1.7.5 Budget

The 2014 budgetary allocations for the six functional activities are given in Figure 4.



The staff category in the figure above does not include project workers. Items under “capital expenditure” in 2014 include the Marine Resource Inventory Survey (\$500,000) and rehabilitation of the Makogai Mariculture Centre (\$200,000).

According to the Director of Fisheries and the staff of the Planning Division of the Ministry, preparation of the Fisheries Department budget begins mid-year. The budget has two components: (1) the operational budget which is focussed on the six functional activities, and (2) the public sector program, the development of which is coordinated with the Ministry of Rural and Maritime Development. In general, the operational budget flows from the work plans. In practice, the allocation from the previous year for each activity is scrutinised in light of any changes in the work plan. Much of this is determined in July each year during meetings of the Director of Fisheries, Principal Fisheries Officers, other heads of the four divisions, project managers, Principal Accountant, and staff of the Planning Division, under the general direction and approval of the Permanent Secretary and Deputy Permanent Secretary. The submission is sent to the Ministry of Finance, which may approve, give a qualified approval, or reject the submission – with the final approval by Cabinet.

Three aspects of the budgetary process deserve some additional mention:

- Stakeholder input is not a prominent feature of the process (i.e. opportunity for formal input is limited). Staff of the Planning Division state that the private sector is invited by the Ministry of Finance by advertisement to make submissions, but this is apparently only for duty concessions.
- The incorporation of major new types of activities or a change of focus does not originate from officers of the Fisheries Department, but rather from senior levels of the Ministry or higher.
- It is difficult to isolate the coastal component of the budget, which is likely to be substantial, and harder still the coastal management component.

1.7.6 Evolution of Structure and Function of the Fisheries Department

Three decades ago the structure of the Fisheries Division (according to the 1986 Annual Report) consisted of: Administration, Technical Services, Extension Services, Resource Assessment and Development (with a sub-section on Aquaculture). Today the functional activities of the Fisheries Department are virtually unchanged with the exception of the creation of the Offshore Fisheries Management Division. Although numerous changes affecting fisheries have taken place in Fiji since the mid-1980s (e.g. expanding population, increase in coastal fishing pressure, degradation of some coastal marine habitats), there has not been a corresponding change in the major focus of the Fisheries Division/Department, as reflected in the groups of activities.

Another aspect of the evolution of the Fisheries Department is de-centralisation to the divisions. An initiative to de-centralize tasks commenced in the mid-2000s. The general idea was to create “mini fisheries departments” in the four divisions, with a broader range of services than currently existed - such as fisheries extension, enforcement, research/assessment, and aquaculture. Apparently, there were some difficulties with the practical aspects of this de-centralisation - and aquaculture and research/assessment have largely been re-based in Lami. An important issue is whether the activities that have been de-centralised have sufficiently qualified staff at the divisional level.

1.7.7 Development vs. Management Functions of the Fisheries Department

The vast majority of staff of the Fisheries Department and other stakeholders interviewed during the present study felt that over-exploitation of coastal fisheries resources is the major threat to fisheries in the country. The enthusiasm of the Fisheries Department for addressing this threat has had its ups/downs over the years. The balance between promoting fisheries production and concern with over-exploitation can be seen in the tone of the annual reports.

- The 1970s and 1980s were indisputably a period of focus on increasing production from coastal fisheries and surveys of potentially new resources. The 1979 Annual Report states: “In addition to excellent resources of tuna, rural and subsistence production can be greatly increased, resulting in greater supplies of fish for local consumption and for export”. The 1986 Annual Report states: “the main thrust of government policy during this period was to encourage fisheries development for subsistence, commercial and industrial purposes.”
- The 1998 Annual Report states: “...Emphasis must now be placed on sustainability and conservation. The Division had previously had its direction focused towards production to increase protein supply at lower cost to urban consumers, but is now forced to consider management/conservation”

- 2013 Annual Report: “Assistance was given to the local fishing industry in terms of boats and engines to encourage more fishing and utilize the big demand for fresh fish in Viti Levu”.

1.7.8 Work on Coastal Fisheries Management

The Fisheries Department’s 2014 Annual Business Plan highlights four areas of involvement with coastal fisheries management:

- Formulation of qoliqoli profiles (26 profile reports) and management plans (15 developed)
- Establishment of MPAs (4 MPAs to be gazetted)
- Re-seeding of MPAs (20 sites to be identified)

In addition to the above work, there appears to be other Department involvement in coastal fisheries management (*but could be considered management-related only if certain conditions are fulfilled*):

- The licensing of commercial fishers (*if the number of licenses is related to predicted catch and resource levels*)
- Market surveys (*if the production estimates are reasonably good and if they are used for fisheries management decisions*)
- The administration of a system of permits for exports (*if the number of permits granted is related to resource levels or if export information is used for fisheries management decisions*)
- Enforcement of the Fisheries Act and regulations (*if this is rigorous enough to be a real deterrent*)

Some important issues related to the Department’s coastal fisheries management are the heavy reliance on reef re-seeding, the effectiveness of alternative activities as a management tool, the attention given to enforcing management rules, and the status of fisheries statistics.

1.7.9 The Department’s Work in Coastal Fisheries in the Field

As much of the work of the Department in coastal fisheries occurs in the smaller fisheries stations spread across the country, attempts were made to determine the major activity in some of those small stations. The officers-in-charge of Kavala, Savusavu, Wainikoro⁸, and Lakeba were questioned as to the importance of the various activities of the stations. According to those people, in terms of partitioning the time of the officer and his staff:

- The production/sale of ice and the provision of advice on aquaculture are generally the most significant.
- Other activities (in generally decreasing order of importance) are licensing, responding to public enquiries, attending district and provincial meetings, law enforcement, commenting on loan applications, spat collection, market surveying, and giving advice on MPAs.

1.7.10 The Marine Resource Inventory Survey

Staff of the Fisheries Department indicate that the marine resource inventories are a major contribution of the Department to coastal fisheries management. As the survey has been going on for over a decade with a large budget each year (F\$500,000 for 2014), it is indeed

⁸ The officer-in-charge of Wainikoro is the sole Fisheries Department employee at that location and is involved exclusively with the sale of ice, and to a lesser extent the sale of fishing gear and repair of outboard engines.

a very large activity. According to Department staff, surveys have been completed for 194 qoliqoli.

The origins of the survey, as given in the Fisheries Department 2002 Annual report are:

“Fiji has a total of 410 fishing grounds or qoliqoli, which is currently managed by the state, but of which total ownership is to be given back to the indigenous communities (in a few years), as this is a policy directive put in place by the present SDL government. Government, however, would not immediately handover the ownership unless fisheries resources surveys are undertaken to determine the resource status of each qoliqoli, which would assist in the development of a management plan for each area.” This basic reason for the surveys appears to be no longer relevant, but survey objectives have not been redefined.

The survey appears to be quite controversial. Many senior staff of the Department defend the concept on the grounds that baseline information is essential for effective fisheries management, there is a need for information all across Fiji, and without such surveys there is virtually no information available for most of the qoliqoli. Many stakeholders outside the Department (especially in the NGO community) have questioned the value of the survey, which can be broadly placed in two categories:

- The process: Are the site surveys statistically significant? Can the stated conclusions be made from the data? Has the methodology been externally reviewed? Are the reports well-written and publically available? Are the reports/data well-stored and likely to be available decades from now?
- The concept: Is baseline information useful for the type of management likely to be carried out by the communities? Is there a relationship between the information collected/presented and the management plans produced by the surveys? Are there more useful types of information for management that can be collected?

1.7.11 Offshore vs Coastal

One notable feature of the Fisheries Department is the different amount of attention focussed on coastal fisheries relative to offshore fisheries. This is shown in Table 7.

Table 7: Offshore versus Coastal: The Fisheries Department's Involvement

Feature	Offshore	Coastal
Statistics	Well trained staff; Very organized collection, analysis and reporting of information on catches. Very good idea of catch levels of target species and bycatch – and readily available on the internet. SPC provides excellent technical back-up. FFA has assisted with database development.	Statistical system has broken down. No enumerator in the Central Division for 3 years. Different systems for the 4 divisions; One junior staff at HQ with no statistical expertise is in charge of compiling statistics from the 4 divisions. Little technical expertise provided by the regional organisations. Estimates of catch levels by both subsistence and commercial fishing are largely guesswork.
Surveillance and enforcement	Enforcement section created and strongly supported. The 2013 Annual report states “Cabinet endorsement of additional 25 staff for the Offshore Fisheries Division to administer the Offshore Fisheries Management Decree”. All vessels required to have electronic vessel monitoring system onboard and operational. Periodic sea patrols with Navy. Well trained and staffed on-board observer program, currently trialing video observing. FFA provides technical back-up and observer training.	Lack of enforcement has a greater impact on benefits of coastal fisheries than offshore. HQ enforcement section disbanded in 2006. Most people responsible for MCS at divisional level have little/no background in MCS. For example, the person in charge of MCS for an entire division did not know about the humphead wrasse ban or the trochus size limits. Scarce assets for patrolling. Navy reports little proactivity by Fisheries Dept for coastal patrolling. Fish warden system only loosely administered by Fisheries Department: most divisions have no listing of current wardens; There is no system for de-listing wardens (death, emigration), maintaining records of training received, or distributing to the wardens any changes in regulations.
Prosecution of offences	Considerable skill exists. For example, 4 individuals (Fisheries Dept and police) attended 3 week workshop in 2014 on Fisheries Evidence and Investigation for offshore fisheries.	Both Fisheries Department staff and police are poorly trained in prosecution. Few successful prosecutions of coastal fisheries offenses. As a result, violators mostly just given a warning.
Consultation with stakeholders	There was significant formal consultation with stakeholders in formulating the national tuna management plan. The National Fisheries Council meetings were strongly offshore oriented. Periodic meetings with offshore stakeholders are organised by Fisheries Dept on important issues.	Coastal fisheries dropped out of the agenda of the meetings of the National Fisheries Council a few years ago. Formal consultation with coastal fisheries stakeholders not perceived by Fisheries Dept as a priority.
Publicly available reports	At least one formally published paper per year. For example, OFD (2014). Information of Fisheries, Research and Statistics for 2013 in Fiji. Offshore Fisheries Division, Fisheries Dept plus two reports to WCPFC (Parts 1, 2)	No readily available reports in public domain for many years. Although the Marine Resource Inventory Program has produced over a hundred reports, according to staff of that program, all remain in draft form and none are publicly available.
Management plans and policy guidelines	Tuna management plans periodically formulated and regularly updated. National Plan of Action - Sharks formulated and approved. Decree promulgated and adopted	Currently no fisheries management plans in place. A beche de mer management plan by SPC for Fiji has been in the formulation process for a very long time – and is awaiting feedback from the Fisheries Dept. Plans or guidelines for trochus, aquarium fish, and deepwater bottomfish have faded away. Decree in preparation/delayed
Strategy for management of fisheries resources	Well organized strategy that is articulated in the national tuna management plan.	The strategy is not clear. In the Department's 2014 Business Plan the objective of “fisheries conservation” is to be obtained by a strategy of using MPAs, but in reality the strategy appears to consist of attempts at encouraging community management plans, (fairly weak) enforcement of provisions in the Fisheries Act and regulations, some MPAs, and some reef re-seeding. A recent report stated: “There is no inshore fisheries policy or clear institutional strategy for inshore fisheries management support” (Govan et al. 2013).
Involvement of NGOs	Minimal. WWF has expressed interest but the Offshore Division is wary of the situation in coastal fisheries. Greater NGO involvement at regional level	A very large number of NGOs involved in community level management of coastal fisheries. There is a common view that at least some of the legitimate role of the Fisheries Department has been taken over by NGOs.

A prominent feature of the above table is that the Fisheries Department focuses significantly more attention on offshore fisheries management than on coastal fisheries management. The relatively small orientation to coastal fisheries management is surprising, considering that from several perspectives coastal fisheries produce more benefits to Fiji than the offshore fisheries (Section 1.5 and Figure 2). One possible reason for why this situation came to be is that an Offshore Fisheries Management Division was created in the Fisheries Department several years ago, whereas coastal management responsibilities have never been consolidated into a division with staff to ensure that the various activities receive adequate attention. Fiji's membership of the Western and Central Pacific Fisheries Commission (and the associated obligations) has also placed a requirement on the Fisheries

Department to focus more on offshore fisheries, including legislative/regulatory change, reporting requirements and other Commission-associated obligations.

1.7.12 Past Reviews Relevant to the Fisheries Department

There have been a number of external reviews of Fiji's fisheries sector over the years, several of which contain suggestions for enhancing the Fisheries Department's involvement with coastal fisheries. Of the reviews that are readily available, several are critical examinations of the situation and are especially relevant to the present study. These are the World Bank's review of fisheries in the Pacific in 1995, the "Voices from the Village" survey in 1999, the Asian Development Bank's review of the fisheries sector in Fiji in 2005, an assessment by Conservation and Community Investment Forum in 2013, a strategic examination of inshore fisheries policies and strategies in Fiji for the Melanesian Spearhead Group in 2013, and a ministerial declaration in 2014. Summaries of the relevant points of those reports are given in Appendix 2. Other reviews of the fisheries sector and its governance in Fiji were examined during the present project, but are not included in the appendix: Kailola (1995), Pita (1996), and Functional Review Team (2011). The former two are somewhat out of date, while the latter is marked as a confidential document.

Although those reports are from very different perspectives, common themes emerge from several of the reports:

- The most common theme in the reviews is the concept that the Fisheries Department's involvement in coastal fisheries management is minimal, that the involvement that currently exists is not very effective, and that the Department should have a much greater focus on coastal fisheries management.
- There are no recommendations for the Fisheries Department to promote increased exploitation of coastal resources, there is no mention of large underexploited coastal resources ripe for development by the Department, and there is no support for further government involvement in such activities as gear development and ice making.
- In general, the reviews observe that the Fisheries Department has considerably more enthusiasm for increasing fishery production from coastal areas, than for management interventions to protect over-exploited resources. This is summed up by the ADB Fiji Fisheries Sector Review: "Our greatest concerns relate to.... the absence of effective/responsive inshore fisheries management initiatives and the incorrect focus on product development as opposed to resource management in the inshore fisheries."

1.8 NGOs and Other Agencies Involved in the Coastal Fisheries of Fiji

There are a very large number of NGOs and other agencies involved in coastal fisheries with varying levels of inputs. Some of these have been working in the field for many years, while others are more recent players.

1.8.1 FLMMA

No discussion of coastal fisheries in Fiji would be complete without a discussion of the Fiji Locally-Managed Marine Area Network. The network is generally recognized as being very effective and has received regional and international acclaim. Box 3 (modified from UNDP (2012)) summarizes the history and characteristics of FLMMA.

Box 3: The Fiji Locally Managed Marine Area Network

The community of Ucunivanua on the eastern coast of Fiji's largest island was the site of the first locally managed marine area (LMMA) in Fiji in 1997. Scientists from the University of the South Pacific supported environmentalists and local villagers in declaring a ban on harvesting within a stretch of inshore waters for three years, building on the tradition of prohibitions for certain species. After seven years of local management, the clam populations had rebounded and village incomes had risen significantly with increased harvests.

The success of the Ucunivanua LMMA spread rapidly, and a support network – the Fiji Locally Managed Marine Area Network – grew from this. By 2009, the network had increased to include some 250 LMMAs, covering some 10,745 square kilometres of coastal fisheries, or more than 25% of Fiji's inshore area. The network has also inspired replication in countries across the Pacific.

The Network's objectives, as stated in its constitution, include encouraging collaboration between government departments, NGOs and communities to better manage Fiji's traditional fishing grounds; engaging in collective advocacy for LMMAs; creating joint policy briefs based on collective learning; and encouraging the use of adaptive management as a key to achieving best practice. The Network's approach recognizes local communities' autonomy in managing their marine resources, while simultaneously providing a network of support and guidance to help them achieve the best possible results. The Network is responsible for planning and facilitating the programme, while the decision making, implementation and evaluation are undertaken on the ground by the individual groups.

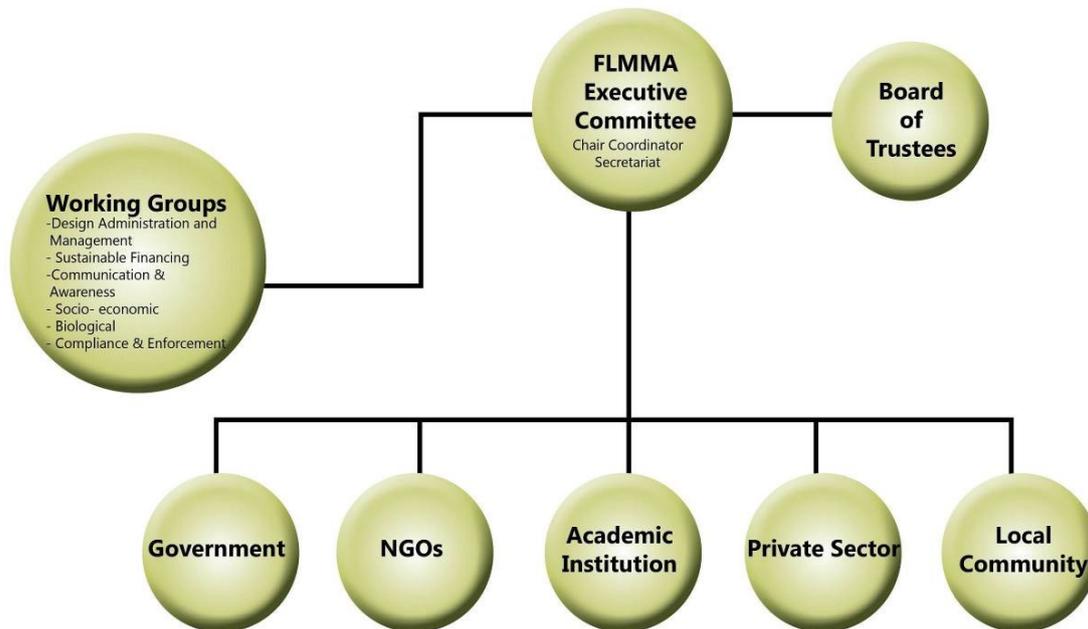
Once a community in Fiji makes its interest in local marine management known, the FLMMA Network and various partner organizations determine who will be the lead agency, and discussions are held with the community to ensure that the goals of all parties are clear and aligned. This initial planning and education process can take up to one year. Network staff then offers assistance through three types of workshop: action planning, biological monitoring, and socioeconomic monitoring. The action-planning workshops are adapted from Participatory Learning and Action methods and include sessions on mapping the village, understanding historical trends, and identifying local stakeholders. The biological and socioeconomic monitoring components of the workshops focus on identifying resource use patterns, threats to local resources, and the root causes of these threats. Finally, a community action plan is developed.

While the establishment of a tabu area (where a no-take zone or ban on destructive fishing practices is declared) is usually a central part of an LMMA, the action plan also contains ways to address other issues faced by the community, such as lack of income sources, poor awareness of environmental issues, pollution, and sometimes, declining community cohesiveness.

The total cost of the FLMMA Network's core operations, including workshops, monitoring equipment, and buoys for demarcating tabu areas, is about US\$500,000 per year, much of which has historically been supplied by US-based charitable organizations, including the Packard Foundation and the MacArthur Foundation.

According to the FLMMA Operation Guide, the structure of FLMMA is given in Figure 5.

Figure 5: The Structure of FLMMA



Source: Govan and Meo (2011)

The FLMMA operations guide states that membership is open to all persons involved in, or interested in, community-based marine resource management in Fiji and who affirm the objectives of FLMMA. Individuals, Partner Organizations and Sites can all be members of FLMMA though the membership requirements are different for each. Currently there are about 10 institutional members.

According to Govan et al. (2009), the approach used by FLMMA at the site level can be partitioned into phases:

1. Initial assessment
2. Management design and planning
3. Implementation of management
4. Ongoing management

FLMMA typically operates at the qoliqoli level. Around 135 sites have been established by FLMMA partners. The number that are still functioning is currently unknown, as many sites may have faded away – and there is difficulty in determining the status of the sites in remote areas.

The work of FLMMA, including lessons learned, is quite well documented, including publications and a dedicated website: <http://www.lmmanetwork.org/fiji>

Some of the important issues that involve FLMMA and the governance of coastal fisheries in Fiji are:

- The relationship of the Fisheries Dept to FLMMA is important. The Department occasionally cites “cooperation with FLMMA” as one of its flagship contributions to coastal fisheries management but this appears largely limited to providing the chair for FLMMA meetings, sharing of some data, and FLMMA members training some Department staff.
- As FLMMA and its members are carrying out some activities that are normally part of the mandate of a modern/effective government fisheries agency, the issue of the

Department progressively taking on more of the FLMMA functions seems to require much more attention than it currently receives.

- In view of the success of FLMMA (as evidenced by enthusiasm at the community level and international acclaim) the reluctance of the Fisheries Department to embrace the FLMMA approach is puzzling, especially in view of its cost-effectiveness.

1.8.2 NGOs and Other Agencies

A wide variety of NGOs and other agencies are involved with coastal fisheries in Fiji. Discussion with the Fisheries Department and some of the major NGOs indicate the following entities have much interaction with coastal fisheries in the country:

- Wildlife Conservation Society
- World Wide Fund for Nature
- Institute of Applied Science of the University of the South Pacific
- Partners in Community Development Fiji
- International Union for Conservation of Nature
- Conservation International
- SeaWeb Asia Pacific
- Environment Law Association
- Pacific Blue Foundation
- Mamanuca Environment Society
- MACBIO Project
- Department of Environment
- iTaukei Affairs Board
- Fiji Navy
- Secretariat of the Pacific Community
- Fourteen other NGOs and agencies with at least some significant involvement in Fiji's coastal fisheries

Information on the 29 agencies cited above is given in Appendix 3. Although the appendix is an attempt to show which agencies are doing what (i.e. a precise display of what is going on), in many cases the information is actually what the organizations are striving to do and success and challenges they have met.

In examining Appendix 3 a number of features emerge. One of the most prominent is the large number of NGOs that are involved in Fiji's coastal fisheries. This is even more striking when considering that NGO presence in countries to the east, north and west of Fiji (where the needs may be greater) is so low.

An important aspect of the NGO work in coastal fisheries is that it is tightly focused on conserving fisheries resources, without any visible elements oriented to additional extraction. This is in contrast to the assistance in coastal fisheries provided by Japan and China, which is very production oriented – and the evolving roles of SPC and FAO which have assumed a much larger management flavour in recent years.

The funding of the NGO⁹ work in coastal fisheries is substantial. Excluding the Fiji government departments and bilateral donors in Appendix 3 (i.e. including only the first 11 agencies in the appendix), a crude estimate of the annual funding of the agencies is about US\$1.9 million¹⁰ (F\$3.4). Unfortunately, this amount cannot be compared to the amount the

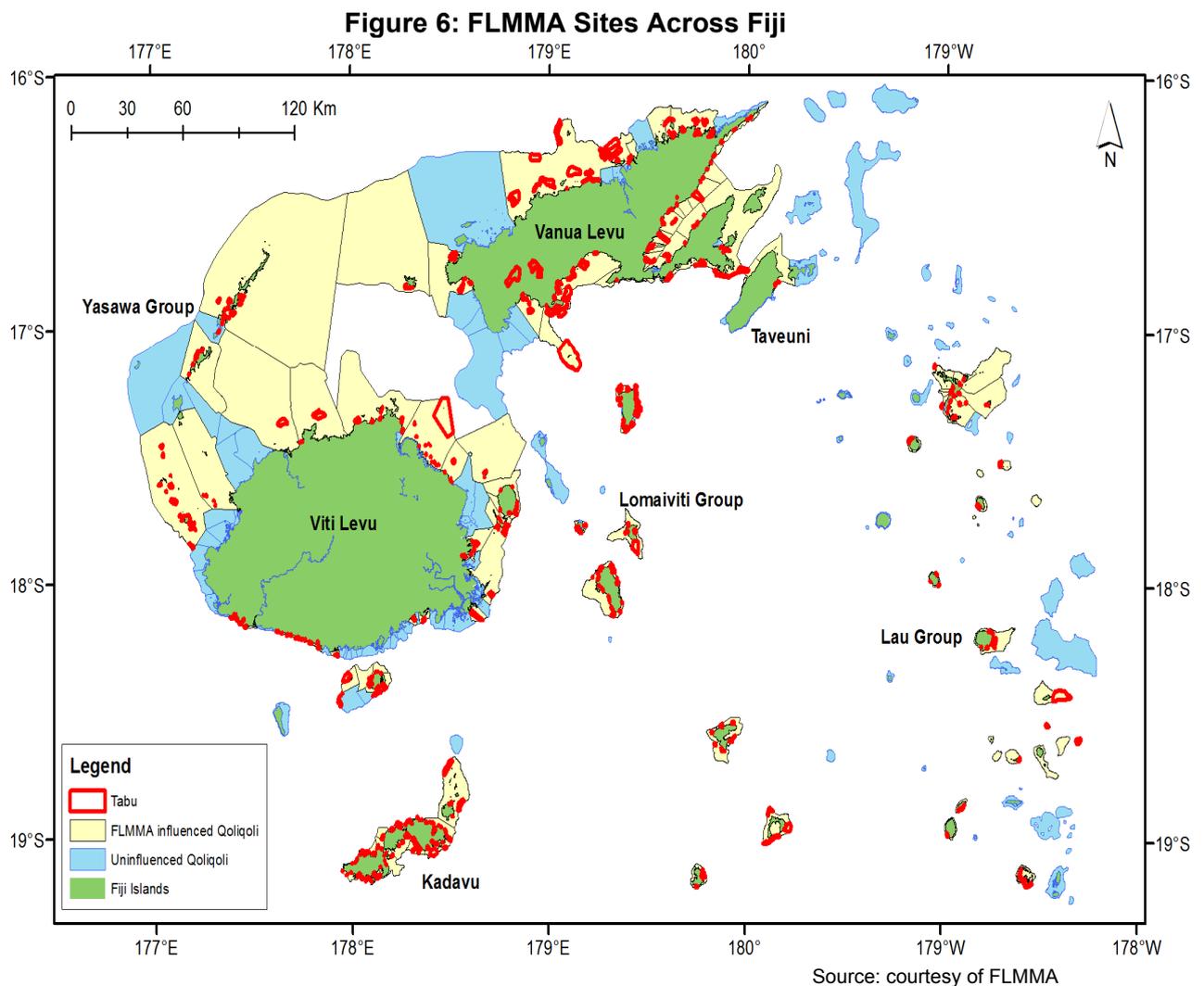
⁹ For simplicity of the discussion, IAS is included with the NGOs in this section, with the recognition that the institute is most definitely a component of the university owned by the governments of the region.

¹⁰ This amount does not include any volunteer work.

Fisheries Department spends on coastal fisheries per year (or yet more interesting, on coastal fisheries management) because coastal fisheries activities and associated budgets are spread across many divisions (e.g. extension, research). To put this F\$3.4 million into a Fisheries Department context, it is 1.8 times the annual allocation for the Offshore Division and 1.7 times than that for the Aquaculture Division (Figure 4).

The major sources for the F\$3.4 of funding above are (by far) US-based philanthropic foundations, mainly Packard and MacArthur. Other major donors are smaller foundations based in the US, Europe, and Australia, with some government money from the US, Germany and New Zealand.

It appears that Bua (especially Kubulau) receives more attention than other areas. Viti Levu to the east and west of Suva is also a focal point for NGO work (especially Navakavu) – which seems logical as it is close to the Fiji headquarters of most of the agencies. The west of Viti Levu does not appear to receive much attention. Other than Bua/Suva and west Viti Levu, NGO activities are widely spread across Fiji. This geographical distribution is best represented by the map of the sites of FLMMA, an organization to which most of the NGOs in Appendix 3 are affiliated with. (Figure 6).



Some other features of the work of the agencies in Appendix 3 are:

- Most of the NGOs take a fairly encompassing view of the management of coastal fisheries, and recognize that terrestrial issues must be dealt with.
- Unlike the Fisheries Department, many of the NGOs include a strong component of economics in their work, including valuing the benefits received from coastal resources.
- A few high quality publications are available from the NGO work in Fiji, but in general the work is not well documented, at least not in a form that is readily available.

The interaction of the NGOs with the Fisheries Department is especially important and deserves additional attention. With the process of formal consultation with fisher stakeholders fading away a few years ago, the FLMMA network seems to currently provide most of the NGO/Department contact. In terms of other types of interaction, about half of the NGOs listed in Appendix 3 indicate they provide some form of training to the Department-appointed fish wardens and field staff of the Department occasionally participate in NGO-organized surveys.

In general, it seems like the NGOs recognize the major flaws of the Fisheries Department (e.g. collection of fisheries data, attention to enforcement, production orientation), but in an attempt to have a cordial relationship with Department staff (so as not to create problems for an NGO's work program), there is little advocacy for improvement. With one possible exception, none of the NGOs feel very strongly about encouraging the Fisheries Department to take on more of the government-type functions presently provided by NGOs. To some extent the strategy appears to be either by-pass the Fisheries Department, do it themselves, or get another government agency (i.e. iTaukei Affairs Board) to do it.

The agencies covered in Appendix 3 often cite frustrations dealing with the Fisheries Department as a major challenge to their work. Much of this seems related to the limited communication with the Department or, more fundamentally, the lack of uptake by the Department of the perceived innovative processes and methodologies pioneered by the NGOs. By contrast, many in the Fisheries Department indicate the NGO work is not sufficiently aligned with government priorities.

From discussions with the Department and NGOs it appears that there is very limited coordination between the two. Although it is clear that some excellent work is being done, what is less clear is the degree to which these NGO activities are in accordance with the overall strategy for the management of coastal fisheries in Fiji as envisaged by Government. This gives rise to a related question – is there such a strategy in existence?

Part Two

2.1 Major Issues in the Governance of Coastal Fisheries

During the review of Fiji's coastal fisheries a number of issues emerged that have a bearing on enhancing their management. Central to this enhancement, and the focus of this second section of the report, is good governance¹¹.

The purpose of this section is to highlight those issues and make some suggestions for improvement. As the subjects covered could be considered somewhat controversial, it is not expected that the staff of the Department or other stakeholders will agree on all positions taken on the issues in this report - but it is hoped that some debate will be provoked and a greater awareness of the issues created. Such awareness is especially important for the senior staff of the Ministry who do not necessarily have a strong technical background in fisheries.

The major issues identified in the first section of the report that need to be addressed to enable the Fisheries Department to be more effective in its involvement in coastal fisheries are judged to be:

- The over-exploitation of valuable coastal resources in conjunction with little fisheries management action to mitigate the problem
- Important coastal fisheries management components fading away: statistics, enforcement, stakeholder consultation, and application of effective management tools
- Striking a balance between development and management
- The relationship of the Fisheries Department with NGOs and FLMMA
- A very poor understanding of the status and trends of coastal fisheries and limited appreciation of their economic and social importance
- The lack of a clear focus on coastal fisheries management by the Fisheries Department

2.1.1 The over-exploitation of resources - but little effective management action

In the present study a large number of Fisheries Department staff and additional stakeholders from other government departments, NGOs, other agencies, and communities were interviewed. When questioned on their major concern related to coastal fisheries, the vast majority indicated it is the over-exploitation of important coastal resources. Others did not dispute that over-exploitation is a serious issue. With respect to past fisheries research, Section 1.4 of this report states: "The most salient feature of the information presented is that it points to the fully or over-exploited condition of finfish and invertebrates in many areas in Fiji."

If over-exploitation is such a large and serious problem, the response of the Fisheries Department seems weak. Out of the 277 people employed by the Department, few, if any, are dedicated full-time to this issue. To stress the point, one stakeholder questioned "why aren't there 100 staff dedicated to mitigating over-fishing?" Far more attention is given to less pressing matters such as ice production (even in urban areas) and experimental

¹¹ Governance is the process of decision-making and the process by which decisions are implemented (or not implemented). Principles of good governance are accountability, transparency, equitability and inclusivity, effectiveness and efficiency, following the rule of law, participatory and consensus orientation.

aquaculture. The Fisheries Department has allowed to fade away in recent years many of the systems in Fiji required for effective action to address over-fishing (section below).

The institutional culture of the Fisheries Department appears to downplay the importance of addressing over-exploitation of coastal resources in favour of increased fish catches. Consider some of the features of the 2014 Department of Fisheries Business Plan:

- Under “public awareness and promotion – sustainable fisheries management”, it has “promote fisheries development through the media”, “promote fisheries development through community awareness program”, and “promote fisheries development through the divisional integration framework” - but there is nothing on promoting an awareness of the need for, and benefits of, fisheries management to address over-fishing.
- There are 63 specific objectives in the plan. Very few of those objectives involve addressing over-exploitation of coastal resources. The only specific activities appear to be the gazetting of four MPAs, the re-seeding of clams at four sites, and development of 15 qoliqoli management plans – with nothing on, for example, the burning issues of the management of the beche de mer fishery or collecting harvest information to determine trends.
- In the 2014 business plan, food security is addressed primarily by aquaculture, ice production, and encouraging more production from coastal areas – with barely anything on measures to be taken to maintain the (large) existing food-related benefits from coastal resources. The reality is that, with the exception of PNG, the production from Fiji’s coastal fisheries is greater than that of any other Pacific Island country – and steps should be taken to safeguard the vital food and other benefits that flow from those fisheries.

The Fisheries Department’s paucity of attention to addressing over-fishing was noted by the 2005 ADB/Fiji fisheries sector review:

Fiji’s coastal fisheries are dynamic. Many significant changes in resources and fishing activity occur each year, but fisheries management responses to changing circumstances (if any) appear to be sluggish at best. If a fishery manager is someone who is aware of the changes in the various fisheries, and who proposes policy changes and associated management measures to meet the new circumstances, then there is a lack of coastal fisheries managers in the Fisheries Department.

The reasons that the institutional culture of the Fisheries Department is oriented to production are probably quite complex. Two factors that may be important are the fisheries development backgrounds of many of the senior officers and the perception by high-ranking government officials of the development potential offered by coastal fisheries. Based on the information in this report, the latter may equate to predicating development on very little potential.

The enthusiasm of the Fisheries Department to address over-fishing has had its ups and downs over the years, as shown by statements in the annual reports (Section 1.7.7 above).

Effective management action to prevent over-fishing depends on both the types of resource problems and types of fishing carried out. Box 4 describes some types of management that are generally not very effective in the Pacific Islands region. In Fiji the mitigation of over-exploitation is dependent to some degree on the types of action mentioned in the box.

Box 4: Management Distractions

A number of such alternatives to restrictive management have been used in the Pacific Island region over the years. These have included re-establishing populations through the use of aquaculture (“reef ranching”) and the promotion of alternatives to coastal fishing to reduce fishing pressure, including aquaculture, fishing outside the reefs (deep-slope and offshore seamounts) and activities outside the fisheries sector. These activities are sometimes more politically acceptable than placing restrictions on fishers.

The problem is that these alternatives to restrictive management are not very successful for the objective of mitigating declines in coastal fisheries resources. Although aquaculture, deep-slope fishing, and FADs may have significant benefits and have important roles in economic development, several studies in the region have examined past experience and concluded that these are not effective alternatives to restricting fishing:

- The implications of reef ranching in the Pacific Islands have been studied with respect to beche-de-mer, coconut crabs, mangrove crabs, spiny lobster, green snail, trochus, pearl oysters, and giant clams. The conclusion was that reef ranching needs to be considered as part of an overall management approach and not as an alternative to management. Overseas experience underlines the fact that simply releasing large numbers of juveniles into the fishery does not produce population increases unless the fishery is also subject to some form of management that allows the released juveniles to reproduce and thus make a contribution to population growth. Reef ranching should be viewed as one of a set of management tools, and not as an easy way out of management (Preston and Tanaka, 1990).
- Four main types of alternative activities have been promoted in the region to reduce coastal fishing pressure: aquaculture, fish aggregation devices, deep slope fishing, and alternatives outside the fishing sector. In reviewing the situation over the last thirty years, it is difficult to identify cases where the use of these activities could be considered clearly successful. Past experience in the use of alternative activities points to some important overall conclusions. Perhaps the most important lesson learned about alternatives to restrictive management in the Pacific Islands is that its performance has not been to the level where it can be considered an effective resource management tool. (Gillett, Nash, Govan, Preston and Lam, 2008)

Source: Gillett (2009)

2.1.2 Important coastal fisheries management components are fading away

For various reasons, some formerly important components of Fiji’s coastal fisheries management system have degenerated over the years:

- Statistics on coastal fisheries. In Section 1.3.1 it is shown that there has been no enumerator in the Central Division for a recent period spanning three years, and there are different systems for collecting data in Fiji’s four divisions. Presently there is one junior staff at the Ministry headquarters with no statistical expertise who is in charge of compiling statistics from the divisions. As advised by Department staff, it appears that in some cases there is a breakdown in the transmittal of data from regional offices to Central Division. There is also a reported issue of NGO-collected data not being provided to the Department during or after the completion of coastal fisheries management projects. The Ministry annual reports for recent years do not contain the fisheries production statistics and in the 2013 annual report the table on coastal exports is incorrect. As a result there is no reliable means for monitoring production trends and the impacts of any measures introduced.
- Enforcement of coastal fisheries regulations. The administration of the fish warden system is almost non-existent: most divisions have no listing of current wardens. There is no system for de-listing wardens (death, emigration), maintaining records of training received, or distributing to the wardens any changes in regulations. Fisheries Department staff involved in MCS are poorly trained in prosecution and hence, few successful prosecutions of coastal fisheries offences. The Navy complains that the Fisheries Department is insufficiently pro-active in coastal

fisheries patrols. Blatantly illegal activity occurs in downtown Suva (e.g. sale of humphead wrasse & undersize fish, SCUBA gear in fishing skiffs) without triggering an enforcement response.

- Choice of fisheries management tools. Rather than the more difficult enforcement of the Fisheries Act and regulations, there is emphasis on the comparatively easy reef re-seeding, despite its high cost and dubious effectiveness. The relatively effective point-of-export controls have mostly faded away (e.g. the Yong Tong button factory has not had a visit from a fishery officer in 20 years). Some of the “fisheries development solutions” to over-fishing (e.g. provision of subsidized skiffs for offshore fishing) have been counter-productive. In general, there is insufficient commitment to enforcing regulations which are relevant and appropriate.
- Attention to management plans. In the past the Fisheries Department had management plans or management guidelines for specific fisheries, including aquarium fish, snapper, live fish, beche de mer (several versions), lobsters, clams, trochus and coral. According to the Director of Fisheries, none are now in force. SPC is currently preparing a beche de mer management plan for Fiji, but indicate that the Fisheries Department over many months did not provide the input necessary to complete the plan.
- Consultation with coastal fisheries stakeholders. It has been over three years since the last formal annual consultation with coastal fishery stakeholders. Coastal fisheries dropped out of the agenda of the meetings of the National Fisheries Council a few years ago. Formal consultation with coastal fisheries stakeholders is not perceived by Fisheries Department as a priority. Many problems now occurring in the Fisheries Department’s involvement with coastal fisheries (e.g. the decay of the statistics system) may not have occurred had there been effective consultation with NGOs and feedback from other stakeholders over the past decade.

The fact that important components of Fiji’s coastal fisheries management system have degenerated over the years has created a deficit in management capacity of the Department. Relative to the NGOs, the management capacity of the Department at the qoliqoli level is especially low. This issue will become increasingly serious as the donors to NGOs start to withdraw funding (as signalled by the Packard Foundation’s intention to reduce funding over the next five years).

2.1.3 Striking a balance between development and management

The Fisheries Department has historically had two main types of involvement with coastal fisheries: (1) development (especially efforts to increase fisheries production), and (2) management (especially efforts to safeguard fisheries resources). As a country advances and as resources become more fully exploited, an emphasis on development should logically evolve into an emphasis on management.

As explained by one stakeholder “a 1980s type get-more-fish Fisheries Department should evolve into a modern Department”. In this respect, the Fisheries Division in Samoa provides a useful model: providing management services to subsistence and commercial fisheries in the country – the justification used was that such work was much less of a priority in an age of fully- or over-exploited fisheries, and a private sector that could largely look after itself.

In general, the enthusiasm of the Fisheries Department for coastal fisheries development is predicated on the concept of substantial under-exploited fishery resources. Neither the fisheries research work mentioned in Section 1.4 nor past reviews of Fiji’s coastal fisheries suggests much potential for increasing the coastal catch. Although the isolated areas of Fiji undoubtedly have some under-exploited fisheries resources, the following should be noted:

- The ADB Fisheries Sector Review stated: “Generally, areas that are not fully exploited are those where it is not economic to fish due to the distance from markets.”
- There have been several cases (e.g. mullet in central Lau, giant clams in southern Lau) where the government has subsidized the access of outer islanders to markets, but resources were quickly over-exploited, leaving communities worse off than before the government marketing involvement.
- Distance from markets also results in harvesting as much as possible on a visit (“clear felling”) rather than the more sustainable smaller and steady harvesting.

The above section should not be taken as an argument for the Fisheries Department’s coastal fisheries development activities to cease; there is a strong case for assisting in such areas for coastal fishers as near-shore FADs and post-harvest aspects (e.g. value adding and quality control). However, this report most definitively argues for shifting the balance between development and management to be appropriate for the current times. We are now in an age where there is substantial over-exploitation of important coastal resources (even if few are unequivocally demonstrated), and few effective activities of the Fisheries Department to address this issue – so the development/management balance in the Fisheries Department requires adjustment.

Currently, there is no lack of a high level directive for altering the development/management balance. The Declaration (signed by the seven fisheries ministers, including the Fiji Minister responsible for fisheries) at the Pacific Beche-de-Mer and the Future of Coastal Fisheries Meeting (Nadi, August 2014) states: “On the state of Coastal Fisheries, participants recognise.....The over-exploited state of coastal fisheries in all Pacific Island Nations and calls for urgent action to improve the management of coastal fisheries to be sustainable.... It is timely to shift the emphasis in coastal fisheries management”.

2.1.4 The relationship of the Fisheries Department to the NGOs and FLMMA

There are some 25 NGOs and other agencies that are involved with aspects of Fiji’s coastal fisheries. The dozen main NGOs spend about US\$2 million per year on coastal fisheries. At least some of the functions of the NGOs appear to be like the normal work of a government fisheries department, such as the training of fish wardens, resource surveys, and fisheries management planning. To a degree, the Fisheries Department’s minimal involvement with coastal fisheries management could be due to heavy NGO involvement.

The NGO funding is not permanent and they will not be working in Fiji in perpetuity. Several of the donors to those NGOs have the expectation that the government will take over the role of protecting coastal fisheries resources in the not-too-distant future. An important point is that if the NGOs retreat from coastal fisheries management without a corresponding Fisheries Department engagement, Fiji’s situation could be worse off than before the NGO involvement.

Despite the international acclaim and apparent success of the coastal fisheries management work pioneered by FLMMA and its partners, the Fisheries Department seems reluctant to adopt FLMMA approaches and methodologies. The Department often cites “Cooperating with FLMMA” but the reality is that this “cooperation” is not great. Several of the aspects of the FLMMA/community engagement seem more effective than that of the Fisheries Department (e.g. survey methodology, community management plans).

It appears that there is a strong case for the Fisheries Department progressively taking on some of the functions of NGOs in coastal fisheries. On the other side, the NGOs and their donors could make a large contribution to improving the governance of coastal fisheries in

Fiji. They need to move away from carrying out the roles of a government fisheries agency and put more effort into facilitating the Fisheries Department's increased involvement in coastal fisheries management. An important role that FLMMA appears to be best positioned to carry out is organizing the heterogeneous range of coastal fisheries stakeholders so that they can be reasonably well represented in formal consultation with the Fisheries Department. There appears to be a need for an "honest broker" to find common ground and shift positions.

2.1.5 A poor understanding of the status and trends of coastal fisheries and limited appreciation of their economic and social importance

As mentioned in above sections there have been few studies on specific coastal fisheries resources in the last two decades. The fisheries statistical system has largely faded away. The marine resource inventories, if done properly, could give information on abundance of resources in a qoliqoli during the period of a survey – but do not show trends.

The above results in an unclear picture of how the health of coastal fishery resources have been changing over time. Without this knowledge it is difficult to gauge when there is need for management and the effectiveness of management where it is being applied. Further, while there are a number of indicators to show a general decline in many important species or species groups, the absence of data specific to many groups makes it more difficult to mount an evidence-based campaign to reduce over-exploitation.

Information on the production of coastal fisheries is important for showing benefits, such as for GDP and the food supply of the country. A lack of accurate production information can lead to under-estimating contributions and the associated under-appreciation of the economic and social importance of coastal fisheries.

2.1.6 The lack of a clear focus on coastal fisheries management by the Fisheries Department

The Department of Fisheries has six functional activities: General Administration, Offshore Fisheries Management, Research and Development, Aquaculture, Extension and Advisory Services and Fleet and Technical Services. In earlier sections of this report, two main points are made concerning this structure:

- The six functional activities cited here have changed very little, despite enormous changes in the Fiji's fishery sector, other than separation of offshore management
- The Department has no single entity with overall responsibility for coastal fisheries management, but rather the components of the coastal fisheries management regime are spread across several functional activities and across all four of the geographic divisions.

Comparisons between coastal management and offshore management (Table 7 in Section 1.7.11) reveal that substantially more attention is focussed on offshore management. Consequently, it is generally recognized that the effectiveness of offshore management in Fiji is superior to that of coastal management in many ways. This is manifested in the quality of statistics, surveillance/enforcement, prosecution of offences, consultation with stakeholders, publicly available reports of activities, and management plans and policy guidelines. Furthermore, in the 2013 annual report there is the statement that is indicative of even more support: "Cabinet endorsement of the additional 25 staff for the Offshore Fisheries Division to administer the Offshore Fisheries Management Decree".

At face value, something is very incongruous here: the coastal fisheries produce far more food, jobs, and contribution to GDP, but the offshore fisheries receives so much more Fisheries Department attention.

One of the major factors that have caused the coastal/offshore disparity is that all activities relating to offshore fisheries management have been consolidated into a single division for several years. If offshore fisheries management functions had been spread across multiple divisions since the mid-1990s, it is likely that the effectiveness of offshore management today would be like the current poor effectiveness of coastal fisheries management. Conversely, if a coastal fisheries management division had been established years ago, it is unlikely that the statistics, enforcement, consultation and other important attributes would have faded away as has been the case.

2.2 Some observations and points for discussion

The discussion in the preceding sections should not be interpreted as deliberate neglect by Department staff of coastal fisheries management. It appears to be more of a situation that, without a specific person or structure responsible for coastal fisheries management, the components of other divisions in the Department that are led by strong/articulate individuals gradually emerge as Department priorities. In the absence of a dedicated division, there is nobody to fight for the funding, staff, and highlighting of issues essential for effective coastal fisheries management.

Several major issues are identified that need to be addressed to enable the Fisheries Department to be more effective in its involvement in coastal fisheries. These include the over-exploitation of valuable coastal resources in conjunction with little fisheries management action to mitigate the problem, important fisheries management components fading away, and the development/management balance. On reflection, the formation of a coastal fisheries management division could make a major contribution towards resolving, all of these issues.

If it is acknowledged that the absence of a division within the Fisheries Department dedicated to coastal fisheries management has much to do with how inadequately coastal fisheries are being managed in the country, then the situation with respect to a strategy becomes clearer. Several NGOs and independent observers (e.g. Govan et al. 2013) note there is no clear institutional strategy for inshore fisheries management. In the absence of a coastal fisheries management division, the general way the Department addresses the major issues in coastal fisheries appears to be created by default rather than design. In other words, the current system appears to be the remnant of a former management system that has been altered by budget cuts, political directives, and the capabilities/interest/limitations of key staff.

Concluding Remarks

This report shows that the important coastal fishery resources in Fiji are often over-exploited. With an expanding population and increasing international demand, the situation is likely to grow worse. Although an effective coastal fisheries management system in Fiji is desperately needed, the system is, ironically, changing for the worse - many important elements of an effective management regime have degenerated in recent years.

An important point is that the Fisheries Department has the ability and resources to run an effective fisheries management programme – as shown by the performance of the Offshore Fisheries Management Division.

A major conclusion of the present review is that the lack of a division within the Fisheries Department dedicated to coastal fisheries management is a cause of the decline in coastal fisheries management in the country – but the establishment of such an entity could be the key to re-invigorating the Department's effectiveness in this field.

The creation of a new division within the Fisheries Department appears quite compatible with the "Roadmap for Democracy and Sustainable Socio-economic Development". With respect to the fisheries sector, that document indicates the need for a review of institutional arrangements, enhance resource management, and restructuring the Fisheries Department.

The relatively simple process of creating a Coastal Fisheries Management Division in the Fisheries Department will not in itself be sufficient to mitigate the major threats to coastal fisheries – but it does appear to be an important pre-requisite for improving the situation. It is difficult to see major advances being made if the authority to make improvements in coastal fisheries management is dispersed across many technical and geographic divisions.

Should a coastal fisheries management division be created, an immediate priority will be the establishment of coherent policies and strategies dealing with coastal fisheries management. These should be consistent with high level policy documents and well integrated with the Ministry's Annual Corporate Plan and the Department's Annual Business Plan. Equally important is that the strategies and tools to be used to achieve coastal fisheries management objectives are technically logical (i.e. of proven effectiveness), rather than being based on wishful thinking.

Other important priorities of a new Coastal Fisheries Management Division would be:

- Determining the additional information required for achieving management objectives (i.e. fisheries research) and reconciling those needs with the current program of marine resource inventories.
- Re-engaging with coastal fisheries stakeholders, including NGOs. Many stakeholders have very strong ideas on how to improve coastal fisheries management in Fiji.
- Determining the appropriate level of decentralization of the new division to the provinces.
- Reviewing the fisheries regulations and revitalizing their enforcement of coastal fisheries legislation in the country
- Taking advantage of the experience in another Pacific Island country, such as Samoa where the Fisheries Division has had a very successful re-orientation to coastal fisheries management.

On a different level, some less tangible but very important changes must be made in order to improve coastal fisheries in the country over the long term:

- Fisheries Department staff need to adjust their views on the appropriate balance in coastal fisheries between development (i.e. catching more fish) and management

(i.e. measures to safeguard the existing level of fish production). As fisheries become more fully exploited the balance would logically change to greater resource management. In some cases altering this balance will not be easy, as several officers have had long and successful careers in fisheries development – but challenges have changed and the Fisheries Department must evolve with the changes to remain relevant.

- There needs to be a greater awareness among senior government leaders that fish landings from coastal fisheries in Fiji are approaching their limits (if they have not already done so). At this stage the primary role of the Fisheries Department (unlike that of a forestry or agriculture department) is less to encourage greater production, but to safeguard the existing production. The fact that there is little potential for expansion of coastal catches should not equate to less government backing. Substantial support in the form of fisheries management interventions by the Fisheries Department is required to maintain the current large benefits from coastal resources.

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Appendix 1: People Interviewed

Ministry of Fisheries and Forests (chronological order)

Sanaila Naqali	Deputy Permanent Secretary
Suresh Chand	Director of Fisheries
George Madden	Principal Fisheries Officer, Eastern
Sunia Waqainabete	Senior Research Officer, FLMMA Chair
Aisake Batibasaga	Principal Fisheries Officer, Research
Apisai Sesewa	Fisheries Officer, Makogai
Atelaite Rokosuka	Principal Economic Planning Officer, Policy
Lelani Kotobalavu	Principal Economic Planning Officer, Projects
Margaret Tabunakawai	Fisheries Officer
Api Cokanasiga	Fisheries Officer, Inshore Statistics
Saimoni Tavoli	Acting Economic Planning Officer
Richard Viridin	Senior Research Officer, Aquaculture
Anare Raiwalui	Principal Fisheries Officer, Offshore
Kolinio Naivalu	Acting Senior Fisheries Officer, Fleet and Technical Services
Sairusi Senilawalawa	Fisheries Assistant, OIC Lakeba
Eroni Talemaikanacea	Principal Fisheries Officer, OIC Western
Mere Lakeba	Senior Fisheries Officer, OIC Central
Peniasi Kunatuba	[former] Director of Fisheries
Viliani Bainivesi	Acting Fisheries Officer, OIC Savusavu
Semi Tuberau	Fisheries Assistant, Savusavu
Nacameli Waqalevu	Project Officer, OIC Rabi
Jioji Vuakaca	Principal Fisheries Officer, OIC Labasa
Nanise Tuqire	Fisheries Officer, MCS Labasa
Alfereti Tuinamata	Fisheries Officer, Labasa
Malakai Tusalu	Project Office, OIC Wainikoro Fisheries Station
Emosi Time	Fish Warden, Kavewa Island
Anare Luvunakoro	OIC Kavala, Kadavu
Jone Tamanitoakula	Fisheries Assistant, Marine Inventory Survey
Diana Valotu	Fisheries Assistant, Marine Inventory Survey
Elisa Kama	Project Officer, Marine Inventory Survey

Other Government Agencies

Department of Environment	Rahul Chand
Fijian Affairs Board	Alisi Rabukawaqa
	Brooke Langston
	Matereti
Fiji Navy	Commander John Fox

Non-Government (chronological order)

WWF Suva	Sally Bailey
	Craig Bohm
	Alfred Ralifo
	Francis Areki
	Chinnamma Reddy
WWF Labasa	Koli Musadroka
WCS	Stacy Jupiter

Conservation International	Susana Waqanabete
	Loraini Sivo (former staff)
National Trust	Ms.Erasito
FLMMA	Brad Carte
IAS	Bill Albersberg
	James Comley
	Semisi Meo
	Alfereti Tewake
USP	Randy Thaman
Seaweb	Scott Radway
PCDF	Matelita Ceinaturaga
	Watisoni Lalavanua
IUCN	Milika Sobey
	Etika Rupeni
	Leanne Fernandes
Coral	Arthur Sokimi (former staff)
MacBio	Jan Steffen (and former staff of IUCN)
Mamanuca Environment Society	Marica Vakacola
Pacific Blue Foundation	Kerry Donovan
Marine Life Alliance	Iliavi Tuwai (former staff), also formerly of Fisheries Division, USP, PCDF, Dept. of Agriculture
Fiji Environmental Law Association	Kiji Vukikomoala
SPC	Ian Bertram
	Lindsay Chapman
University of Hong Kong	Yvonne Sadovy
AusAID/Samoa Fisheries Project	Mike King (former Team Leader)
Independent consultant	Hugh Govan
Resort Support	Helen Sykes
Walt Smith International	Walt and Deborah Smith
Savusavu businessman	Tony Philp
Navakavu Qoliqoli Committee	Asakaia Balawa
Yon Tong Trochus Factory	Newton Yuen

Appendix 2: Reviews Relevant to the Structure/Role of the Fisheries Department

There have been a number of external reviews of Fiji's fisheries sector over the years, several of which contain suggestions for enhancing the Fisheries Department's involvement with coastal fisheries. Of the reviews that are available, several are especially relevant to the present review.

World Bank (1995):

- The Fisheries Division should further devolve some of its infrastructure and fisheries development responsibilities to the private sector, and assume greater responsibility for management, regulation, and enforcement. This will require considerable re-training of staff.

World Bank (1999):

- Considering the perception in other [Pacific Island] countries of the high effectiveness of coastal resource management rules which are enforced by the buyers/exporters, the national government should reactivate this activity.
- Community leaders should be sensitized to the need for, and benefits of, specific national legislation with the intention that important national laws become adopted as village rules. [This follows from the observation that national laws that are adopted as village rules are especially well-enforced.]
- National authorities should emphasize the importance of local communities restricting local harvesting effort.
- The system of honorary fish wardens should be enhanced.

The Asian Development Bank Fiji Fisheries Sector Review (Hand et al. 2005):

- Fiji's inshore fisheries are dynamic. Many significant changes in resources and fishing activity occur each year, but fisheries management responses to changing circumstance (if any) appear to be sluggish at best. In the Fisheries Department there appears to be considerably more enthusiasm for increasing fishery production from inshore areas, than for management interventions to protect over-exploited resources. This seems ironic, considering that many of Fiji's important inshore resources are either fully exploited or very much over-exploited.
- The process of surveying inshore areas needs to be accelerated, and surveying methods more focused on the pressing issues for the inshore management area rather than on providing a comprehensive species listing.
- The role of extension officers needs to be modernized and focused more on resource conservation and development of management plans and less on fisheries development—fisheries development is an antiquated concept given the accessibility to vessels and outboards, and the over-exploitation of stock in many areas (particularly areas close to villages and markets).
- With respect to assisting in the management of customary fishing areas, the Department should place priority on firmly establishing a policy that the protection of village fishery food supplies is paramount.
- Rather than the fairly weak present activity of "cooperation with FLMMA", the Department's objectives, and planning, should be based around eventually assuming the role that FLMMA has successfully pioneered.
- The Department should actively revitalize the system of fish wardens to address widespread problems of illegal fishing.
- Our greatest concerns relate to.... the absence of effective/responsive inshore fisheries management initiatives and the incorrect focus on product development as opposed to resource management in the inshore fisheries.

CCIF (2013):

- The Department of Fisheries lacks the institutional capacity, financial resources, political power, and (to some extent) political will to enforce the existing Fisheries Act.

- The importance of Fiji's natural environment to its citizens who rely on its resources, combined with a lack of capacity at government level as well as the ability to use traditional hierarchical structures, has led to a proliferation of NGOs.
- The i-Taukei Affairs Board Conservation Officer program may address the provincial capacity gap and further strengthen nearshore fisheries and coastal marine resource management efforts.
- Governmental funding for fisheries and coastal marine resource management is lacking, and it targets offshore fisheries and aquaculture more than nearshore coastal fisheries management. At the nearshore level, the focus is on development of infrastructure for coastal fisheries that aims to stimulate the economic output of coastal marine resources.
- Very little money currently goes to conservation: conservation and nearshore management efforts focus almost entirely on expensive (F\$500,000 per year) marine resource inventories that conduct biological and socioeconomic surveys at approximately 20 qoliqoli areas each year. The results of these surveys are lengthy reports that take time to reach communities, are not widely shared or peer-reviewed, and do not appear to inform community or national management practices.

Govan et al. (2013):

- The efforts of NGOs, USP and other government departments to incorporate or promote ecosystem approaches to resource management greatly outstrip those of the Fisheries Department.
- There is no inshore fisheries policy or clear institutional strategy for inshore fisheries management support.
- The promotion of fisheries development strategies such as fisheries centres for ice making or the provision of new transport opportunities for remote islands will increase pressure on stocks unless it is preceded by, and linked to, coherent inshore fisheries management in the affected areas.
- Fisheries Department Extension and field officers have ToR that would permit a greater involvement in effective support of inshore fisheries management but in practice duties such as ice-making are excessively time consuming. These officers require increased capacity for inshore fisheries management.
- Fish Wardens are being successfully used as a key tool for Community Based Resource Management, but more training and support is needed.
- Despite a relatively well financed Fisheries Department, key initiatives relating to inshore fisheries management (such as the Marine Resource Inventories) do not represent cost-effective or strategically sound investments compared to alternatives.
- Unlike the potential of seaweed or freshwater aquaculture for rural livelihoods, the expensive hatchery production of invertebrates does not seem justified as a cost-effective management intervention especially given its undemonstrated impact.

While not a review of the Fisheries Department, there has recently been a Ministerial Declaration that has considerable relevance to the role of the Department. The Declaration (signed by the seven fisheries ministers, including the Fiji Minister responsible for fisheries) at the Pacific Beche-de-Mer and the Future of Coastal Fisheries Meeting (August 2014) states: "On the state of Coastal Fisheries, participants recognise:

- The over-exploited state of coastal fisheries in all Pacific Island Nations and calls for urgent action to improve the management of coastal fisheries to be sustainable
- The emphasis on offshore fisheries has led to a lack of consistent support for coastal fisheries management
- It is timely to shift the emphasis in coastal fisheries management"

Appendix 3: NGOs and Other Agencies Involved in Coastal Fisheries

A non-exhaustive listing of NGOs and other agencies involved in the coastal fisheries of Fiji is given below. Those organizations were identified on the basis of mention during discussions with the Fisheries Department and NGOs. Information presented is from discussions with the representatives of the agencies, information available on the internet, and presentations made at the Packard Foundation meeting in Suva in April 2014.

Wildlife Conservation Society

WCS opened its office in Fiji in 2001. Currently, they have four main types of interactions with coastal fisheries in Fiji:

- Determining sustainable extraction levels (in both the periodically closed areas and in general areas) and associated means to achieve this sustainability through wise use of management tools (e.g. quotas, licensing, gear restrictions) and monitoring indicators of vulnerable species.
- Maintaining or increasing populations of five iconic species: camouflage grouper, squaretail coral grouper, white-tipped reef shark, bumphead parrotfish, and humphead wrasse.
- Working on marine protected areas (MPAs). Since 2005, WCS has worked with communities to establish 257.61 km² of locally-managed MPAs.
- Studying land-based impacts on coastal fisheries, including work on modelling the impacts of sedimentation.

Geographically, WCS originally concentrated on Kubulau District in southwestern Vanua Levu, and has since spread out eastward/westward to cover all coastal areas of Bua Province. In recent years, they have carried out marine work in Lomaiviti (Ovalau, Koro), Macuata, Ra, and some work in Lau, especially Totoya.

In the future WCS anticipates getting more into coastal fisheries, especially the management and governance aspects. Attention to conservation and management across the Vatu-i-Ra seascape will remain a high priority.

Nine Fiji-based staff of WCS have at least some involvement in coastal fisheries in the country. About 70% of the work of WCS in Fiji is on coastal fisheries. The main items in the work program not involving coastal fisheries are on offshore management, alternative livelihoods and watershed management.

The total budget for the WCS office in Fiji is about US\$600,000 to \$700,000 per year. The main donors to the coastal fisheries work are the Packard Foundation and the MacArthur Foundation, with smaller amounts from the Tiffany Foundation, U.S. National Science Foundation, LanMar Fund, and Science for Nature and People initiative.

The main interaction with the Fisheries Department is through the FLMMA network. During the preparation of a grant proposal WCS would normally consult with the Fisheries Department to determine that a proposal is consistent with the Ministry of Fisheries and Forest Annual Corporate Plan. In the past WCS cooperated with the Department in the survey of sea cucumber in Lau, shark tagging, and the training of fish wardens.

WCS perceives that their biggest success involving coastal fisheries in Fiji was in assisting the Kubulau community develop and implement the first "Ridge to Reef" management plan -

the concept for which has later been applied to other communities in Bua and Cakaudrove provinces, and is currently being applied more broadly in Fiji.

The major difficulties experienced by WCS in its work related to coastal fisheries in Fiji have been: (a) The disclosure of locations of high fish biomass to many people resulted in massive reductions in stock; and (b) The template and facilitator's guide for ecosystem based management planning have not been integrated yet into government processes, and (c) The over-reliance on single individuals - rather than spreading capacity development more broadly - as people tend to leave positions frequently.

World Wide Fund for Nature

WWF has had an office in Fiji since the mid-1990s, but their interaction with coastal fisheries in the country started about a decade later when they commenced work with MPAs, focusing initially on biodiversity issues. Currently, they have two major initiatives: (1) The Great Sea Reef, and (2) Sustainable Fisheries and Seafood. A major NZ-funded activity to connect the tourism sector with community-based qoliqoli management began in May 2014. That work will feature tracing the supply chain from LMMA sites to hotels, developing stock assessment in data deficient fishery for management, and trialling adoption of pricing based on willingness to pay for a managed fishery.

In general, WWF often works by bringing stakeholders together and on integrated land/sea initiatives. In the recent past this has included helping put together development plans for many communities, assisting in the formulation of natural resource management strategies for three provinces, involvement in turtle conservation work (some of which is through the "Dau ni Vonu" initiative), scaling up reef system management from the qoliqoli level, assessing the benefits of the Great Sea Reef, and the training of fish wardens. WWF is also involved in policy advocacy at provincial, national and regional levels based on their field experiences.

Historically, WWF has had a concentration of marine activities in Macuata (including the Great Sea Reef) and in Lomaitviti. They have worked in four qoliqoli of Macuata for many years and are expanding to areas of Ba and Ra. In Lomaiviti they have worked with some 20 communities formulating development plans. They have also done work in Kabara and southern Lau.

Currently, about 11 Fiji-based WWF staff have some involvement in coastal fisheries. More involvement in coastal fisheries management in Fiji is anticipated in the future.

The main donors to the involvement of WWF in coastal fisheries in Fiji are the Moore Foundation, MacArthur Foundation, Packard Foundation, and the WWF network (UK, Switzerland, International). The annual budget for this involvement is about F\$1 million (US\$550,000) per year.

WWF publications related to coastal fisheries in Fiji include an economic analysis of the Great Sea Reef (draft), the results of marine biological surveys (not yet published), turtle work (draft), and for the future, fact sheets on project sites and processes.

The main interactions of WWF with the Fisheries Department are with the staff of the Northern Division and with the fisheries policy people in Suva. They have interaction with the Department staff that attend FLMMA meetings and during cooperative efforts to train the fish wardens and monitor turtles. A memo of understanding WWF/Department was formulated, but has been pending for several months with the previous minister responsible for fisheries.

WWF feels their biggest successes in dealing with coastal fisheries are the understanding they have gained of the complexity/dynamics of the situation in Fiji. They are also quite satisfied with their work with fisheries trade and with turtle conservation and in their demonstration that qoliqoli management goes hand in hand with sustainable land use practices and livelihood generating activities. Current difficulties include (a) inability to provide qoliqoli stock assessment advice over the years to guide the issuing of licenses as a primary mechanism to regulate harvest levels; (b) inability to effectively prosecute violators of the community qoliqoli management rules; and (c) inability to obtain good data (e.g. catches, licensing) from the Fisheries Department.

Institute of Applied Science of the University of the South Pacific

The beginnings of IAS involvement with coastal fisheries date from the mid-1990s when the institute was supported by the Biodiversity Conservation Network to do bioprospecting in marine areas. The promoters of that work saw bioprospecting as an entry point into community-based development and conservation. From the community engagement in the bioprospecting work in Verata, a relationship was formed with the community and eventually the community was assisted in the development of a resource management plan. In the plan there was eventually some degree of focus on the *Anadara* shellfish as a species to be protected, on marine protected areas as a management tool, and on community monitoring as a mechanism to determine effectiveness and further stimulate community interest. The success of the work in Verata spread rapidly, and a support network – the Fiji Locally Managed Marine Area Network – grew from this. In retrospect, a crucially important part of the IAS work was the development of a standard process for an adaptive management cycle.

Since the work in Verata IAS has been involved in assisting communities with coastal resource management at about 150 sites across Fiji, without any areas of geographic concentration.

In addition to assisting communities IAS carries out research in support of coastal resource management. This has included such subjects as investigating the questions that are frequently asked by communities, community perceptions of effectiveness, ecological effectiveness of tabu and reduction of ecological impacts of periodically opening MPAs.

The height of IAS involvement in this work was in 2002 to 2007. At that time there were about 10 staff involved in coastal resource management, including one from the USP faculty, four project staff, and graduate assistants.

The main funding for the work came from the Packard Foundation (mainly for site work) and from the MacArthur Foundation (for the national and regional learning). During the mid-2000s this support was about US\$100,000 per year for 3 years. The contribution of USP was limited to the time of the core staff.

IAS has had several types of interaction with the Fisheries Department over the years. IAS attempted to assist the Department with the methodology for qoliqoli surveys when the Department began that activity over a decade ago. IAS provided to Department staff training on the adaptive management cycle. The Institute interacts with the person from the Fisheries Department who serves as the coordinator of FLMMA. IAS had the idea of taking the qoliqoli survey results back to the concerned communities, but the Department would not release the results.

According to various IAS staff, the biggest achievements related to coastal fisheries are:

- “Getting the whole thing going”: starting the process that snowballed into the FLMMA network
- Promoting the Yaubula Management Support Teams in the provinces to mainstream the management process
- The fact that some communities have evolved their management approach verifies their belief in management

One of the major difficulties experienced by IAS in this field of work is the lack of uptake by the Fisheries Department of methodologies and processes developed by IAS.

Partners in Community Development Fiji

PCDF (formerly known as the Foundation of the Peoples of the South Pacific Fiji) has been operating in Fiji since 1978. They assist communities in environmental, governmental and social development. One of their four areas of concentration is natural resource management, has some projects related to coastal fisheries.

PCDF involvement in coastal fisheries work has included coral reef rehabilitation, coral and mangrove planting, fish warden training, assisting with beche de mer (focus on socio-economic and post-harvest aspects) and helping qoliqoli owners establish MPAs. PCDF indicates that their work is normally at the community or provincial officer level, and is characteristically associated with a livelihood component.

PCDF is currently not part of FLMMA, but it works in collaboration with some of the main institutions in the network like the Fisheries Department, WWF and IAS/USP to deliver specific activities.

Because the work at the community level is a result of requests, the areas of involvement are widely dispersed throughout Fiji. PCDF has carried out work related to coastal fisheries in about 32 villages in the Northern, Central and Western Divisions.

The number of PCDF staff that have at least some involvement in coastal fisheries is about 5. Those people spend about half to three-quarters of their time on work that has a fisheries component.

The main donors to the PCDF coastal fisheries work are Bread for the World, the Australian Department of Foreign Affairs and Trade, the Australian Centre for International Agriculture Research, the Australian Foundation for Peoples of the Asia and the Pacific, and New Zealand Aid. Annual funding from these sources for work connected to fisheries is about F\$300,000, with Bread for the World being the most significant donor (F\$400,000 over three years).

The recent publically available PCDF reports that have some connection to fisheries are the annual reports and an article in SPC's Beche de Mer Bulletin.

The main interactions of PCDF with the Fisheries Department have been fish warden training, cooperation in a marine resource inventory in one district in early 2013, some joint turtle tagging work, and collaboration on a beche de mer survey. PCDF participated in the Fisheries Department's beche de mer management consultation but was not invited to the consultation on the inshore fisheries decree.

PCDF feels their biggest success in dealing with coastal fisheries is their approach to communities: not imposing projects on communities and working with existing community

structures. The main current difficulty is having to work with the awkward qoliqoli ownership issue.

International Union for Conservation of Nature

IUCN has a regional office in Fiji. Currently, IUCN has only minimal involvement with coastal fisheries in Fiji, which is at least partially due to the departure of the Marine Program Coordinator in mid-2013 and to other organizations' involvement in the field.

IUCN has been a participant in the Marine Sector Working Group of the Council of Regional Organisations in the Pacific and has assisted with the enhancement of the Pacific Oceanscape, both regional activities that have coastal fisheries content.

According to staff, IUCN prides itself on its "convening power". In August 2014 IUCN convened the "Pacific Beche de Mer and the Future of Coastal Fisheries Meeting" in Nadi. A declaration from that meeting (signed by the seven fisheries ministers attending, including the Fiji Minister responsible for fisheries) stated that the meeting recognises "the over-exploited state of coastal fisheries in all Pacific Island Nations and calls for urgent action to improve the management of coastal fisheries to be sustainable".

Other IUCN involvement in subjects that involve coastal fisheries in Fiji are its environmental law program, the valuation of ecosystems (e.g. the report "Economic Benefits of Marine Protected Areas: Vanuatu and Fiji Case Studies"), the species program, and the project Mangrove Ecosystems for Climate Change Adaptation & Livelihoods (MESCAL).

The document "IUCN Regional Programme for Oceania 2013-2016" gives information on likely involvement in coastal fisheries in the future. It indicates *inter alia*:

- Protected areas are at the heart of IUCN's programme in Oceania
- Improved understanding of the economic value of biodiversity can contribute to informed decision-making in policy arenas. IUCN Oceania will work to enhance the understanding of the value of biodiversity and ecosystems services through contributions to additional valuation studies to ensure more sustainable island ecosystem management.
- Community-based governance of marine and coastal resources demonstrating sustainable natural resource management and biodiversity conservation will be nurtured in mangrove and other coastal ecosystems in selected Pacific Island countries.

As much of the IUCN work in Fiji that involves coastal fisheries is at the policy level, there is no geographic specialization in the country. Some locations have received special attention (e.g. Navakavu as a site for ecosystem evaluation), but they are mainly case studies or examples.

Because IUCN has so little effort concentrated on coastal fisheries in Fiji, it would be difficult to estimate the staff time or annual budget dedicated to that purpose. Donors to programs that involve coastal fisheries include IUCN headquarters (ecosystem evaluation work), New Zealand (beche de mer meeting), Asian Development Bank (environmental law), and Germany (mangroves).

As IUCN has no proper marine program at present their interaction with the Fiji Fisheries Department is minimal.

One of the biggest successes in IUCN's dealing with coastal fisheries has been the convening of the Pacific beche de mer meeting. A major challenge for IUCN is to create a niche for themselves in a "very crowded playing field".

Conservation International

CI in partnership with the FLMMA network, has supported since 2007 local research to provide answers relating to the management of marine protected areas in Fiji. The CI Marine Program in Fiji was designed to provide research and technical support to the FLMMA network. In doing so, it implemented a total of nine projects from 2007-2013 across different LMMA sites in Fiji to help identify effective management regimes for decision makers and resource users. The projects were focused on both social and ecological research to help answer key specific questions for improving current management practices.

In 2010 CI established a memorandum of agreement with FLMMA in which CI, unlike other FLMMA partners, decided not to invest in the establishment of its own project sites in Fiji, but rather work to benefit existing LMMA sites, as well as the network as a whole.

During the period 2011 – 2013 the first year was focused mostly on project planning, which then transitioned to data collection and analysis in the second year. During the project's third year effort was focussed obtaining answers to critical questions through a learning network created to integrate and ensure the use of high quality science in decision-making processes.

Geographically, the sites where CI worked were spread across Fiji, with some concentration on Viti Levu to the west of Suva, Kubulau, Taveuni, Kadavu, Vanua Balavu, and the Mamanuca Islands.

The CI Marine Program employed one full-time person. Consultants were also employed, about nine in the period 2007-2013.

The main donors to the CI Marine Program have been the Moore Foundation (2007 to 2010) and the MacArthur Foundation (2011-2013). For the latter period the annual funding from the donor was about US\$80,000 per year.

CI has had interaction with the Fisheries Department in bringing to their attention the seriousness of the poaching issue, in the training of fish wardens in Vanua Levu, and in the FLMMA meetings.

CI feels that their major achievements in the last few years have been:

- Demonstrating the ecological importance of long-term managed marine areas
- Demonstrating the challenges to compliance and enforcement of LMMAs
- Building short-term and long term capacity within the partnership network
- Identifying gaps in planning Fiji LMMA's sustainable financing
- Influencing the establishment of new locally managed areas and improving management of existing sites
- Working closely with partners to increase compliance and enforcement of LMMAs

One of the common challengers that CI had across all projects was poaching as a result of lack of effective surveillance by communities and the lack of enforcement support within the legal system to prosecute poachers when they are apprehended.

SeaWeb Asia Pacific

SeaWeb has supported Fiji LMMA efforts since 2003, with a focus on strategic communications. The primary objective of its Fiji program is to create social marketing initiatives to advance sustainable natural resource management. The organization has historically offered a multi-level strategy that included supporting community leaders in advancing LMMA approaches by improving site-based, stakeholder engagement. The efforts are designed to ensure that management actions are driven by local decision-making processes/priorities and that change is sustainable. The work provides leadership, communications, and basic science skills along with appropriate outreach tools.

SeaWeb also advances inshore fisheries management in Fiji through strategic communications and social marketing initiatives at a national level. Activities include capacity building for NGO partners and government, media development/outreach and of recent, a national campaign, 4FJ to conserve groupers. The campaign approach, which employs such tools as social diffusion and self-perception to activate audiences, is anticipated to be the major focus moving forward.

Geographically, SeaWeb supports partners and communities across Fiji, with an additional focus in Bua Province in recent years.

In the future SeaWeb in Fiji is likely to have a greater focus on national fisheries management issues, such as on beche de mer. The organization also desires to expand beyond marine conservation into the broader natural resource management and social issues to help expand its funding base and increase its internal resources to support social marketing initiatives regionally. SeaWeb AP became a registered local NGO in Fiji in February 2014.

The SeaWeb presence in Fiji consists of the Executive Director SeaWeb Asia Pacific and two program staff. A Fiji director is expected to be hired in 2014. Communications services beyond its current capacity, such as web development, are subcontracted out, in a similar model to private sector public relations firms.

The Packard and MacArthur Foundations and NOAA are the historic funders. There is additional funding through sub-grants from other NGOs (TNC, IUCN). The annual budget at present for work in Fiji is about US\$150,000 per year.

The interactions with the Fisheries Department have consisted of work on the 4FJ campaign and communications training. SeaWeb has coordinated to some extent with the heads of the Department's divisions.

In terms of successes in Fiji, empowering community leaders to better engage their communities has proven a highly effective approach to driving community-driven change. The 4FJ campaign however has proven the most successful endeavour to date and the organization intends to focus heavily on developing similar targeted initiatives. A major challenge is providing ongoing support for leaders over time without having more integration with existing networks, such as that of the Yaubula Management Support Teams, conservation officers and partner NGOs.

The Environment Law Association

Since 2009 the ELA's contribution to coastal fisheries governance and management is primarily through legal services to communities to empower them to better understand the law and to effectively participate in decision making process that will impact on their fisheries

resources. ELA also provides legal training and legal advice to enable better decision making. Other specific work involving coastal fisheries includes:

- Building capacity to implement the Fisheries Act by training enforcement officials and fish wardens.
- A pilot project to develop a training program on coastal and fisheries management in Ra Province
- Legal advice to partner organisations on new and relevant laws impacting fisheries resources. This includes comprehensive legal advice to FLMMA on shipwrecks, impacts on the maritime transport decree, and development of toolkits for effective enforcement (e.g. Turtle Enforcement Toolkit).
- Development of papers on fisheries, such as an integrated ocean policy paper.
- Legal training for conservation officers, legal practitioners, regional participants, and government officers on development/resource laws. This is intended to promote effective, transparent and accountable decision making relevant to resource exploitation that impact fisheries and marine resource. (Up-coming October and November.)

Rewa Province has been a major focus of the ELA due to the heavy concentration of development activities within the coastal area. A pilot project is being carried out in Ra.

The main donor to ELA has been the Packard Foundation. The pilot work in Ra is funded by the Asian Development Bank, under the Coral Triangle Initiative.

The ELA successes include:

- The prevention of development activities that could threaten fisheries and marine resources by giving advice on the legality of certain decision making processes.
- Encouraging cross agency enforcement training has ensured better collaboration amongst enforcement agencies - seeing this approach adopted by Fisheries Department in their training of enforcement officers has been a positive development.

Pacific Blue Foundation

Pacific Blue Foundation provides basic research, education, encouragement and dissemination of sustainable practices in coastal regions with the ultimate goal of preserving and promoting biological and cultural diversity. The Foundation collaborates with other organizations and departments in order to create increased understanding. An important aspect of the work of Pacific Blue is that it looks to Fijian traditions to help further conservation efforts to the benefit of the small island communities.

Work related to coastal fisheries in Fiji has included:

- Participation in the FLMMA network
- At Yanuca Island: a study of the MPA, a control program for crown of thorns starfish, and an FLMMA workshop to enhance the knowledge and skills of community members in marine conservation practices by combining traditional methods with scientific knowledge
- At Totoya Island: a wide variety of activities including assistance to communities in declaring an MPA and a survey of fish abundance of Sacred Reef
- In Serua Province: sponsorship of a conservation officer

Mamanuca Environment Society

MES is committed to protecting the marine and terrestrial environment of the Mamanuca Islands. The society was formed in 2001 after concerns for the Mamanuca Island environment were raised by local resorts, tour operators and Coral Cay Conservation. Its

goal is to promote awareness of the need to protect the marine and terrestrial resources of the Mamanuca Region. Through partnerships with local communities, tourism operators, government and non-government organisations, the MES encourages environmentally sustainable development for the benefit of present and future generations.

The main activities are:

- Awareness
- Reef Awareness Programs for Resorts
- Mooring Buoy Project
- Reef Check Surveys
- Water Analysis
- Waste Management
- Turtle Conservation
- Crown of Thorns Starfish Control
- Clam and Coral Restoration
- Marine Protected Areas

In the past MES attended meeting of FLMMA, but staffing turnover currently makes attendance difficult.

The Society receives most of its funding from contributions from member resorts: F\$100 per room per year. They have also received a GEF grant of US\$50,000 covering three years.

MES has cooperated with the Fisheries Department in the past in the sharing of their turtle database and turtle conservation practices, preparation of awareness material, and the re-seeding of giant clams.

Marine and Coastal Biodiversity Management in Pacific Island Countries

The MACBIO program began in June 2013 and has the goal of strengthening management capacity to conserve marine and coastal biodiversity. The five-year program covers Fiji and four other Pacific Island countries. MACBIO has three areas of involvement:

- Integration of economic assessments of marine and coastal ecosystem services in development and conservation planning
- Holistic marine spatial planning
- Supporting effective marine conservation and management

Recognizing that there has been decades of experience by a variety of agencies on marine managed areas, MACBIO will carry out analysis on bottlenecks for up-scaling of current efforts. Some emphasis will be on encouraging and supporting areas that have had much attention from outside agencies in the past such as Macuata Province or Kubulau in Bua to review and document efforts and outcomes to strengthen their role as “learning sites”.

To carry out the work program, MACBIO is implemented in close collaboration with two partner agencies: IUCN and SPREP, with some staffing in those agencies paid by the program. The general idea is for MACBIO to rely on a limited number of core staff (presently three professionals) and therefore smaller overheads so that available funding can support existing structures and efforts by national stakeholders in the five partner countries.

MACBIO is funded by the Federal Ministry of Environment of the German government. Its budget for a five-year period is Euro 8.1 million (US\$10.2 million). Since the German Government aims to support the efforts of state parties to the Convention on Biodiversity to fulfil their national commitments under the Strategic Plan for Biodiversity 2011-2020, the

MACBIO focal points in the five partner countries are the national CBD focal points in each Ministry of Environment.

The Program is relatively new so its interactions with the Fisheries Department have been limited to dialogues on government priorities and available forms of support through the 3 MACBIO core components.

Because the program is relatively new, it is premature to identify or analyse successes. One of the biggest challenges has been to deal with rotation and replacement of technical staff in government agencies, as well as to identify technically strong and available people to work with at the site level.

Department of Environment

The Environmental Management Act provides the mandate for the Department of Environment, and therefore the law determines to some extent the involvement of the Department in coastal fisheries. In practice most of their involvement in fisheries is on the level of policy and coordination, especially in the area of complying with Fiji's international commitments.

The document *Implementation Framework 2010-2014 for the National Biodiversity Strategy and Action Plan 2007: Fiji Islands* has several thematic areas, one of which is on inshore fisheries – and provides insight on the thinking of the Department Environment on the main issues and government institutional responsibilities in inshore fisheries. The inshore thematic area has nine strategies:

- Promote sustainable aquaculture for restocking
- Promote biodiversity tourism
- Maintain existing protected areas
- Design new ecologically relevant inshore MPAs
- Strengthen natural resource leadership, management, and governance
- Promote education and awareness in environmental science
- Improve communication between Department of Environment and Department of Fisheries on relevant biodiversity and food security issues
- Reform fisheries legislation and management institutions
- Reduce demand for marine natural resources and biodiversity products

In the above Implementation Framework the Department of Environment is not listed as a lead agency under most of the nine strategies, whereas the Fisheries Department is listed as a lead agency under eight of the strategies.

The Fisheries and Environment Departments have a substantial amount of interaction with each other. This occurs on the various committees (e.g. Inshore Fisheries Sub-Committee of the National Biodiversity Steering Committee), the issuing of CITES permits, formulation of awareness/educational material, dealing with endangered/threatened/protected species, and carrying out environmental impact assessments.

According to staff of the Department of Environment, their biggest challenge related to coastal fisheries is the difficulty of establishing effective coordination between the various government agencies that have over-lapping responsibilities.

iTaukei Affairs Board

In 2011 the iTaukei Affairs Board made the decision to pursue increased environmental capacity through placement of provincial conservation officers in each of Fiji's fourteen

provinces. These provincial conservation officer positions are full time, with 100% of officers' time dedicated to supporting Fijian communities on the ground with conservation initiatives and resource management. These conservation officers are native Fijians, reside in the province to which they are assigned, and possess experience in the environmental field as well as a degree from a reputable university in a relevant field of study. Conservation officers are coordinated by the Provincial Services Division in the Board's headquarters in Suva, and report on a day-to-day basis to the Roko Tui and Provincial Office staff.

There are currently nine Conservation Officers in the provinces. There are plans to have 16 such officers in the provinces by the end of 2015.

The responsibilities of the Conservation Officers that are specifically related to coastal fishery management include:

- Developing natural resource management committees at the provincial, district and village levels
- Working with communities to inventory natural resource assets and develop natural resource management plans
- Connecting national environmental legislation, policies and programs with Fijian communities.
- Partnering with the FLMMA network, NGOs, and fisheries and other line officers working in the provinces.
- Conducting awareness programs on sustainable fishing practices.

According to discussions with staff of the iTaukei Affairs Board, the focus by conservation officers on land or coastal issues depends on the province in which they are based. In most provinces the balance would be about 50/50. Each officer works to targets set in work plans.

The cost of a conservation officer is currently about F\$23,000 per year, including salary, travel and some project money. The conservation officers are funded from a variety of non-government sources: in Kadavu (GEF grant), in Ra (ADB Coral Triangle Initiative), in Serua (Pacific Blue), CMB and Rewa (Packard Foundation) and in Lomaiviti (MacArthur Foundation). There is a proposal for government funding of conservation officers in the 2015 budget.

The amount of interaction between the conservation officer program and the Fisheries Department is not great. An officer from the Fisheries Department came to the launching of the program in January 2014. In the provinces the conservation officers (because they have no power of enforcement) sometimes seek fisheries officers for matters dealing with illegal fishing. It appears that the staff of the conservation officer program interact more with the Environment Department than with the Fisheries Department.

The biggest success of the program has been the acceptance of the validity of the concept of Conservation Officers. An example of site specific success has been the halting of an illegal beach mining operation. The major challenges have been (a) the reality that some senior provincial government officials are not very conservation oriented, (b) it is difficult and expensive to get travel around provinces, and to get where the work needs to be done and (c) sometimes conservation officers are encouraged to be office help rather than focussing on conservation.

Fiji Navy

The Navy's main involvement with coastal fisheries is in surveillance for illegal fishing and in search/rescue of people that have gone missing while fishing. The Navy carries out about 30 to 40 coastal patrols per year, and concentrates on the west and north of the country.

Often these patrols involve one of the Navy's offshore vessels to act as a mother ship, with the actual surveillance and apprehension by outboard-powered fibreglass skiffs. In a typical patrol several illegal activities will be detected in the first few days, with a notable decline thereafter, presumably as the illegal fishers communicate with each other. The most common offence is commercial fishing in an area without the proper license followed by use of underwater breathing apparatus without an exemption. Because the Navy staff do not have fisheries enforcement powers, illegal fishers that are apprehended are turned over to the police or Fisheries Department.

According to the Commander of the Navy, the Navy indicates to the Fisheries Department when they are going to depart on a patrol and invites the Department to send along staff – but many times nobody from Fisheries participates. The Navy feels that the Department should be much more proactive in coastal fisheries patrolling work. Another recommendation of the Navy is that the Fisheries Department should prioritize coastal fisheries surveillance above that for offshore – because there is much more illegal activity in coastal area and that activity negatively affects Fijians more than any offshore illegal activity.

Secretariat of the Pacific Community

For over sixty years SPC has been providing assistance to Fiji in matters regarding coastal fisheries. This has covered almost every facet of the work program of the Fisheries Department. A major difference between the work of SPC and that of the NGOs is that for SPC to do work specifically in Fiji, there must be an official request from the government of Fiji.

In recent years the most substantial work done by SPC in Fiji coastal fisheries has been the survey work to provide information on reef fisheries during four periods from 2002 to 2007 (in the DemEcoFish and PROCFish/C projects). The work took place at Dromuna, Muaivuso, Mali, and Lakeba. According to SPC, the objective of the work was to provide baseline information on the status of reef fisheries, and to help fill the massive information gap that hinders the effective management of reef fisheries.¹²

In more recent years a prominent feature of the SPC assistance to Fiji in coastal fisheries has been training: beche de mer survey techniques, database development, creel survey, and underwater visual census. SPC has done much work on beche de mer on Fiji: a study of the status and management in Fiji, the preparation of a beche de mer management plan, and sheets in the Fijian language describing simple management options for specific groups of fishery resources. SPC also provided input on the draft Inshore Fisheries Management Decree. It should also be noted that periodically SPC convenes a Heads of Fisheries Meeting that gives an opportunity for senior fisheries officials from Fiji to learn of fisheries developments in the regional and exchange views with other Pacific Island countries.

A major challenge for SPC in carrying out work related to coastal fisheries in Fiji is obtaining timely feedback from the Fisheries Department on enquires related to the work.

Other NGOs and Agencies with Involvement in Fiji's Coastal Fisheries

- The Coral Reef Alliance had an office in Fiji for several years and was on the FLMMA executive committee. It had involvement in coastal fisheries in Kubulau and the Tuva

¹² It is likely that this survey was the model that the current marine resource inventory work is based on.

catchment area. Since July 2013, when the sole full-time employee in Fiji left the organization, the office has been staffed on a part-time basis.

- The Pew Charitable Trusts have had considerable involvement in recent years with conservation of sharks in Fiji.
- The Trust for Conservation Innovation assessed the state of enabling conditions in Fiji that are critical for a community-driven, rights-based management approach to coastal marine resources.
- The Society for the Conservation of Reef Fish Aggregations has been involved in studying grouper spawning aggregations in Fiji for several years, with a focus on Kadavu.
- The Environmental Defenders Office NSW has been working on legal capacity building and has been a major partner of the Fiji Environmental Law Association.
- The University of the South Pacific (other than the IAS mentioned above) has compiled a fisheries bibliography for Fiji, and through the Technical Report series of Marine Studies Programme has published many documents on Fiji's coastal fisheries (e.g. *the Fisheries and Marine Environment of Ono-I-Lau*). Many student projects and subsequent reports have involved coastal fisheries in Fiji.
- The University of British Columbia has carried out several studies aimed at estimating the production from Fiji's fisheries and an analysis of gaps of information on fisheries.
- The Asian Development Bank has recently funded work in Fiji related to coastal fisheries through its Coral Triangle Initiative. It carried out the Fiji Fisheries Sector Review in 2004 and had a Fiji chapter in its 2009 book quantifying benefits from fisheries.
- The World Bank carried out a study of coastal resource management at six locations in Fiji in 1999 ("Voices from the Village") and a short review of the Fiji fisheries sector in 1995.
- The Food and Agriculture Organization of the United Nations has had involvement in coastal fisheries in Fiji for over 50 years. Relatively recent work has include a studies about various topics: traditional marine management in Macuata, spearfishing, safety at sea, and qoliqoli management. A request to FAO for the formulation of a fisheries policy is now pending.
- The Forum Fisheries Agency since the mid-1990s has been primarily responsible for providing assistance for offshore fisheries, but it recently was involved in the formulation of the Inshore Fisheries Management Decree. In 1994 FFA produced the extremely useful *Fiji Fisheries Resources Profiles*.
- The Australian Centre for International Agriculture Research carried out the extensive survey of subsistence and artisanal fisheries of Viti Levu in 1995 (published), which was followed up with a similar exercise in Vanua Levu (data lost).
- Japan largely funded the Wainikoro Rural Fisheries Service Centre in Vanua Levu and a fisheries jetty project in Lami.
- China funded the vessel *Bai ni Takali* (US\$2.9 million) which is intended to be used for "exploratory fishing, targeting other species apart from tuna, and procuring and buying marine resources from outer islands".
- The European Union funded the Procfish/C work described above and recently a project to raise fishery stakeholder awareness of the proposed fisheries legislation.

Appendix 4: Abbreviations Used in this Report

ADB	Asian Development Bank
CITES	Convention on International Trade in Endangered Species
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
FLMMA	Fiji Locally-Managed Marine Area
GDP	gross domestic product
HIES	household income and expenditure survey
HQ	Headquarters
IAS	Institute of Applied Science (of the University of the South Pacific)
IUCN	International Union for the Conservation of Nature
MPA	marine protected area
NGO	non-government organization
OFD	Offshore Fisheries Division
PCDF	Partners in Community Development Fiji
SPC	Secretariat of the Pacific Community
UNDP	United Nations Development Program
USP	University of the South Pacific
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature