



**Valuing the contributions
of Fijian fishers and traders
of Indian descent to small-
scale fisheries in Fiji**

This study was supported by a grant from the John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD).

Copyright: ©2021 Wildlife Conservation Society

<https://doi.org/10.19121/2020.Report.38151>

All rights reserved. This publication may not be reproduced in whole or in part and in any form without the permission of the copyright holders. To obtain permission, contact the Wildlife Conservation Society's Fiji Country Program, infofiji@wcs.org

Cover photographs: Shiri Ram, RAW Fiji

Layout and design: Kate Hodge

This document should be cited as:

Nand Y, Mangubhai S, Audh R, Bhan N, Kumar A (2021) Valuing the contributions of Fijian fishers and traders of Indian descent to small-scale fisheries in Fiji. Wildlife Conservation Society. Report No. 01/21. Suva, Fiji. 45 pp.

Acknowledgements: Foremost we thank all of the fishers and traders who participated in the surveys and for speaking so openly about their roles in different fisheries in Fiji. We acknowledge the support of the provincial offices of Ba, Bua, Cakaudrove, Macuata, and Ra which made this study possible. We are grateful to the Ministry of Fisheries, especially Saras Sharma, for her guidance on different groups of fishers and identifying key data gaps. We thank Robert Howard for editing this report. This work was funded through the generous support of John D. and Catherine T. MacArthur Foundation. Human ethics approval was granted in February 2019 by the Wildlife Conservation Society's Institutional Review Board.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION	3
2 METHODS	5
2.1 Field surveys	5
2.2 Data analysis	6
3 RESULTS AND DISCUSSION	7
3.1 Demographics, fishing strategies and practice	7
3.1.1 Demographics	7
3.1.2 Fishing experience and motivations	8
3.1.3 Fisheries strategies and habitats	9
3.1.4 Fishing patterns and effort	10
3.1.5 Fishing technique and assets	12
3.1.6 Fish storage and spoilage	13
3.2 Targeted fisheries and catch	14
3.3 Seafood sales	17
3.4 Fisheries dependence for food and livelihoods	22
3.4.1 Fish consumption levels	22
3.4.2 Income for fisheries actors	23
3.4.3 Fisheries actors and their livelihood sources	23
3.4.4 Fishing and fish trading as a stable livelihood source	25
3.4.5 Changes in fish population	27
3.5 Resources and information	29
3.5.1 Access to fishing grounds	29
3.5.2 Fairness of the licensing system	29
3.5.3 Fisheries management	30
3.5.4 Access to credit	30
3.5.5 'Voices together'	32
3.5.6 Access to information	34
3.6 Challenges	36
4 CONCLUSION	38
5 REFERENCES	39

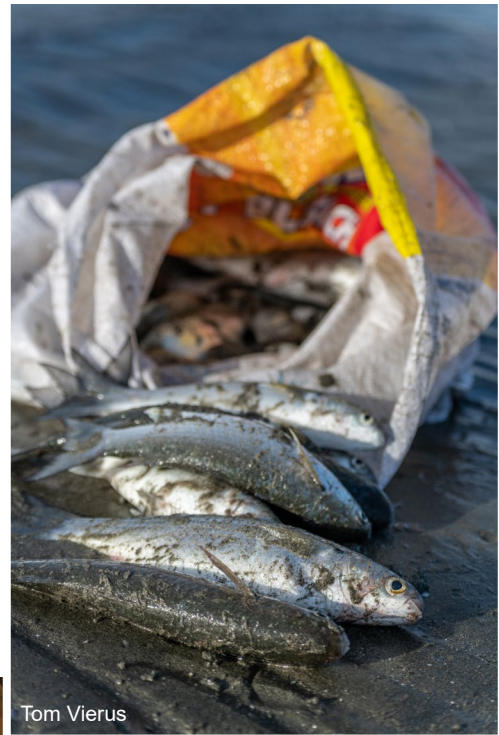
EXECUTIVE SUMMARY

Fijians of Indian decent (or Indo-Fijians) are the second largest ethnic group in Fiji, making up 37.5% of Fiji's population. Many of them are descendants of Indian labourers who came to Fiji during the British colonial rule under the indenture system between 1869 to 1916. There is remarkably very little documented on the marine resource-related economic specialisation of different ethnic groups, especially in the fisheries sector. To address this gap, the Wildlife Conservation Society led a study to document the critical role and contribution of the Indo-Fijian fishers and traders to small-scale fisheries in Fiji. The study also examined their dependence on fisheries, the challenges they face, their access to resources (including financial, information), and engagement in fisheries management.

A total of 173 fisheries actors were interviewed from February to April 2019 that comprised of independent fishers, boat owners, crew members and traders from the towns in Ba, Tavua and Rakiraki on Viti Levu and Labasa and Savusavu on Vanua Levu. These towns were selected because some of the highest concentration of Indo-Fijian fishers and traders reside and operate from these centers. For this report independent fishers, boat owners and crew members were collectively referred to as 'fishers'.

The key findings of this study were fisheries actors main motivation for fishing or fish trading was income and food. Many had investments in the sector spanning (on average) three decades for fishers, and two decades for traders. Indo-Fijians fishers are mostly men, with women preferring to be involved in fish trade and sales. A large majority of fisheries actors were self-employed while specific groups such as crew members worked for a boat owner or a company; some independent fishers also worked for other companies. The main habitats fishers targeted were coral reefs and oceanic habitats, followed by deepsea slopes (targetted for deepwater snapper and groupers). Some fishers targetted mangrove and nearshore areas for mud crabs, reef crabs and other invertebrates. Most seafood was traded live or frozen, with little investments in post-harvest processing.

For 84.4% of fisheries actors, fishing and fish trading was the most important livelihood source, while 6.2% stated farming was their most important livelihood source and fishing was an additional income source. About 88% fishers and more than half of the traders stated that fishing and fish trading provided for almost all their financial needs. A large majority of fisheries actors still depended on fisheries as their their only source of livelihood. However, when asked about whether



Tom Vieras



Sangeeta Mangubhai/WCS

fishing and fish trading provided a stable livelihood, more than half of boat owners (64.0%), independent fishers (59.6%), crew members (50.9%) and traders (50.0%) stated it was a stable livelihood source. Just under half (45.7%) of fisheries actors earned less than \$5000 a year, while another 31.2% earned between \$5000–10,000 annually. Only 0.6% of fisheries actors earned the higher range (\$50,000–75,000) annually, while 4.0% earned between \$30,000–40,000 annually. Those with low income struggled to access to financial support, and many fishers depended on their employers, family members and relatives, friends and money lenders for loans. Only 36.4% of fisheries actors stated they had been successful in getting formal loans, while 63.6% stated they had not been successful or had never applied for a loan. Crew members reported the highest percentage of unsuccessful loan applications (76.8%) compared to traders who reported the highest percentage of successful applications (64.7%).

When asked how they see the fish population overtime, fishers largely stated that fish stocks were declining (70.8%) or rapidly declining (10.2%), while some fishers (17.0%) perceived fish stocks as stable or increasing (1.5%). The reasons given for the decline in fish stocks were: climate change (34.5%), cyclones (22.3%), destructive fishing practices (18.7%), habitat damage (11.5%), an act of god (2.2%), or too many fishers allowed to fish in one fishing ground (0.7%). About 10.1%, who stated that fish stocks were declining did not know the reasons for the decline.

Similar to all commercial fishers, Indo-Fijian fishers must apply for fishing permits to access state waters or customary fishing grounds. Many (>70%) were aware of *tabu* areas within customary fishing grounds or stated it was listed on their fishing licences. The majority (89.9%) stated they had good relations with the *iTaukei* communities with traditional rights to inshore fishing grounds. The study found that some fishers have to negotiate with community leaders and pay about \$100–500 and in rare cases up to \$3000 annually to access traditional fishing grounds. Some fishers stated that they were asked for a payment in return for consent to use fishing grounds, while some agreed to pay out of a wish to support the communities. For fishing grounds where payments were requested, fishers were asked to make in-kind payments, including fish worth the amount requested, kava, food items, and fishing gear. If the fishers were not able to make the payment, some communities do not allow them to fish.

Overall, some of the challenges fishers faced included shortage of ice, availability of fishing bait, road and landing sites infrastructure, purchasing and maintenance of boats, and not being able to afford engine and fishing gear given their low income from fishing. They also raised concerns about the challenges of the current boat and fishing licensing systems, and the depletion of fisheries resources (i.e., fish sizes and volumes) resulting from the high number of fishers accessing the same fishing grounds. Furthermore, some fishers explained unpredictable weather conditions can severely reduce the number of fishing trips a fisher can do monthly, which can affect their income.

Indo-Fijian fisheries actors play an important in Fiji's small-scale fisheries sector and contribute significantly to the national economy. The authors hope this baseline study will inspire others to expand their investments to engage and include all ethnic groups that engage in fisheries. The long-term sustainability of Fiji's fisheries will depend on the engagement of all those who are dependent on the sector for food and livelihoods.



1 INTRODUCTION

The large majority of Fiji's population resides in coastal areas and is highly dependent on marine resources for food, livelihoods and cultural practice (Fache and Pauwels 2016).

Fiji is a multi-cultural nation with the population at 884,887 (2017 census) and comprising Indigenous Fijians or *iTaukei* (56.8%), Fijians of Indian descent or Indo-Fijians (37.5%), and 'other' ethnic groups (5.7%) including Rotumans, Chinese, i-Kiribati, part-European and other Pacific Islanders (Fiji Bureau of Statistics, 2018). There is ongoing dialogue about the most appropriate or preferred term to describe Fijians of Indian descent. This report does not favour one over another, but for simplicity adopts the commonly used self-descriptor 'Indo-Fijian'.

Fiji's colonial history has shaped its socio-political environment, identity and the relationships between different ethnic groups (Firth and Naidu 2019). Indians from various parts of India were brought to Fiji between 1879 and 1916 under the British colonial rule known as the indenture system (Ali 1979). Within the indenture system, Indian labourers were expected to serve a bond for five years working mainly on sugarcane farms in servitude (referred to as the *Girmit era*), and were allowed to extend this deal for another five years if they wished to or return to their homeland (Prasad 2004; Rai 2010). At the end of the indenture bond, Indian labourers were allowed to stay in Fiji and work on sugarcane farms and earn minimum wage (Ali 1979). For many of the Indian labourers who stayed back, their descendants now make up the second-largest ethnic group in Fiji.

The land-based economic specialisation between the two largest ethnic groups in Fiji is unique, where *iTaukei* who are Indigenous custodians of land and sea, focus on subsistence and commercial agriculture and the public sector, while Indo-Fijians concentrate more on sugarcane and commerce (Firth and Naidu 2019). However, Indo-Fijians have diversified their livelihoods over the decades and are now heavily invested in Fiji's agricultural and fisheries sectors. There is remarkably very little documented on the marine resource-related economic specialisation of different ethnic groups, and specifically the role and contributions of Indo-Fijians to the country's fisheries sector. The fisheries sector, which is the third-largest natural resource-based sector contributed around 1.8% to GDP and 7% of Fiji's total export earnings in 2017 (Fiji Bureau of Statistics 2018). Fisheries is an important source of employment, with subsistence and commercial coastal fisheries contributing an estimated US\$63.8 million to the country's national GDP (Gillett, 2016).



Tom Vierus



Tom Vierus

Inshore waters extending from the foreshore to the outer reef edge are subject to a dual system of management under both customary and statutory laws (Sloan and Chand 2016). There are 411 registered fishing grounds (*qoliqoli*) within which *iTaukei* communities have customary fishing access and use rights. Due to their historical migrant status during British colonial occupation, Indo-Fijians and other ethnic groups do not have traditional fisheries access rights. The ownership of the seabed and overlying resources rests with the State, which retains the power to legislate or regulate resource use including commercial fishing within customary fishing grounds.

The Fisheries Act (1942) states that all Fiji citizens can fish and harvest from the sea for subsistence purposes, *regardless of ethnicity*. However, all commercial fishing and harvesting activities must apply for a commercial fishing license, and the process applies to all, including *iTaukei* fishers (Ministry of Fisheries 2019). Commercial fishing licenses for inshore water requires signed consent from the *iTaukei* chief or community leader, those requiring access to specific customary fishing grounds for commercial purposes, have provided 'goodwill payments' to access their desired fishing grounds (Veitayaki 1998). This historic practice can include a cash payment or in-kind payment such as a certain amount of kava (*yaqona*) or fish provided and may be applied to any fisher, regardless of ethnicity (Veitayaki 1998). However, with no guidelines on goodwill payments, it is unclear how these payments are used for community benefit, or whether this system creates a space for abuse and corruption (Veitayaki 1998; Reddy 2019; Mangubhai et al., 2021). Because goodwill payments were inconsistent across geographies and impacting fishers disproportionately, in 2017 the Ministry of Fisheries announced a ban of 'goodwill payments' until there were clear guidelines established in place for customary fishing grounds (Reddy 2019).

Indo-Fijians as resource users, have limited engagement and participation in fisheries management and decision making processes (Reddy 2019). Historically, efforts to improve inshore fisheries, especially by government agencies, environmental non-government organisations and academic institutions have focused on *iTaukei* communities because they are the custodians of inshore fishing grounds (Fache and Pauwels 2016). For example, there is a diversity of work written on *iTaukei* communities in the fisheries sector (e.g. Purcell et al. 2013, 2014a, 2014b, Mangubhai et al. 2016, 2017; Vitukawalu et al. 2020; Thomas et al. 2020, 2021). In contrast, the knowledge, role, contribution, and the magnitude and investment of the Indo-Fijians in the fisheries sector is poorly understood, and therefore somewhat undervalued. As a result, there is an assumption that Indo-Fijians (and perhaps other ethnic groups) have less responsibility for sustainably using and managing marine resources than *iTaukei* communities do.

To address this gap, this study documented the critical role and contribution of the Indo-Fijian fishing community to Fiji's small-scale fisheries sector. The study also examined their dependence on fisheries, the challenges they face, their access to resources (including financial, information), and engagement in fisheries management. The term small-scale fisheries is used rather than coastal fisheries because some fishers target fisheries inside and/or outside customary fishing grounds, and the size of the boats used are less than 30 feet.



2 METHODS

2.1 Field surveys

Interviews were conducted with the Indo-Fijian fishing community engaged in small-scale fisheries in Fiji. The major fisheries actors targeted for this study were:

- *Independent fishers* – fishers, who largely fish for themselves and sell their catch to traders and/or consumers;
- *Boat owners* – individuals, who own fishing boats, hire crew members, and may or may not be a fisher themselves;
- *Crew members* – fishers, who work for a boat owner and are paid based on a trip's catch; and
- *Traders* – middlemen or middlewomen who buy fish from fishers and sell to the customers at various locations that include markets, roadside stalls or retail stores.

Throughout this report, the term '*fishers*' refers collectively to independent fishers, boat owners and crew members, unless stated otherwise. However, during the interviews and subsequent consultation workshops, it was highlighted that other actors are also part of the Indo-Fijian fishing community such as transport providers, boat builders and boat washers.

To guide the design of the survey, the Wildlife Conservation Society undertook a scoping exercise in August 2018 with 15 Indo-Fijian fisheries actors in Labasa, Vanua Levu, to understand the role and investments of Indo-Fijian fishing communities in the small-scale fisheries sector. The half-day workshop provided the opportunity for the participants to help define the scope of the survey and the types of issues that should be covered to help provide a "collective voice". As a result, two questionnaires were designed to target fishers (i.e. independent fishers, boat owners, crew members) and traders. The final questionnaires comprised 55 questions across five key thematic areas:

1. fishing strategies and practice;
2. fishing catch and effort;
3. livelihood dependence;
4. challenges faced by Indo-Fijians; and
5. types of support needed to improve their contribution to the small-scale fisheries sector.

A total of 173 Indo-Fijian fisheries actors, comprising of 57 fishers, 25 boat owners, 57 crew members and 34 traders, were



interviewed across five town centres in Fiji from February to April 2019 (Table 1). Surveys were conducted in Savusavu and Labasa on the island of Vanua Levu, and in Ba, Tavua and Rakiraki on the island of Viti Levu (Fig.1). All interviews were conducted in Fiji-Hindi language and each interview took between 60 and 90 minutes. All fishers and the majority of traders interviewed were men, as very few Indo-Fijian women are involved in small-scale fisheries. However, 10 of the 34 traders interviewed were women from Labasa (n=6) and Savusavu (n=4). All financial data presented in this report are in Fijian dollars (FJD).

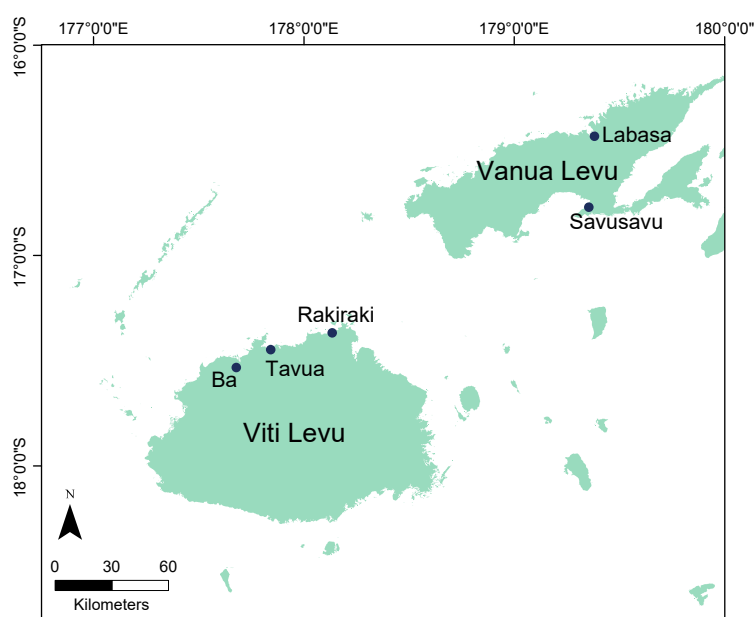


Figure 1. Map of the town centres where interviews were conducted with Indo-Fijian fishing communities across Viti Levu and Vanua Levu.

Table 1. The number of Indo-Fijian small-scale fisheries actors interviewed across five town centres in Fiji.

Island	Town	Independent fisher	Boat owner	Crew member	Trader	Overall
Vanua Levu	Labasa	12	7	10	9	38 (22.0%)
	Savusavu	3	4	5	10	22 (12.7%)
Viti Levu	Ba	25	5	34	15	79 (45.7%)
	Tavua	8	3	1	-	12 (6.9%)
	Rakiraki	9	6	7	-	22 (12.7%)
Overall (n)		57	25	57	34	173
Overall (%)		33.0%	14.4%	33.0%	19.6%	

2.2 Data analysis

All data was analysed using Microsoft Excel version 16 and R programming software (version 3.6.3). To ensure confidentiality, no personal identifiers were used in the database, and data were aggregated at the town level. Data were pooled by fisheries actor and location as needed. Data on the frequency of fishing trips differed between participants (e.g. trips per week, trips fortnightly, trips per month) were converted to trips per month for consistency. Where study participants did not provide the exact number of fishing days per week but a range (e.g. 3–5 days per week), the lower end of the range was used for the calculation to avoid overestimated values. Where data gathered used different units and could not be pooled together, the results were reported on the individual units used by participants. For example, catch data with different units (weight, piece, bundle) were analysed and reported separately to avoid any under or overestimation of catch. Where specific names for fish or habitats were not provided, the common local term such as ‘*grounding fish*’ or ‘*floating fish*’ were used, and cross-referenced with the Ministry of Fisheries’ inshore fisheries licensing unit. To calculate sale price, an average price and range (minimum and maximum value) was calculated for the different units used to sell seafood. For example, fish sales were calculated by bundle, weight and piece and presented separately as there was no other way to qualify their actual income. All graphs were developed in R using ggplot 2 (version 3.3.2).

3 RESULTS AND DISCUSSION

3.1 Demographics, fishing strategies and practice

3.1.1 Demographics

Indo-Fijian fisheries actors interviewed were from the towns of Ba, Rakiraki, Tavua, Labasa and Savusavu (Table 1). The highest number of fisheries actors (45.7%) were interviewed from Ba town and independent fishers and crew members made up the highest percentage of fisheries actors interviewed for this study. The majority of the fisheries actors (94.8%) interviewed were between the age group of 31–60 years, with only eight fishers greater than 60 years of age, and one fisher under the age of 20 (Fig. 2). The majority of fisheries actors (79.2%) had lived in the same location between 21–60 years, while a small number (2.3%) had just moved to the current location; 4.1% had lived in the same location for more than 60 years (Fig. 2).

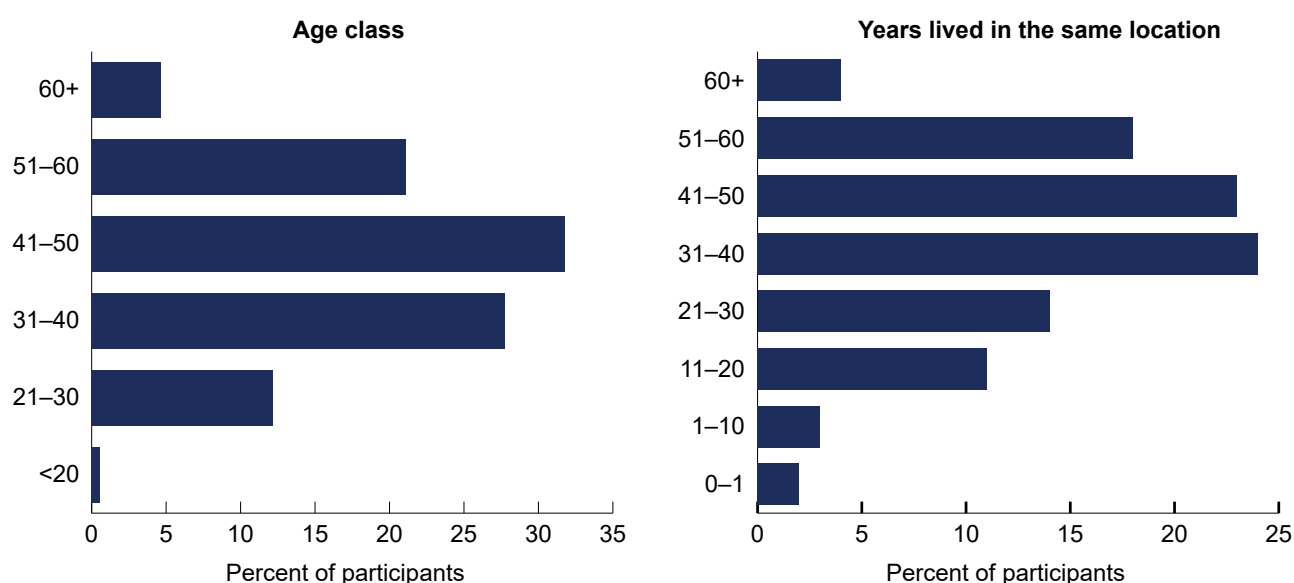


Figure 2. Percent of Indo-Fijian fishers and traders interviewed by the age class (left) and years lived in the same location (right).

In terms of marital status, the majority of the fisheries actors interviewed were married (79.8%) while the rest were single (9.8%), separated (5.2%) or widowed (5.2%) (Fig. 3). Most fisheries actors had received some secondary (38.2%) or some primary education (32.9%) and a small percent (3.4%) had never attended school (Fig. 3). None of the crew members or traders had any tertiary education, compared to 12.0% of boat owners and 10.5% of independent fishers that had completed some level of tertiary education. Just over a third of crew members (38.6%) and independent fishers (36.8%) had incomplete levels of primary education or had never attended school.

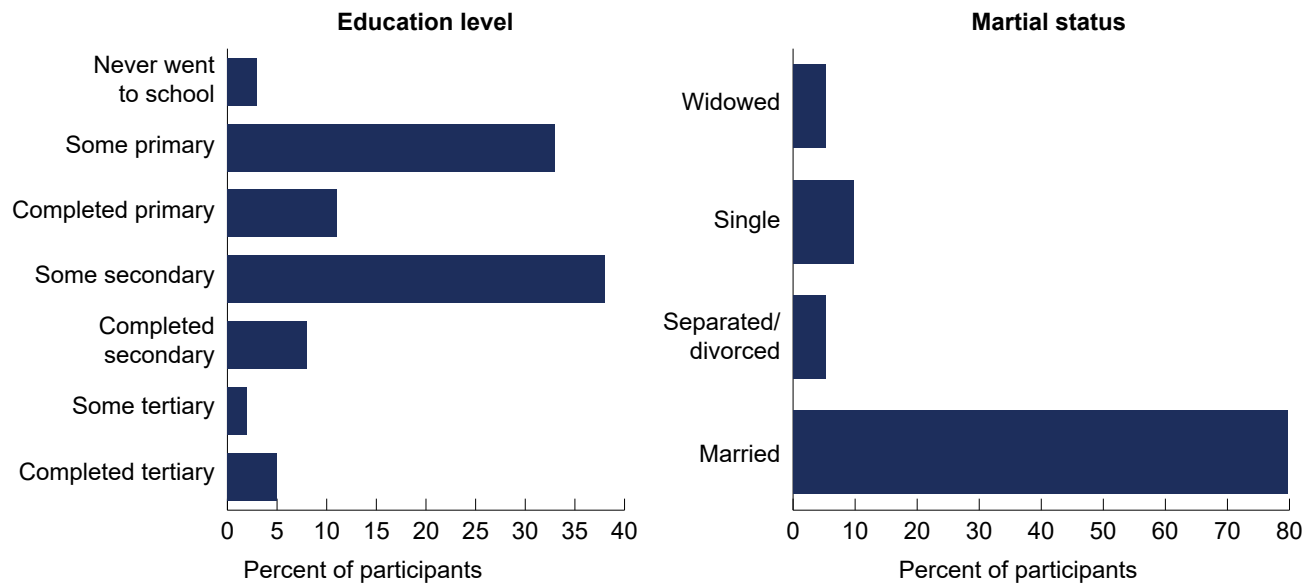


Figure 3. Percent of Indo-Fijian fishers/traders grouped by the level of formal education (left) and by their marital status (right).

3.1.2 Fishing experience and motivations

Very few Indo-Fijian women fish (e.g. Reddy 2019) but only male fishers were available for interview. When asked about their experience, the majority of Indo-Fijian fishers had been fishing for an average of 20 years (range <1 to >45 years), indicating a long-term commitment to the fisheries sector. Fishers were mainly involved in the small-scale fisheries sector for income (67.4%) and/or food (30.6%), with only a small percent fishing for social and/or cultural events (2.0%) (Fig. 4). Some variation was observed in the motivations for fishing between locations; for example, all fishers in Rakiraki fished for income, while those in other towns retained a portion of the catch for household consumption.

Despite Indo-Fijian men dominated the sector, some Indo-Fijian women worked as traders and represented 29.4% of traders interviewed. Overall, traders have been in the business for an average of 10 years (range 1–37 years), and this was fairly similar across towns (Ba=11 years, Labasa=9 years, Savusavu=10 years).



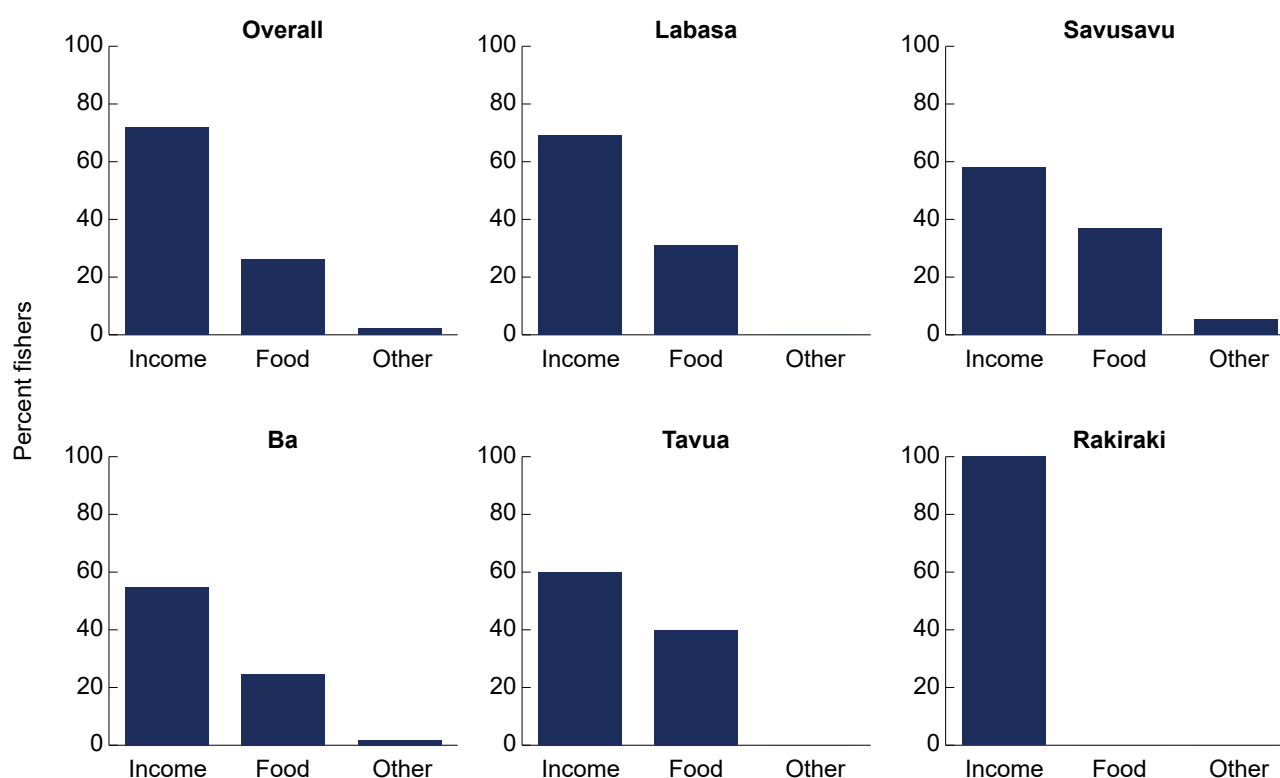


Figure 4. Main reasons why Indo-Fijian fishers (comprising independent fishers, boat owners and crew members), engaged in fishing activities.

3.1.3 Fisheries strategies and habitats

To understand how Indo-Fijian fishers operated, a series of questions were asked to determine if they were largely self-employed or worked for other people or a company, and if they were accompanied by others on fishing trips. The study found independent fishers (96.5%) and boat owners (100%) were largely self-employed, where only one independent fisher stated he worked with the spouse. In contrast, crew members were largely employed by a boat owner (77.2%), a company (21.1%), or by relatives (1.7%). On fishing trips, fishers were largely accompanied by other fishers (79.9%), their spouse (0.7%), or other household members or relatives (14.4%). Very few (0.5%) went on fishing trips alone. Similar to fishers, traders were largely self-employed (85.4%), though some work for their relatives (8.8%), have a family business (2.9%), or a company (2.9%).

To document the types of fisheries Indo-Fijians engaged in, a series of questions were asked on fishing grounds and the habitats they accessed. The three most common habitats targeted were coral reefs (53.5%), followed by oceanic¹ (29.7%) and deepsea² (11.5%) (Fig. 5). In Viti Levu, the results also showed that slightly more than half of the fishers (52.5%) interviewed accessed fishing grounds in Ba Province targeting a diverse range of habitats (Fig. 5). It was also noted that these fishers were mostly from Ba and Tavua towns. Nearly 20% of the fishers interviewed accessed fishing grounds in the Ra Province and largely resided in the towns of Ba, Tavua, and Rakiraki. Fishers from Tavua town fished in specific habitats while those from Rakiraki fished in a range of habitats (Fig. 5). On Vanua Levu, fishers interviewed from Labasa and Savusavu towns targetted fishing grounds in the provinces of Bua (14.4%), Macuata (7.9%) and Cakaudrove (7.9%). The most common habitats targeted by these fishers were coral reefs and oceanic habitats while some fishers from Savusavu also targeted deepsea.

¹ These are open ocean habitat beyond the reef edge, in state-owned waters.

² These are at depth >100 m. These habitats are largely targeted to capture deepsea snappers and groupers. This is not a traditional Fijian fishery and was introduced in the late 1960s.

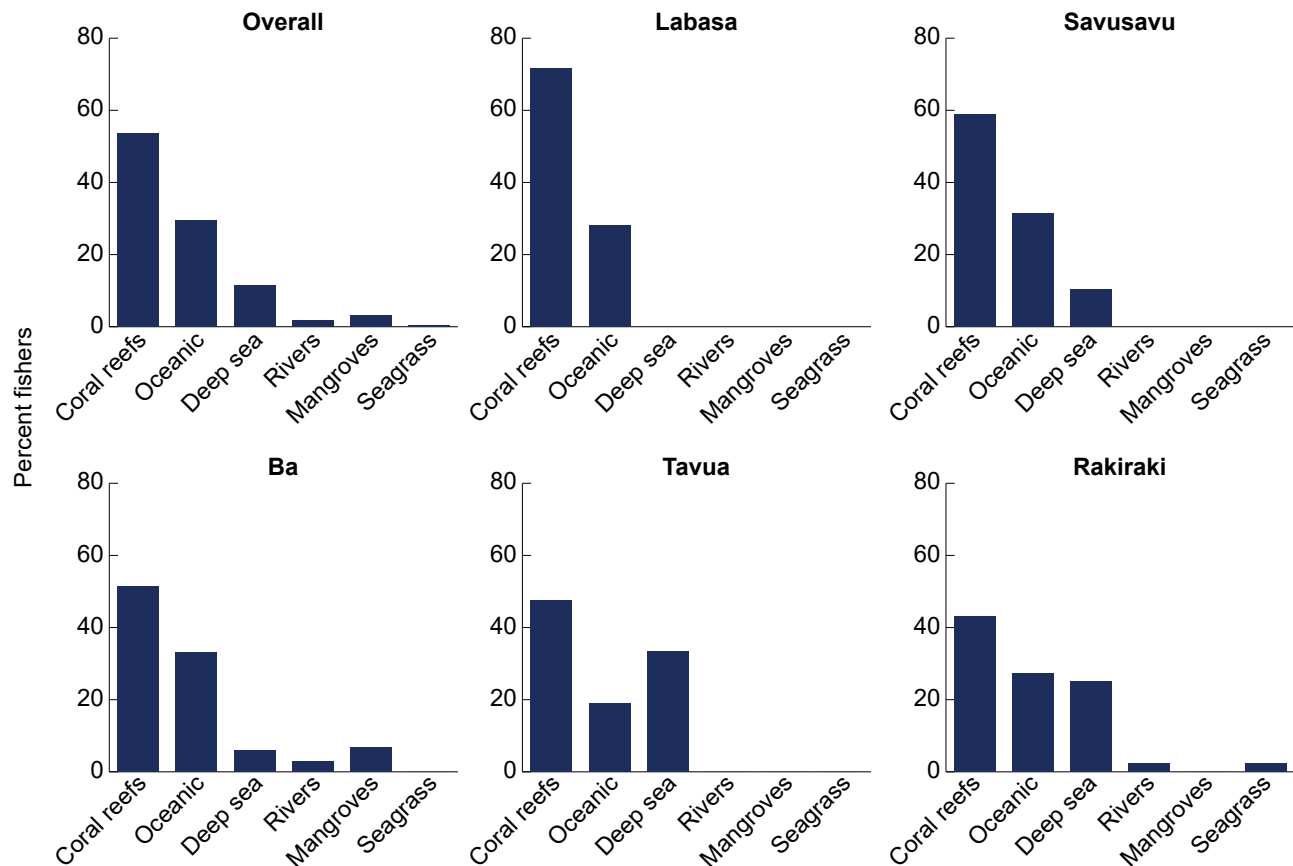


Figure 5. The common habitats Indo-Fijian fishers from different towns targeted for fishing. Fishers comprised independent fishers, boat owners and crew members.

3.1.4 Fishing patterns and effort

To understand fishing effort, fishers were asked how much time they spent travelling and the time they spent fishing. Generally, Indo-Fijian fishers stayed out at sea for 2–14 days with only 10.9% stating they travelled to their fishing grounds on a daily basis. About half of fishers interviewed camped for 3 (30.7%) or 4 (20.4%) days. Only one fisher stated he camped for 2 weeks at sea. Across towns, fishers from Labasa camped for up to 5.2 days on average (range: 1–8 days), followed by fishers in Savusavu, who spend up to 4.2 days at sea (range: 1–7 days). Fishers in Ba and Rakiraki spend 3.5 days on average camping at sea (range: 1–14 and 1–7 days respectively) while Tavua fishers spend on average 2.8 days fishing at sea (range: 2–4 days). Many fishers moved between fishing grounds while at sea, targeting specific habitats. There was some variation in the number of camping days for fishing due to fisher location, fishing grounds, target habitats, weather patterns and catch volume.

In general, those fishing within Bua Province spent the longest time (~15 hours) travelling to their fishing sites, and were from the towns of Labasa and Savusavu. While those fishing in Ra and Cakaudrove provinces travelled the shortest amount of time to reach their fishing grounds. Those fishing in Ra Province were from Ba, Tavua and Rakiraki towns while fishers accessing the fishing grounds in Cakaudrove Province were from Labasa (Table 2). It should be noted that traveling time is the time a fisher needed to travel from his location/town to the various fishing grounds within each province and return.

Furthermore, a fishers spent about 6 to 8 hours per day (on average) fishing, depending on the fishing ground, habitat and weather. Average fishing time was almost similar

across different province as a large majority of the fishers camped at sea and were not spending long hours traveling daily. As expected, fishing time varied between provinces and for fishing sites within each province. For instance, those from Ba fishing within Ra Province spent on average 4.7 hours per day while those from Tavua and Rakiraki spent an average of 7.5 hours per day (Table 2). The variation in fishing time depended on the habitats targeted and the number of days fishers camped at sea.

Table 2. Average time spent (in hours) travelling from fisher location to the different provinces to access fishing grounds and return and average time spent fishing in a day. '-' are fishing grounds not accessed by fishers.

Fisher location	Province in which fishing grounds are accessed									
	Ba		Ra		Bua		Macuata		Cakaudrove	
	Travel	Fishing	Travel	Fishing	Travel	Fishing	Travel	Fishing	Travel	Fishing
Labasa	-	-	-	-	16.6	8.4	13.8	7.8	4.0	4.5
Savusavu	-	-	-	-	3.3	6.3	-	-	4.0	6.8
Ba	6.2	7.7	4.0	5.7	-	-	-	-	-	-
Tavua	4.6	8.4	2.0	8.5	-	-	-	-	-	-
Rakiraki			4.2	8.4	-	-	-	-	-	-
Overall	6.0	7.8	4.0	8.1	14.7	8.1	13.8	7.8	4.0	6.4

Fishers were also asked if there were particular days they started their fishing trips and if there were certain months they preferred for fishing. In most cases (70.3%), fishing trips were organised on random days as fishers plan their trips based on weather conditions and availability of crew members, ice and fishing bait. Fishers has no major preferences for which months they fished (71.9%). However, the months of July to August were the least preferred for fishing because of other commitments that included religious festivals such as Eid al-Fitr, and sugarcane crushing season for those fishers who had other livelihood sources. July to August was also highlighted as the months for reduced income due to the grouper seasonal ban resulting in lower demand for fish. Additionally, less fishing trips were organised in the months of January and February as fishers had to renew boat and fishing licenses. Weather condition and availability of ice and fishing bait had the greatest influence on fishing trips across all towns, followed by moon phase that usually affected catch volumes and fish sale (Fig. 6).



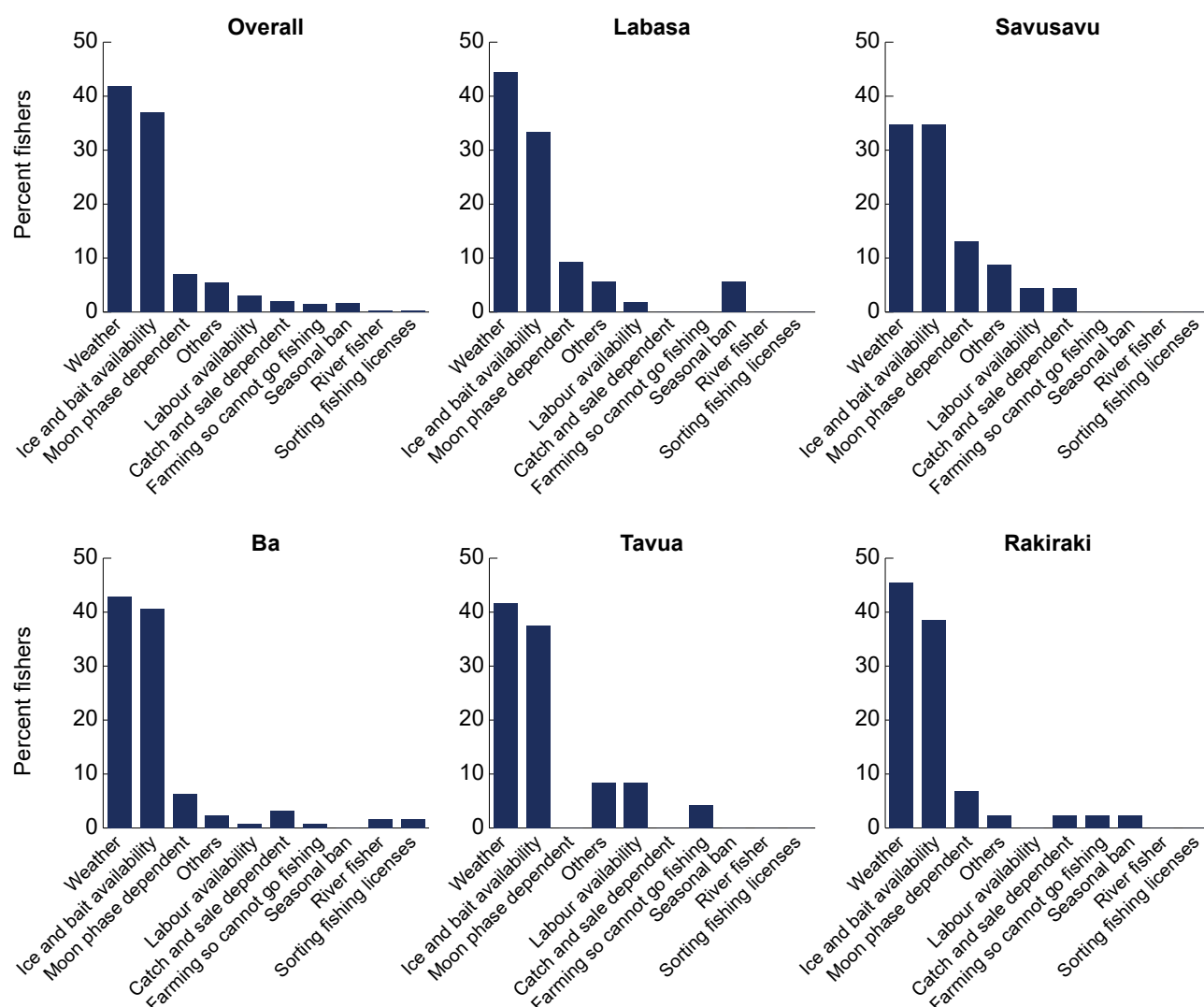


Figure 6. Reasons fishers gave to explain their preferences for fishing specific months of the year.

3.1.5 Fishing technique and assets

Fishing was mostly done using handlines (89.2%), followed by different types of nets including mesh nets (4.8%), handnets (2.4%) and gillnets (1.8%). Net fishing was largely done to catch bait fish. A small number of fishers (1.8%) depend on other fishing methods such as fish aggregating devices (FADs) and crab traps. Crab traps were specifically used in mangrove areas and rivers targeting mud crabs (*Scylla serata*). Fishers from Labasa and Savusavu largely used handlines to catch fish, while fishers in Ba, Rakiraki and Tavua used a wider range of gear types (Table 3).

All fishers travelled to the fishing sites on motorised boats which were mainly owned by boat owners and independent fishers. Some fishers also stated that they use vehicles to travel to the fish landing sites (where they board the boat) while a few also mentioned they walked to the landing sites. Only 26.6% of fishers interviewed answered questions regarding the type of fishing boats used and the size of engines on the boats. The most common types of boats used were wooden half-cabin with inboard engine (89.2%), fibreglass (8.1%) and outboard engine boats (2.7%). The boats used by Indo-Fijian fishers were of various length (15–30 ft) with a range of engine sizes (15–80 hp) (Table 4). However, it should be noted that 13–15 ft boats were used as skiffs to carry gillnets tugged by the main boat, as these boats were too small and not suitable for fishing (N. Singh, pers. comm.)

Table 3. Type of fishing gear used by fishers from a different location. All values represent percentages. Other included fish aggregation devices and crab traps.

Fisher location	Fishing gear used				
	Handline	Handnet	Gillnet	Meshnet	Other*
Labasa	100	-	-	-	-
Savusavu	100	-	-	-	-
Ba	83.1	4.2	1.4	7.0	4.2
Tavua	81.3	6.3	6.3	6.3	-
Rakiraki	90.9	-	3.0	6.1	-
Overall	89.2	2.4	1.8	4.8	1.8

Table 4. The 3 most common types of fishing boats with various length and engine size across different locations.

Fisher Location	Boat type	Boat length (ft)	Engine size (hp)	# of boats
Labasa	Wooden half-cabin inboard engine	23–28	20–40	17
Savusavu	Wooden half-cabin inboard engine	23–26	40	4
	Outboard engine	26	40	1
Ba	Wooden half-cabin inboard engine	16–29	20–60	10
	Fibreglass	13–23	15–55	2
Tavua	Wooden half-cabin inboard engine	25–30	40–80	6
Rakiraki	Wooden half-cabin inboard engine	23–26	40	4
	Fibreglass	15	25	1

3.1.6 Fish storage and spoilage

The fishers were asked to estimate the percent of fish that spoiled during fishing trips, while offloading the catch, and during sales. Information was also gathered on how long fish was stored before it was sold or eaten given fishers were camping for a few days with limited resources. The results (93.5% of fishers) showed that fish was stored in ice for long hours before it was sold, given away or consumed. The two most common techniques for storing fish while at sea were ice (95.7%) and brine solution (2.2%). While on land and with traders, fish was stored in ice to keep it fresh or stored in a freezer (5.0%). There was rarely any post-processing done on fish species unlike other fisheries in Fiji (e.g. sea cucumbers, Mangubhai et al. 2016). Customers preferred fresh or frozen fish and in rare cases dried, which was a unique post-processing technique applied to certain fish species. However, none of fishers or traders interviewed engaged in any post processing techniques.

When asked about spoilage, fishers estimated that about 29% (during fishing) and 21% (after fishing while stored) of fish was lost due to spoilage. Furthermore, fishers and traders estimated about 19% of seafood spoiled during sales. The main causes of spoilage highlighted during and after fishing were lack of ice (33.9%), damage due to shark attacks (20.7%), poor handling (18.9%), exposure to sun, dust or rain (11.3%),

delay in returning to shore, or extended camping days (7.54%). Other reasons given were fish stuck in the fishing net for too long, fish left without ice for more than 6 hours and improper storage facilities on the boat and at landing sites. Lack of ice and poor handling also resulted in spoilage during sales.

Key findings

- Indo-Fijians had a long-term commitment to fisheries with sectoral investments spanning (on average) three decades for fishers, and two decades for traders.
- The primary motivation for fishing was income and food.
- The Indo-Fijian fishing community is male-dominated but women play important roles as traders.
- Fishers largely operated in groups while traders operated individually.
- Fishers normally camped out at sea from 2-14 days, rather than making daily trips to their fishing grounds. While out, fishers spent 5–6 hours fishing daily.
- The timing of fishing trips was influenced by weather conditions, availability of crew members, and access to ice and fishing bait.
- The most common type of fishing boats used were wooden-half cabin with inboard engine and most common fishing method was handline.
- Fish was normally sold fresh or frozen and rarely was there any post-processing involved.
- 21–29% of fish was lost due to spoilage.

3.2 Targeted fisheries and catch

Fish targeted by Indo-Fijian fisheries actors for subsistence and trade purpose are often grouped in one of four common local categories. These categories are: (1) “Grounding fish” – selected species from the families Lethrinidae, Lutjanidae, Muraenidae, Serranidae, and (2) “Floating fish” – selected species from the families Belonidae, Bramidae, Caesionidae, Carangidae, Carpiidae, Chanidae, Hemiramphidae, Mugilidae, Mullidae, Scatophagidae, Scombridae, Sphyrnidae, Terapontidae, Trichiuridae, and Xanthidae, (3) “Reef fish” – selected species from the families Acanthuridae, Albulidae, Balistidae, Diodontidae, Ehippidae, Gerreidae, Haemulidae, Holocentridae, Kuhlidae, Kyphosidae, Labridae, Lactariidae, Leiognathidae, Lethrinidae, Lutjanidae, Megalopidae, Monodactylidae, Polynemidae, Pomacanthidae, Priacanthidae, Scaridae, and Siganidae, and (4) “Deepsea fish” – species belonging to the sub-family Etelinae.

Parrotfish (Family: Scaridae), emperors (Family: Lethrinidae), snappers (Family: Lutjanidae) and groupers (Family: Epinephelidae) were a primary target for a large majority of the fishers (84.9%). This was followed by trevally (Family: Carangidae), Indian mackerel and wahoo (Family: Scombridae), which were targeted by 46.7% of the fishers. Deepsea fish were targeted by 17.9% of fishers and largely comprised of deepsea snappers (sub-Family Etelinae). However, selected species of grouper were often grouped as deepsea fish. This was because fishing areas targeted by deepsea fishers were greater than 150 m. According to Lee et al. (2020), deepsea fishing was mostly done on seamounts and reef slopes with depth range of 130–460 m. These depths are divided into two distinct fishing zones. The first zone was 130–220 m depth targeted for *Pristipomoides* spp., *Aphareus rutilans*, *Paracaesio*

kusakarii, *Seriola rivoliana* and *Wattsia mossambica*. The second zone was 330–400 m depth mostly targeted for *Etelis* spp., *Epinephelus* spp., and *Paracaesio stonei*. During the interviews, fishing zone was not specified by the fishers but groupers and snappers were classified as deepsea fish. Indo-Fijian fishers, targeting deepsea fishery were mostly from the towns of Tavua and Rakiraki (Table 5). A small number of fishers also targeted mangroves and rivers (5.7%) for brackish and freshwater fish and invertebrates while some fished in seagrass (0.7%). A wide range of fish (and in some cases invertebrate) species and a variety of habitats were targeted by Indo-Fijian fishers (Table 5).

Table 5. Percent fish caught in different habitats by Indo-Fijian fishers across different locations in Fiji.

Location	Coral reefs ³	Oceanic habitat ⁴	Deepsea habitat	Mangroves habitat ⁵	Seagrass habitats	Rivers
Labasa	89.6	34.4	3.4	-	-	-
Savusavu	83.3	50.0	8.3	8.3	-	8.3
Ba	82.8	51.6	9.3	10.9	-	10.9
Tavua	83.3	33.3	58.3	-	-	-
Rakiraki	86.3	54.5	45.5	-	4.5	4.5
Overall	84.9	46.7	17.9	5.7	0.7	6.5

Experience from other surveys by the Wildlife Conservation Society in Fiji suggest fishers do not keep records of their catches and will therefore over- or under-estimate annual catches; however, they are able to remember how much they caught on their last fishing trip. To understand catch volumes or numbers, fishers were asked to quantify their catch size on their last fishing trip. Additionally, fisher catch was made of a wide range of fish and invertebrate species, often lumped together; hence proportional estimate of the catch into specific types of fish and invertebrates could not be obtained within the limited survey time. Fish and invertebrates were often measured by weight in kilograms (kg), by the bundle (ranging from 4–6 fish per string and 1–4 strings per bundle) and/or by piece. The majority of fishers (87.1%) estimated their catch volumes for fish by weight therefore catch data reported in kg only is presented below.

3 Coral reefs are targeted for a combination of “grounding” and “reef” fish species.

4 Oceanic habitats are targeted for a combination of “grounding” and “floating” fish species.

5 Mangrove habitat refers to fish and invertebrates targeted in the mangrove area. This includes mudcrabs.

Table 6. Average volume of fish caught by Indo-Fijian fishers during their last trip. Catch volume range is provided in parenthesis. 'Mixed fish' refers to fish caught from two or more habitats (e.g. coral reef and oceanic fish species) which could not be separated by the fisher provided.

Fisher location	Catch volume (kg)				
	Coral reef fish	Oceanic fish	Deepsea fish	Mixed fish	Bait fish
Labasa	96.8 (28–300)	126 (20–400)	–	300	–
Savusavu	101.3 (10–200)	177.0 (58–300)	120.0 (40–200)	175 (100–250)	–
Ba	72.3 (5–240)	34.3 (8–110)	165 (100–360)	74.9 (10–300)	–
Tavua	41.9 (3–120)	207.5 (20–750)	85.0 (20–180)	820 (140–1500)	–
Rakiraki	27.3 (5–60)	41.0 (5–150)	124.3 (20–200)	41.0 (12–70)	100
Average	70.4 (3–300)	77.7 (5–400)	124.1 (20–360)	162.9 (10–1500)	100

Across all locations, the average estimated catch was 162.9 kg for 'mixed fish' species, 124.1 kg for deepsea fish, 77.7 kg for oceanic fish, and 70.4 kg for coral reef. However, there was a wide range in fish caught by fishers on their last trip. For example, catch estimate for coral reef fish ranged from 3 to 300 kg and catch volumes for oceanic fish ranged from 5 to 400 kg (Table 6). Similarly, there was a lot of variation in catch volumes across location and fish types. For example, estimated catch volume for Rakiraki fishers ranged from 5 to 200 kg but there was variation in the types of fish caught.

A few fishers (2.2%) also harvested invertebrates, especially mud crabs (*Scylla serrata*) and a mixture of coral reef crab species. Crabs were mostly caught in rivers, mangroves and coral reef habitats. Crab caught on the last trip was mostly estimated by piece (75% of fishers), however, some fishers (12.5% each) estimate crab volumes by weight and bundle. Fishers residing in the towns of Ba, Rakiraki and Savusavu reported invertebrates as part of their catch during the last fishing trip. Fishers from these locations also mentioned the use of habitats other than coral reefs, oceanic and deepsea (Table 5). Mud crab was the most common invertebrate caught by Indo-Fijians across all locations. On average a fishers caught about 12 mud crabs and about 13 other crabs (of species other than mud crabs) during their last fishing trip (Table 7).

Table 7. Average invertebrates caught in different habitats targeted by Indo-Fijian fishers. The range in average catch on their last fishing trip is provided in parenthesis.

Fisher location	Catch volume for invertebrate during the last fishing trip					
	Crabs			Mud crabs		
	Piece	kg	Bundle	Piece	kg	Bundle
Ba	13 (8–15)	-	-	12 (8–15)	-	6
Rakiraki	-	-	-	4	-	-
Savusavu	-	-	-	-	3–4	-

When asked if their catch on the last trip was higher, lower or same as normal, just over half (55.8%) stated that their catch was lower, while under a third (32.6%) stated their catch was the same, and slightly more than 10% stated their catch was higher than normal. The majority of fishers in Rakiraki (47.8%) and Savusavu (69.2%) stated that the amount of fish on the last trip was the same as what they normally caught.

Key findings

- Fish targeted by Indo-Fijian fishers were grouped into four common local categories: grounding fish, floating fish, coral reef fish and deepsea fish.
- Indo-Fijians fishers from the towns of Tavua and Rakiraki largely targeted deepsea fish.
- The common type of fish caught were from coral reefs, followed by oceanic and deepsea habitats.
- Some fishers also harvested invertebrates with the most popular being mud crabs.

3.3 Seafood sales

Indo-Fijian fisheries actors sold a range of seafood including different types of fish and invertebrates. Fishers and traders were asked to list the top three and five seafood they sold, respectively. The most common type of seafood⁶ sold were reef, oceanic and deepsea fish, crabs⁷, prawns, lobsters and shellfish (Table 7). Fishers across all locations mainly sold fish except in Ba where very few fishers mentioned they sold crabs. There was no mention of fishers selling other invertebrates. Traders, by contrast, sold a range of invertebrates in addition to the common fish that made up a large proportion of fisher sales.

More than half of the fishers (55.3%) and traders (60.3%) mentioned that reef fish was the most common type of fish sold followed by oceanic fish, while crabs made the highest proportion of invertebrates sold by traders. There was some variation in

6 Seafood in this report refers to fish and invertebrates from the ocean as well from rivers and estuarine environment.

7 Crabs include both mudcrabs and coral reefs crabs. Despite having different market value, different crabs species were grouped for this report. During the surveys, the actual proportion of different types of crabs making up the total sale for traders were not specified.

perceived proportion of the fish types sold by fishers across locations. For example, fishers from Ba and Rakiraki stated that more than 30% of their seafood sale was oceanic fish, while fishers in Tavua stated that deepsea fish made slightly more 40% of their seafood sale (Table 8). Similarly the proportion of seafood sold by traders also showed some variation across locations. For example, traders in Labasa stated about 30% of the seafood sale was oceanic fish while Savusavu and Ba traders mentioned that oceanic fish made less than 20% of their seafood sale. Traders in Savusavu also stated that crabs (mud crab and reef crabs) made up a higher proportion of their seafood sale (range 9–21%) compared to other invertebrates. Unlike fishers who were all male, a small number of traders were female. There were differences in what was sold by a male compared to female traders between locations. For example, male traders in the towns of Savusavu and Ba sold a diverse range of seafood, compared to Labasa where they sold a few types of seafood. In Labasa, women sold both fish and invertebrates but men were large involved in fish sales (Table 8).

Table 8. Preceived percent of seafood sold by Indo-Fijian fishers and traders across different towns in Fiji.

Fisher location	Fisheries actor	Gender	Seafood sold (%)							
			Reef fish	Oceanic fish	Deepsea fish	Other fish	Crabs	Prawns	Lobster	Shellfish
Labasa	Fisher	Men	70.2	29.8	-	-	-	-	-	-
	Trader	Women	32.5	30.0	3.3	-	14.2	11.7	8.3	-
		Men	70.0	30.0	-	-	-	-	-	-
Savusavu	Fisher	Men	58.8	29.4	11.8	-	-	-	-	-
	Trader	Women	48.8	12.5	-	-	21.3	7.5	10.0	-
		Men	55.0	8.3	5.0	-	9.2	8.3	7.5	6.7
Ba	Fisher	Men	53.6	35.5	4.5	5.5	0.9	-	-	-
	Trader	Men	65.0	19.1	12.4	-	2.6	0.3	-	-
Tavua	Fisher	Men	41.2	17.6	41.2	-	-	-	-	-
Rakiraki	Fisher	Men	46.8	31.9	17.0	4.3	-	-	-	-
Overall	Fisher	All	55.0	31.9	9.2	3.4	0.4	-	-	-
	Trader	All	60.3	14.0	4.1	-	9.4	5.6	5.3	1.3

The seafood supply chain showed the complex relationship between fisher locations, the buyers and the buyer locations. For example, fishers based in Ba town had two major buyers of seafood (traders/agents and consumers), while fishers based in Labasa had a wider diversity of buyers (traders/agents, other fishers, exporters, customers). Seafood buyers such as traders/agents, and consumers bought seafood from all fishers across all locations. Traders/agents and customers bought seafood from a diverse range of places including markets, roadside stalls, and fisher landing sites (Fig.7). Some buyers even collected seafood directly from a fisher's home. In addition to fisher-buyer arrangement, sometimes the boat owners took sole responsibility of selling the catch then distributing the income to crew members on the fishing trip (after a certain percent of sale income was deducted for the boat owner). This was highlighted by fishers in Labasa (Fig. 7).

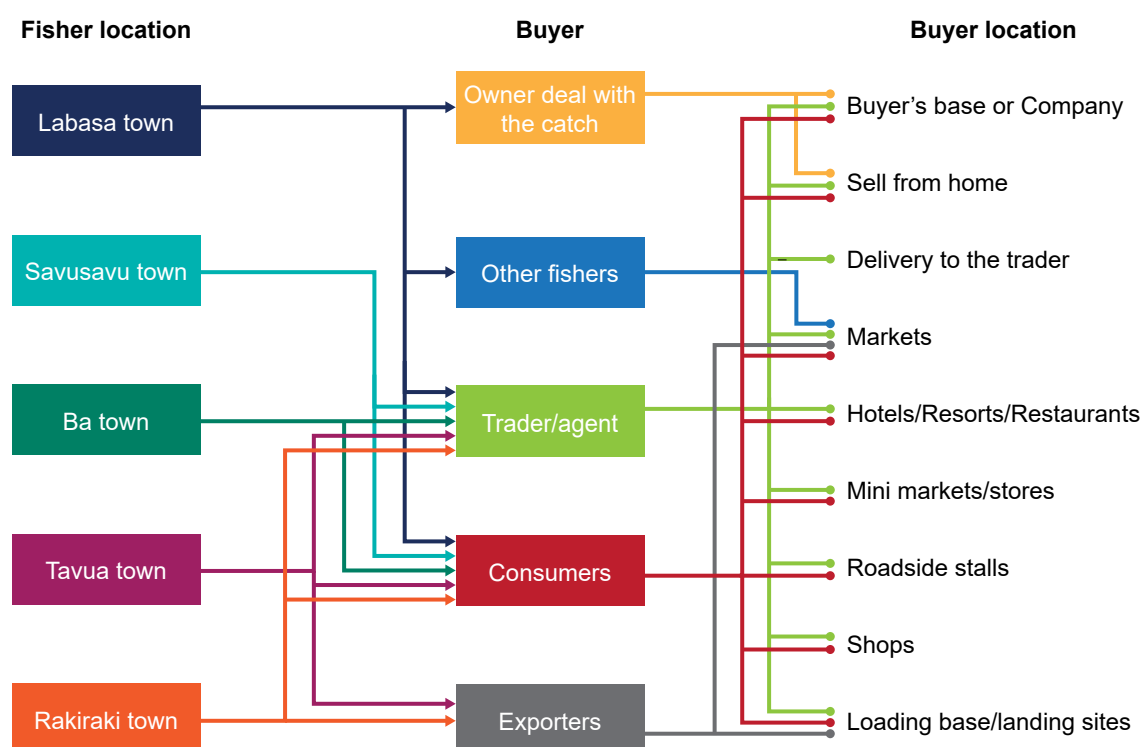


Figure 7. Supply chain of seafood sold by fishers at each location showing their major buyers and buyer locations.

The majority (93.3%) of Indo-Fijian fishers sold fresh seafood and only a few (6.7%) sold frozen seafood. Slightly more (14.3%) boat owners sold frozen seafood compared to crew members (6.4%) and independent fishers (4.3%). Almost half of the fishers sold their seafood to traders, 35.2% seafood from fishers were sold directly to consumers and about 15% of the fishers sold seafood to other buyers. Fishers sold their seafood at a variety of locations including (Fig. 7): landing site/jetty (29.8%); various municipal markets (23.6%); other (e.g. pick up from home or direct delivery to customer) (22.4%); retail shops (13.7%); roadside stalls (8.1%); and hotels/resorts (2.5%).

Table 9. Estimates of the percent of seafood sold to different buyers by Indo-Fijian fishers.

Fisher	Seafood buyer (%)							
	Traders	Consumers	Others	Hotel/ resorts	Restaurants	Exporters	Mini markets	Other fishers
Independent fisher	46.5	33.3	7.1	5.1	3.0	2.0	2.0	1.0
Boat owner	52.8	38.9	5.6	2.8	-	-	-	-
Crew member	52.6	35.9	7.7	2.6	1.3	-	-	-
Overall	49.8	35.2	7.0	3.8	1.9	0.9	0.9	0.5

Indo-Fijian traders were highly dependent on local fishers (80.5%) for the supply of fish and invertebrates for sale. Other suppliers of seafood were boat owners (9.8%), other traders (7.3%), and fish shops (2.4%). The women traders interviewed had only two seafood suppliers compared to men who had a wider diversity of suppliers to purchase from. Male traders in Labasa and female traders in Savusavu were almost completely (100%) dependent on local fishers for the purchase of seafood.

Table 10. Suppliers for Indo-Fijian seafood traders by location and overall for the study.

Location	Gender	Seller (%)				Seller location (%)			
		Local fisher	Trader	Fish shop	Other	Market	Shops	Roadside	Other
Ba	Male	77.8	11.1	-	11.1	20.0	-	6.7	73.3
Labasa	Female	85.7	14.3	-	-	50.0	25.0	12.5	12.5
	Male	100.0	-	-	-	33.3	-	-	66.7
Savusavu	Female	100.0	-	-	-	50.0	16.7	16.7	33.3
	Male	66.7	-	11.1	13.3	33.3	16.7	16.7	33.3
Overall	All	80.5	7.3	2.4	9.8	34.2	10.5	7.9	47.4

When asked how seafood was graded for sale, Indo-Fijian traders stated that seafood was sold by the piece⁸, by weight, or by grade⁹ depending on the quality and freshness, with prices varying between locations. For example, in Ba crabs were sold (on average) for \$35 a piece, while traders from Labasa and Savusavu sold crabs by weight and grade (Table 11). Comparing the average crab price by weight, in Ba the average price was \$25/kg while in Savusavu the average price was \$20/kg. The average price for crabs also varied between female and male traders. It was also noted that male traders in Savusavu sold crabs by grading them compared to women who sold crabs by weight, which was different in Ba town where crabs were mostly sold by the piece. Similarly, for different types of fish, male traders in Ba and female traders in Labasa mostly sold deepsea fish by piece and weight compared to male traders in Savusavu, who largely sold deepsea fish by grade.



Yashika Nand/WCS

⁸ Piece mainly refers to individual animals for this report.

⁹ The crab grading systems normal follows this pattern: Grade A would be crabs of large or very large size, with both claws intact, and/or weight of about 1 kg. Grade B would be medium size crabs with both claws intact, weight of about 500 g or more but less than 900 g or large size crabs with one or both claw missing. Grade C would be small size crabs with both claws intact, weight of about 200 g but less than 400 g or medium size crabs with one or both claw missing. Similarly, fish were also graded based on its market value, size and freshness.

Table 11. Average sale price of seafood by traders across locations.

Trader location	Gender	Seafood	Average seafood sale price by				
			Piece	Weight (kg)	Grade A (kg)	Grade B (kg)	Grade C (kg)
Ba	Male	Crabs	\$35.00	\$25.00	-	-	-
		Deepsea fish	\$20.00	\$8.00	-	-	-
		Lobsters	-	\$30.00	-	-	-
		Oceanic fish	\$13.13	\$14.00	-	-	-
		Prawns	-	\$20.00	-	-	-
		Coral reef fish	\$19.86	\$9.00	-	-	-
Labasa	Female	Deepsea fish	\$3.80	\$7.00	-	-	-
		Coral reef fish	\$3.80	\$6.30	\$7.00	\$6.00	\$5.00
	Male	Oceanic fish	-	-	\$10.00	\$8.00	\$7.00
		Coral reef fish	-	-	\$8.50	\$7.00	\$6.00
Savusavu	Female	Crabs	-	\$20.00	-	-	-
		Lobsters	-	\$35.00	-	-	-
		Oceanic fish	-	\$4.00	\$8.00	\$3.00	-
		Prawns	-	\$25.00	-	-	-
		Coral reef fish	-	\$5.50	\$8.00	\$6.00	-
	Male	Crabs	-	\$5.00	\$22.00	\$17.00	-
		Deepsea fish	-	-	\$8.00	\$6.00	-
		Lobsters	-	\$35.00	-	-	-
		Oceanic fish	-	-	\$7.00	\$5.00	\$4.00
		Prawns	-	\$27.00	-	-	-
		Reef fish	\$4.30	-	\$7.50	\$5.50	\$4.00

Key findings

- Fisheries actors sold a range of seafood including reef, oceanic and deepsea fish and crabs, prawns, lobsters and shellfish.
- The seafood supply chain showed complex and diverse business arrangements between fishers and buyers.
- A large majority of the traders were dependent on a diversity of local fishers for seafood supply.
- Seafood was sold by piece, weight, grade or by bundle depending on the quality and freshness. Grades were largely used by traders.

3.4 Fisheries dependence for food and livelihoods

The dependency of Indo-Fijian fisheries actors on the small-scale fisheries sector was measured in three ways: (i) fish consumption levels across locations; (ii) income from fisheries; and (iii) perceptions on whether fishing and fish trading were considered a stable livelihood.

3.4.1 Fish consumption levels

Fish consumption levels were aggregated into three categories: low (1–3 fish meals per week), moderate (4–6 fish meals per week) and frequent (7–8 or more fish meals per week). The results showed a high percentage of fishers (44.6%) consumed fish frequently, while others consumed low (28.1%) or moderately (27.3%). Boat owners (48.0%) and crew members (54.4%) consumed fish in the frequent consumption category while independent fishers were similar across all categories (33.3% each). Crew members stated that during fishing trips it was easier to catch fish and they do not have to pay anything so they consumed fish frequently but back at home, they would have to buy fish so the consumption frequency was lower.

The source of fresh fish may influence fishers' consumption levels. The results showed that fishers had two main sources of fresh fish: self-caught (74.1%) and purchased (25.9%). There was some variation in the source of fresh fish across fishers. Crew members (27.3%), boat owners (26.5%) and independent fishers (24.3%) purchased fresh fish. Crew members often purchase their fish from the boat owners at a lower price and boat owners if they needed fresh fish had the option (because they could afford it) to purchase from shops, traders or others sources. However, on rare occasions, fishers also purchased fresh fish from vendors for their household's consumption. Fish was purchased by bundle¹⁰, by weight, or by piece. There was some variation in the amount of money spent on purchasing fish by location. For example, fisher in Rakiraki purchased (on average) fish for about \$27/bundle, while fishers in other towns spent (on average) about \$20/bundle on fresh fish. However, there was not much variation in the money spent on purchasing fish by different fishers (Table 12).

Table 12. Average spent on purchasing fish by location and by fisheries actor.

Island	Fisher location	Average fish purchase price		
		Bundle	Weight (kg)	Piece
Vanua Levu	Labasa	\$20.00	\$25.75	-
	Savusavu	\$20.00	\$6.00	-
Viti Levu	Ba	\$20.36	\$23.75	\$35.83
	Tavua	\$23.33	\$20.00	\$17.50
	Rakiraki	\$27.50	\$12.33	\$30.00
Fisheries actors				
All	Independent fisher	\$23.00	\$22.13	\$26.67
	Crew member	\$21.20	\$18.33	\$33.75
	Boat owner	\$19.00	\$16.20	\$32.50

10 A bundle of fish is often described as certain number of fish in a string that are tied together. This can vary from 4–6 small fish in one string and 2–3 strings in one bundle or 2–3 medium size fish in one string and 2–3 strings in one bundle.

3.4.2 Income for fisheries actors

A large proportion of fisheries actors (45.7%) earned less than \$5000 annually, and very few (2.3%) earned over \$30,000. A few respondents (1.7%) were not comfortable disclosing income information. On disaggregation of the data, the study found that 40.4% independent fishers earned less than \$5000, with the highest earnings range falling between \$50,000–75,000 (0.6%) annually. In contrast, 32.0% of the boat owners earned less than \$5000 and 4.0% fell in the highest income category range of \$30,000–40,000 annually. The highest salary range for crew members was \$10,000–15,000 annually earned by 5.3% of respondents, while the majority (61.4%) earned below \$5000. In contrast, 38.2% of traders earned less than \$5000 annually with 2.9% falling within the highest income category of \$30,000–40,000 annually (Table 13).

Table 13. Percent of fisheries actors within annual income ranges across different locations in Fiji.

Island	Location	% Annual income range						
		<5000	5000–10,000	10,000–15,000	15,000–20,000	20,000–30,000	30,000–40,000	50,000–75,000
Vanua Levu	Labasa	32.4	37.8	21.6	-	2.7	-	-
	Savusavu	28.6	33.3	9.5	23.8	-	4.8	-
Viti Levu	Ba	57.0	27.8	8.9	2.5	-	2.5	1.3
	Tavua	59.1	31.8	4.5	4.5	-	-	-
	Rakiraki	25.0	33.3	33.3	-	8.3	-	-
% Annual income range for fisheries actors								
All	Independent fisher	40.4	33.3	17.5	5.3	-	1.8	1.8
	Boat owner	32.0	28.0	16.0	4.0	8.0	4.0	-
	Crew member	61.4	33.3	5.3	-	-	-	-
	Trader	38.2	26.5	14.7	11.8	2.9	2.9	-
Overall	All	45.7	31.2	12.7	4.6	1.7	1.7	0.6

3.4.3 Fisheries actors and their livelihood sources

Income from fisheries was compared to income from other livelihood sources. Fishers and traders were highly depending on fisheries for their livelihoods; 49.9% of fisher income was from fishing and 80.6% of trader income was from seafood trading. We categorised fisheries actor dependence on livelihood sources based on its overall contribution to income as follows: 'heavy' for 81–100%, 'moderate' for 51–80%, 'light' for 10–50% and 'minimal' for less than 10%. Approximately, two-thirds of each fisheries actor were classed as having a heavy dependence on the sector; specifically, 70.6% of traders, 68.4% of independent fishers, 68% of the boat owners, and 63.2% of crew members. Disaggregating by location, there was a heavy dependence on fisheries in Labasa (78.9%), followed by Ba (70.9%), Tavua (66.7%) and then Rakiraki and Savusavu (50% each). Other livelihood sources fisheries actors relied on for supplementary household income included farming, own business, carpentry, boat mechanic/builder, financial assistance from family members or relatives, paid employment and remittances (Table 14). It was also found that a few fisheries actors (3.5% independent fishers and 5.3% crew members) also depended heavily on paid

employment. The results also showed that independent fishers and crew members had the most diverse range of livelihood sources compared to boat owners and traders where the dependence was largely 'light'. However, it should be noted that there were crew members who were solely dependent on fisheries and had no other source of income.

Table 14. Percentage of fisheries actors within different categories of dependence across livelihoods.

Fisheries actors	Livelihoods	Dependence (%)			
		Heavy	Moderate	Light	Minimal
Independent fisher	Fishing/fish trading	68.4	8.8	15.8	3.5
	Boat builder/mechanic	-	-	3.5	-
	Business	-	-	5.3	1.8
	Carpentry	-	-	1.8	-
	Financial support from family members/relatives	-	-	1.8	-
	Farmer	-	8.8	5.3	5.3
	Paid employment	3.5	-	-	-
	Remittance	-	-	1.8	-
Crew member	Fishing/fish trading	63.2	5.3	24.6	-
	Boat builder/mechanic	1.8	1.8	-	-
	Business	1.8	-	3.5	-
	Carpentry	-	-	5.3	-
	Financial support from family members/relatives	-	3.5	1.8	-
	Farmer	-	-	5.3	-
	Paid employment	5.3	3.5	7.0	-
	Remittance	1.8	-	-	-
Boat owner	Fishing/fish trading	68.0	12.0	16.0	-
	Business	-	-	8.0	-
	Farmer	4.0	-	12.0	-
	Paid employment	4.0	-	-	-
	Remittance	4.0	-	-	4.0
Trader	Fishing/fish trading	70.6	-	29.4	-
	Business	-	2.9	8.8	-
	Financial support from family members/relatives	-	-	2.9	-
	Farmer	-	8.8	-	-
	Paid employment	-	5.9	2.9	-

When asked “which livelihood was most important”, 94.1% traders, 84.0% boat owners, 80.7% crew members and 78.9% independent fishers stated that fishing was the most important livelihood for them. Across fisher locations, 89.5% of fisheries actors in Labasa, 89.0% in Ba, 81.8% in both Savusavu and Rakiraki, and 75.0% in Tavua ranked fishing as the most important livelihood. When asked ‘why fishing was most important to certain fisheries actors’, we also found that a large majority of fisheries actors had been fishing or fish trading since childhood and stated they were not interested, qualified or familiar with other jobs; hence fishing and fish trading was the most important livelihood source. Some actors also stated that they were earning enough from fishing, so would not want to do anything else, while several elder actors mentioned that they were unable to do labour intensive jobs due to health issues and are happier fishing. Additionally, several fishers were passionate about fishing and would do it regardless of how much they earned, while a large majority stated that fishing was the only income source as some actors have no land for farming. Some stated that the fish they caught was the only source of protein and fresh fish for their households. While a few actors also stated that fishing or fish trading was an additional income source mainly used for daily expenses, loan, hire purchase and mortgage payment. For farmers (sugarcane or other agricultural produce) fishing was the most important source of income to manage household expenses when there was no income from farming due to natural disaster or when their farming income was on hold. Some fishers also perceived fishing as a good exercise and therefore have an additional health benefit. However, some highlighted that the income from fishing was not sufficient to support all their household expenses and needs.

For some fisheries actors (12.3% independent fishers, 8% boat owners, 2.9% traders and 1.8% crew members) farming (specifically sugarcane farm) was the most important livelihood source, stated that fishing was a good alternative outside of the sugarcane crushing season. A large majority of fishers who were also farmers perceived farming as providing a higher income and being more reliable livelihood source. Some actors also stated that farming was not weather dependent, although sugarcane farming was seasonal and had other risks, including fire, compared to vegetable farming, which was more stable. A few actors chose to farm ahead of fishing because they felt there was little to no support from the government for the fisheries sector.

3.4.4 Fishing and fish trading as a stable livelihood source

When fishers were asked “if they stopped fishing, will their household be affected?”, 90.7% of crew members stated they will be affected, followed by 88.0% of the boat owners, and 86.0% of independent fishers. All fishers in Labasa, 95.5% in Rakiraki, 84.4% in Ba, 83.3% in Tavua and half of the fishers in Savusavu said their households would be affected if they stopped fishing. Traders were asked if “they were able to meet all their financial needs from seafood trading income?” More than half (61.8%) of the traders stated that they were able to meet all their financial needs while 38.2% stated they were not.

This study also sought to understand whether Indo-Fijian fisheries actors perceived fishing and fish trading as a stable livelihood source. More than half of boat owners (64.0%), independent fishers (59.6%), crew members (50.9%) and traders (50.0%) stated it was a stable livelihood source. For several fishers, this perception was based on the belief that fish will always be abundant and in demand. A respondent in Savusavu stated that “*stability will depend on the availability of fish*”. Some actors related the stability of fishing as a livelihood to the new fishing licensing system, which they feel was more efficient, but only if challenges are identified and addressed by the government and assistance made available for growth in the sector. A few fishers also stated that the demand for fresh fish was related to the change in lifestyle choices

with more people opting for fresh fish as a protein source as they become more health-conscious. Conversely, half of the traders, 49.1% of crew members, 40.4% of independent fishers and 36.0% of the boat owners did not perceive fishing and fish trading a stable livelihood source.

Fishers also highlighted the main reasons they felt fishing was no longer a stable livelihood. Several fishers felt that there was no regulation on the fishing techniques as too many destructive fishing methods were being used, including small nets, night diving and dynamite fishing that leads to depletion in fish stocks. They also felt that there was no regulation on the number of fishers per fishing ground as too many fishers are allowed in one fishing area. The effects of changing weather patterns and climate, severe damage to reef system associated with natural disasters, and human impact, including plastic pollution all contribute to the rapid decline in fish stocks. Some fisheries actors also pointed out that the cost of living was very high and maintaining the fisheries sector was very difficult due to limited assistance to Indo-Fijian fishers and traders. Some fishers also highlighted the challenges in getting fish bait as net fishing was no longer allowed. Moreover, the expenses associated with organising fishing trips was increasing drastically as nearby fishing grounds did not have enough fish so fishers have to travel further to other fishing grounds. Some fishers reported being unable to find potential buyers or good prices for their catch. The fluctuation in fish price and ability to catch enough fish was associated with cyclones, seasonal sales and bans, varying demand, and changing weather. Night diving was highlighted as an unsustainable practice, which some fishers felt affected the fish population and growth.

When asked how satisfied each fisheries actor was with the income from fishing and fish trading, 38.2% of traders and less than 10.0% of fishers said they were satisfied or very satisfied (Fig. 8). More than half of independent fishers (56.4%) and half of the boat owners and 40.7% of crew members were very unsatisfied, together with 8.8% traders. Slightly less than half of the boat owners (41.7%) and approximately 20% or less of independent fishers, traders and crew members stated that they were unsatisfied with the income from seafood sales (Fig. 8).



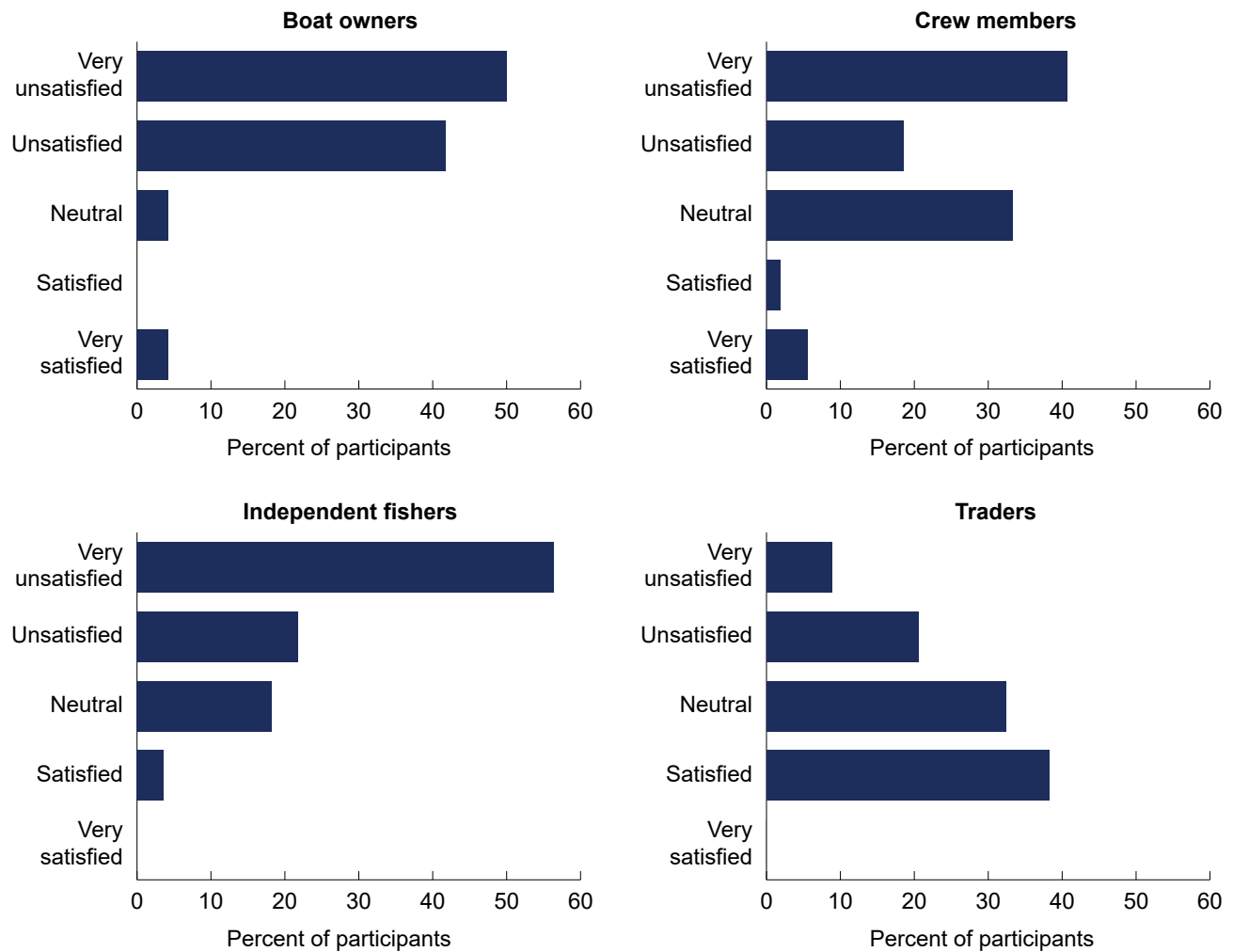


Figure 8. Fisheries actors level of satisfaction from fisheries income.

3.4.5 Changes in fish population

When asked how they see the fish population overtime, fishers largely stated that fish stocks were declining (70.8%) or rapidly declining (10.2%), while others felt fish stocks as stable (17.0%) or increasing (1.5%). Fisher perceptions on changes in fish stocks overtime varied across locations and also by individuals as fishers did not access the same fishing ground all the time. For example, about half of the fishers in Savusavu and about 70% of fishers in Labasa thought fish stocks were declining and they did not or rarely accessed the same fishing grounds. Additionally, more than 60% of fishers across Ba, Tavua and Rakiraki thought the fish population was declining while none stated that fish stocks were increasing (Fig. 9). The reasons given for the decline in fish stocks were climate change (34.5%), cyclones (22.3%), destructive fishing practices (18.7%), habitat damage (11.5%), an act of god (2.2%) and too many fishers allowed to fish in one fishing ground (0.7%). About 10.1%, who stated that fish stocks were declining did not know the reasons for the decline.

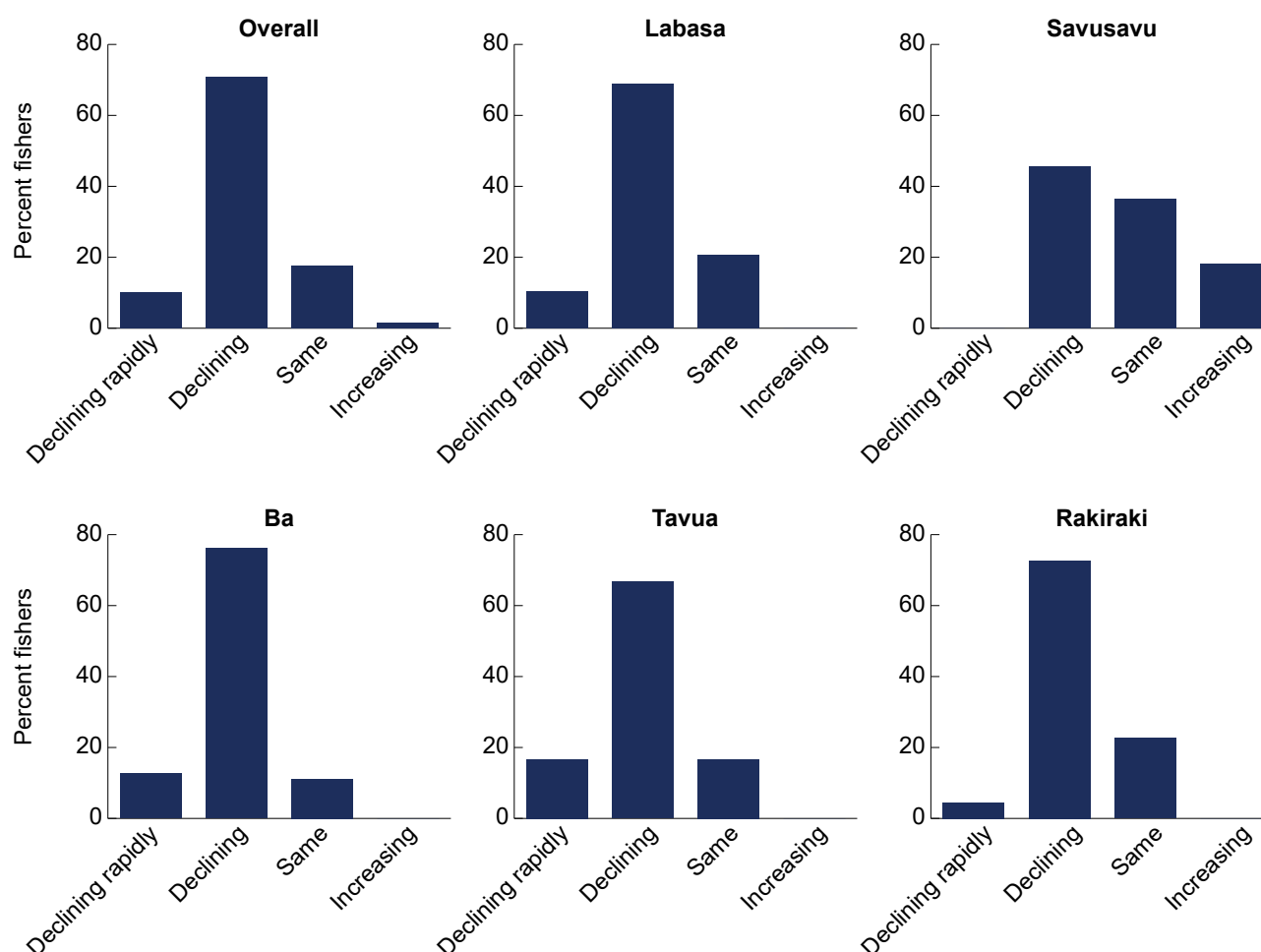


Figure 9. Fisher perceptions of how fisheries resources have changed over the last 10 years.

Key findings

- Indo-Fijian fisheries actors' dependence of fisheries was measured in terms of fish consumption levels, income from fisheries, and perception on the stability of fishing and fish trading as a livelihood.
- 44.6% fishers had a high consumption rate of 7–8 or more fish meals per week.
- 74.1% of the fish consumed by fishers were self-caught and other 25.9% was purchased.
- Slightly less than half fisheries actors earned less than \$5000 annually from fishing and fish trading.
- On comparing income from fisheries to other livelihoods, the study found about half of fishers' income and 80.6% of traders' income was from fisheries.
- For about 81% fishers and 94% traders, fishing was the most important livelihood.
- Other livelihoods that fisheries actors were engaged in included farming, personal businesses, carpentry, boat mechanic/builder, financial assistance from family and relatives, paid employment and remittances.
- About 88% fishers and more than half of the traders stated that fishing and fish trading was providing for almost all their financial needs, and more than half felt it was a stable livelihood source.
- About 38% traders and less than 10% fishers (on average) were satisfied or very satisfied from fisheries income.

3.5 Resources and information

3.5.1 Access to fishing grounds

Indo-Fijian communities do not have the same access rights to customary fishing grounds as Indigenous *iTaukei* communities. To be able to fish in any fishing ground in Fiji, all commercial fishers including Indo-Fijian fishers, need a signed consent which was granted by the chiefs, villages, District offices, Ministry of Fisheries or Divisional Commissioner's office. When asked how fishers access fishing grounds, a large majority stated that they applied through the Ministry of Fisheries or the Commissioner's office (96.4%). A notable proportion of fishers stated that they negotiate with the chiefs (39.6%) and few applied through the District office (1.4%). Some variation was documented in the way fishers deal with different entities to access fishing grounds across provinces and/or districts. More than half of fishers in Savusavu (66.7%), Tavua (58.3%) and Labasa (51.7%) always negotiate with the chiefs while less than 30% of the fishers in other towns use the same process of negotiating. In Labasa, very few fishers (6.9%) stated they seek consent through the District office. Indo-Fijian fishers are known to have good relationships and make arrangements directly with the resource owning communities and compensate them through an informal 'goodwill payment' system to access fishing grounds. Several fishers agreed they continue with this practice despite the Government of Fiji's new standards for fishing licence applications and abolishing the goodwill payment system in 2017. Under the new system, the Ministry of Fisheries negotiates with the communities who own the access rights and agrees on the number of fishers allowed per fishing ground. Fishers then only need to apply to the Ministry for a fishing license.

The survey found that some fishers continue to negotiate with community leaders and pay about \$100–500 and in rare cases up to \$3000 annually to access customary fishing grounds. Some fishers explained that they were asked for a payment in return for consent to use fishing grounds, while some agreed to pay out of a wish to support the communities. For fishing grounds where payments were requested, fishers were asked to make in-kind payments, including fish (worth the payment requested), kava (*sevusevu*), food items, and fishing gear. If the fishers are not able to make the payment, some communities do not allow them to fish. The regulations on fishing activities and the number of fishers allowed per fishing ground have changed over time. Any form of payment to the right owners provides a sense of security to a particular fisher that they will continue to be able to access the desired fishing ground. Conversely, some fishers stated that government intervention has reduced some of the expenses, such as the goodwill payment, which was very high for some fishing grounds. However, savings appear to be offset by additional spending to meet the requirements of the new regulations, including expenditure on boat maintenance, safety equipment, the fee for boat fitness and additional related travel costs.

3.5.2 Fairness of the licensing system

Fishers were asked for their opinion on the fairness of the current licensing system. A large majority (86.9%) agreed that the current system was fair because it was cheap and fishers were not expected to make goodwill payments to get consent from chiefs. Also on the positive side, some fishers saved personal time and transportation costs while others stated otherwise. Several fishers believed that not everyone was aware of the new standards to get a fishing licence, which created a lot of confusion. Fishers also felt that dealing with Ministry of Fisheries for fishing licences was much easier compared to previously when they had to get 3–4 approvals just to renew a fishing license. However, few fishers (13.1%) felt the licensing system was not fair.

Some of the key reasons for this perceived unfairness and issues of concern included the following:

- The requirement for fishers to get a separate licence for selling fish;
- Some resource owners are still demanding money, goods, food items and fish in return for a signed consent;
- The licence application process requires fishers to visit multiple offices and the process was very long; a large majority of fishers stated that all of the application processes should be streamlined and all paperwork needs to be at one place;
- Boat owners were not very comfortable with boat licences and permits being under the boat captain's name rather than the owner's name as every time the captain changes, the boat owner has to apply for a new boat license and permit under a new captain's name;
- Some fishers felt that the licencing system and process was not very clear and there were concerns raised about frequent changes in fishing rules causing confusion;
- Fishers noted that licences are often renewed in January and the process takes about a month, which affects their income; therefore, they recommended the licence renewal be done around mid-December;
- Several fishers highlighted that proper records of licences are not kept by the Ministry of Fisheries. In Ra, fishers reporting losing their licence during Tropical Cyclone Winston, and then being unable to get a replacement licence when records were lost; and
- All fishers agreed that safety at sea was important, however, some thought that the Maritime Safety Authority of Fiji had a lot of requirements that were very expensive for fishers to accommodate. For example, safety equipment was very costly and expires within a year, and the boat master licenses and workshops are both expensive and time-consuming.

3.5.3 Fisheries management

This study sought to understand how aware Indo-Fijian fishers were about *iTaukei* resource management efforts. The results showed that more than 70% fishers were aware of *tabu* areas within the fishing grounds they accessed; however, there was some variation on how aware fishers were about *tabu* areas and other resource management rules across locations. Only 3.4% fishers stated they were unaware of *tabu* areas within the fishing grounds. It was also highlighted that Indo-Fijians did not have licenses to fish in the majority fishing grounds with existing *tabu* areas. Several fishers also highlighted that a map with marked *tabu* areas was given to them with the licences by the Ministry of Fisheries. Few fishers also mentioned about reefs they were not allowed in but did not know the reason. Interviews with fishers suggest that there was a lack of awareness amongst some about some of traditional rules governing customary fishing grounds.

Indo-Fijian fishers were asked about their relationship with the *iTaukei* leaders and communities. A large majority of fishers (89.9%) stated their relationship with resource owners was good and easy while a small number (5.1%) mentioned their relationship was "sometimes good and sometimes not so good" and a similarly small number (5.0%) also stated they had a very challenging relationship with resource owners.

3.5.4 Access to credit

In addition to fishing ground access, the study sought to understand how Indo-Fijian fishers accessed financial assistance. Access to credit was essential considering the majority of fisheries actors do not earn enough to pay upfront for capital investments or to bridge temporary shortfalls in income earned. When asked about loans, 38.2% stated

that they had applied for a loan or borrowed cash in the last 12 months. Of all fisheries actors, the category with the highest percentage of participants who had applied for a loan were independent fishers (45.6%), while the category with the smallest percentage were crew members (30.4%). Of the five locations, the highest percent of fisheries actors who applied for loans were in Ba (46.8%).

The top reasons given for needing a loan were to buy a boat engine (35.8%), for household expenses (20.8%), and to buy a boat (17.0%) (Table 15). The study also found that independent fishers and boat owners highlighted buying a boat engine as the top reason for a loan while the top reason for crew members was for household expenses. When examining geographic differences the study found the large majority of the fisheries actors interviewed from Ba, Tavua and Rakiraki took out loans for three main reasons: (i) to buy boat engine, (ii) for household expenses, and (iii) to buy boats; while in Labasa and Savusavu the main reason for a loan was to buy a boat engine. Furthermore, 37.9% of traders stated that they needed a loan for business, including buying fish and appliances for fish shops, and 17.2% stated loan was needed for their houses (e.g. renovation and appliances). Few traders stated that they needed a loan for fishing gear, buying land and to open an ice plant. By contrast, it should be noted that 61.8% of fisheries actors did not apply for a loan or borrow cash.

Table 15. Main reasons for needing a loan highlighted by each fisheries actor.

Reasons for loan	Fisheries actors (%)			
	Traders	Independent fishers	Boat owners	Crew members
Buy boat engine	10.3	42.9	66.7	6.3
Household expenses	-	3.6	11.1	56.3
Buy a boat	6.9	28.6	-	6.3
Boat and engine maintenance	-	7.1	-	12.5
Buy vehicle	10.3	7.1	11.1	6.3
Fishing gear	3.4	3.6	-	12.5
Boat licenses	-	0.0	-	11.1
Fishing trip expenses	-	3.6	-	-
Sugarcane farm	-	3.6	-	-
Buy land	3.4	-	-	-
House renovation/appliance	17.2	-	-	-
Business (buy fish, equipment for fish shop)	37.9	-	-	-
Open ice plant	3.4	-	-	-
Children's education/marriage	6.9	-	-	-

It was clear from conversations that some fisheries actors were struggling to support their households as the income from fishing was not sufficient and there was a need for financial assistance to support their livelihoods. To better understand why more than half of the fisheries actors were not applying for a loan, a few questions were focused on how many fishers got financial assistance and from where. When asked if they were successful in applying for a loan in the past 12 months, only 36.4% of fisheries actors stated they had been successful, while 63.6% stated they had not been successful. Crew members reported the highest percentage of unsuccessful loan applications (76.8%) while traders reported the highest percentage of successful applications (64.7%). The main reasons highlighted for not getting loans from a formal money lender were: did not qualify (59.0%), no specific reasons (15.4%), interest rate/ other costs too high (12.8%), difficult to get a loan for wooden fishing boats that Indo-Fijian fishers use, or afraid might not be able to pay back the money (5.1% each), and not allowed to borrow/ household dispute in borrowing (2.6%).

The study indicated that a large proportion of fisheries actors were unsuccessful with loan application. Then how are they getting financial assistance? For those who were successful with a loan application, formal lenders such as banks and financial institutions accounted for only 37.8% of loan requests. Additionally, finance was also sought through government grants. Fisheries actors generally needing financial assistance and those unsuccessful loan applicants often got credit from friends and relatives (33.6%) of requests and boat owner or company (14.7%). Loans were also requested from traders, money lenders, and neighbours. About 10% of actors stated that they do not take a loan because they can not find a money lender due to the unreliable income state they are in. The results also showed that fisheries actors have different entities that they rely on for financial assistance. For instance, a trader would likely apply for a loan from a formal money lender while crew members are more likely to get financial assistance from the boat owner or company if they are working for one (Table 16).

Table 16. Main money lending source for Indo-Fijian fisheries actors.

Money lending source	Fisheries actors (%)			
	Traders	Independent fishers	Boat owners	Crew members
Formal lender (Bank, financial institution)	48.6	40.4	22.2	27.5
Friends/relatives	35.1	42.1	0.0	27.5
Boat owner/company	5.4	0.0	33.3	40.0
Trader	0.0	7.0	33.3	0.0
Money lender	2.7	5.3	0.0	2.5
Neighbours	8.1	3.5	0.0	0.0
Government grants	0.0	1.8	11.1	2.5

3.5.5 'Voices together'

Any sector with multiple actors will have challenges, but it was upon the players to act together to overcome challenges. In Fiji, the Wildlife Conservation Society has worked with sea cucumber and mudcrab fisheries and witnessed the actors working together to make a fishery more successful. This was often done by forming an association where issues and ideas are put forward for open dialogue and challenges raised with

the appropriate authority. Because it's a 'collective voice', the chance of any request being successful was much higher. In terms of Indo-Fijian fishing community, the study examined if they use a similar strategy to raise issues to appropriate authorities. A few questions relating to fisher associations were asked.

When asked if they were part of a fisher's association, 9.8% stated that they were. Boat owners had the highest proportion of association membership amongst all actors at 16.0%, and Labasa was the location with the highest percentage of association membership at 28.9%. Three associations were mentioned during the surveys: Labasa Fishermen's Association in Vanua Levu, Ba Fishermen's Association and another unnamed association in Ba. Many of the study participants were unsure of the existence of these associations and those who knew about them mentioned that none of the associations was registered, therefore there was uncertainty on the functionality and effectiveness of such associations. Although 90.2% of the fisheries actors interviewed were not associated with any fishers' association, 74.1% showed interest in being part of an association. Independent fishers were the most interested in being part of an association (80.8%), and Rakiraki was the location with the highest interest (83.3%).

Fisheries actors suggested that being a member of an association will help them raise issues collectively with government, which was viewed as more effective than an individual raising a concern. Those willing to join a fisher association believed that being in a group would make it easier to highlight challenges, get support from fellow fishers and traders, and propose ideas that improve fishing practices, safety at sea and livelihoods. Fisheries actors viewed a fishers' association to be successful model for a number of reasons:

- it can assist fishers or traders who are in need for support. For example, accessing grants and other forms of assistance would be easier as a group and/or an association can raise funds to support fishers /traders during difficult times. These include not being able to fish due to continuous bad weather, being unable to fund a fishing trip or sell catch, being unable to buy new boats or repair boats and cover maintenance cost, or in response to disasters;
- during meetings, fishers/traders can be updated on new rules, ideas on better fishing techniques and resource management information can be shared and implemented;
- fisheries actors are likely to work as a team, and address issues collectively;
- it creates a platform for dialogue amongst fisheries actors and a great platform to socialise and share ideas on changes in fish stocks, better fishing areas, unsustainable fishing methods, and unpredictable weather patterns, fish poisoning and fish migration patterns, and ways to support members;
- it serves as a great platform to share updates on fishing regulations and policies and inform those who hardly interact with the Ministry of Fisheries or miss updates because they were out at sea as well as enforce rules if fishers or traders do not comply;
- an association can also help a fisher with big events like weddings and funerals, which was difficult for individuals to host and organise;
- it fisheries actors a better stand on negotiating for fish sale price; and
- enables collective fundraising to provide food and financial assistance if fishers are not able to fish for extended periods due to unpredictable change in weather conditions.

By contrast, fisheries actors who were not part of any fishers' association felt that the main reason such associations fail was due to lack of unity amongst individuals. While those who were not interested in being part of any fisher association stated that they did not see any benefit. Some stated they may not be part of the decision-making process, while some re-emphasised the issue of unity amongst individuals. A few felt they may raise their concerns, but there will be no action taken or follow up on any issues. There were also concerns about every member not getting equal benefit from an association. Some also stated that at the moment they find solutions to problems as a group of trusted fishers, so there was no need to form an association with others that might bring in disagreement and conflict of interest. Some felt problems were better solved by the elders and more experienced fishers because they are respected. Some even felt there are inequalities between fisheries actors their individual opinions would not be heard or taken into consideration.

Fishers were also asked how they got support. Many stated that despite being comfortable raising issues with multiple authorities as individuals or small groups, they have not received positive feedback. If the issues are related to operations such as the boat engine, fishing gear and weather conditions, it was often raised with the boat owner, discussed amongst fishers and solved. However, if there are issues related to legislation, rules, or fishing grounds, these were raised with government agencies such as the police and relevant ministries, many felt their issues are rarely addressed. Issues related to fishing grounds are often raised with *iTaukei* communities and if Indo-Fijian actors have a good relationship with them, then issues are addressed. Several fishers agreed they never raise any issues because they have no faith in them being solved, so they just discuss amongst other fishers or relatives and think of alternative ways so they do not have to face the same problems again.

3.5.6 Access to information

To understand and improve resource management, information must be disseminated to the right people. The study had a set of questions addressing the dissemination of information to Indo-Fijian fisheries actors. The results showed that 85.5% of fisheries actors received regular updates on fishing rules, including temporary and seasonal bans on fisheries such as grouper and sea cucumber fisheries. However, 14.5% stated that they were not getting regular updates. Of all fisheries actors, boat owners appeared to be the most well-informed group, with 92.3% stating they received regular updates. When asked about how fisheries actors got their information, the most common means specified was through the Ministry of Fisheries (26.8%) followed by television (18.6%), then notice boards (15.5%) and newspaper (14.2%). Other ways information was received included through networks, including from fisher-to-fisher, social media, NGOs, and fishers' associations. When asked if the current means of receiving information was sufficient, a large majority agreed that they were happy, while some proposed other means that included though calls and messages, more social media posts, and more regular updates on radio and television.

The study also asked what types of fisheries information they preferred. Nearly a third (31.0%) requested training and workshops on fisheries legislation and policies including the most recent updates on the seasonal fish ban, catch size and spawning periods and sites. Just over 10.0% of actors also wanted updated information on fisheries research relating to fish migration patterns, fish poisoning, fish identification, and size limits. About 8% requested safety at sea training that included boat maintenance and repair, swimming and waste management to help keep the ocean clean. Safety also included safety at markets such as security for the stalls, hygiene, availability of running water, proper and regular maintenance of stalls specifically for traders who sell at the markets.

Moreover, fisheries actors also requested for more information on:

- how to apply for grants;
- fish warden and boat master training;
- maps of fishing grounds and managed areas that should not be accessed;
- clarity on the fishing and boat licensing processes and timelines on when licences must be renewed;
- training on new fishing techniques and gear used; and
- updates on fish pricing.

Key findings

- Commercial fishers, including Indo-Fijian fisheries actors do not have access right to customary fishing grounds, and need signed consent from Indigenous communities leaders and the national government to access fishing grounds for commercial purposes.
- A large majority of fishers applied for fishing license the Ministry of Fisheries or Commissioner's Office (96.4%) while a notable proportion also negotiate with the chiefs (39.6%).
- Indo-Fijians generally have good relationships with resource owning communities and they still use the "goodwill" system. There was exchange of money or goods in return to consent for accessing the fishing ground.
- About 90% Indo-Fijian fishers stated that their relationship with the resource owners was good and easy.
- More than 70% Indo-Fijian fishers were aware of resource management efforts by Indigenous resource owners.
- Indo-Fijian fisheries actors often got financial support from relatives, friends, traders, money lender or employers. Slightly less than 40% had applied for loan in the last 12 months.
- More than 90% were not a member of any association because they were not aware of any in existence. However, 74% of fisheries actors showed interest in being part of associations.
- In terms of fisheries information, 85% stated they were aware and updated on a regular basis.

3.6 Challenges

Indo-Fijians make significant national contributions to the small-scale fisheries sector, but their challenges are not known and understood. The study examined challenges associated with daily tasks and income, selling fish, negotiating with other communities including *iTaukei* as marine custodians, and engaging with government authorities, amongst others. Challenges highlighted by fisheries actors but not mentioned in earlier sections of the report, were grouped and are described below.

- **Shortage of ice:** Indo-Fijian fishers highlighted that ice plants were not maintained resulting the ice plants not being able to provide for fisher and trader ice needs. Additionally, it was also mentioned that there was no clear system on the distribution of ice was determined. For example, sometimes ice distribution was based on a number system while other times was on first-come-first serve basis. Fishers are often forced to purchase ice from the private plant, which was more expensive and time consuming.
- **Purchasing and maintaining boats and gear:** It was highlighted that boat and engine maintenance was very costly, which was very difficult with the level of income most made from fishing. Furthermore, the cost of maintaining fishing gear (primarily fishing lines, led weights and at times fishing nets) was too expensive for low-income fishers. Sometimes fishers also have to buy fishing bait that adds to the existing cost they can not afford to absorb.
- **Restriction on fish species and areas:** Seasonal grouper ban and certain *tabu* areas seem to be problematic for the majority of fishers. Groupers are a high-value species and fishers are unable to compensate for the cost of losing such a high-value fishery for four months a year. Further, bad weather conditions have already minimised the time spent on a fishing trip and led to decline in their income. Many felt there was no support or subsidies for local fishers during seasonal grouper ban. Sometimes *tabu* area boundaries were not marked or fishers were not aware of new resource management rules for different fishing grounds.
- **Issues with fishing and boat licences:** In addition to concerns about boat licenses being issues under the boat captain's name, fishers explained that if a boat was caught breaking rules such as fishing in *tabu* areas, the fine was given to the boat owner and not the boat captain. It was also mentioned that the annual renewal of fishing licenses was also very problematic due to various reason. The inconsistent and unclear process of renewing fishing licences confused fishers. Some fishers also raised issues about obtaining a separate license to sell fish despite having a valid fishing licence as they are not aware why there was a need for separate licenses.
- **Size of fishing ground:** Some fishers stated that the size of fishing ground was too small and crowded. In addition, fishers got permission to access one fishing ground only, which made it difficult for them to earn enough from fishing. Fishers have requested to be allowed more than one fishing ground access, as this was the condition before.
- **Decrease in catch volumes and size:** A large number of fishers stated they were unable to catch as much fish as they did in the past decade (Fig. 9). Many fishers linked the decline in catch volumes and size to the frequent changing weather patterns. The use of unsustainable fishing practices including night diving for target species, dynamite and the use of small size net fishing was re-emphasised as some of the main reasons for decline in fish stocks. It was also mentioned by some of the more experienced fishers that fish stocks maybe have declined by 70% in the last three decades.
- **Poor infrastructure of roads and fish landing sites:** A large majority of fishers mentioned that fish landing sites were unsafe but they still used them because

there was often no other alternative. For instance, some landing sites have broken ladders, there was no ramp to pull boats and the road to landing sites are in very poor condition. There was no effort from the government to improve road conditions and landowners refuse to sign consent and give permission to Indo-Fijians fishers to improve road infrastructure at their expenses.

- **Availability of bait:** With the current restriction on the mesh size on fishing nets it was very difficult for fishers to catch bait fish, which was very small. If fishers are unable to catch enough baitfish, they are forced to buy bait. Particularly in Rakiraki, some fishers mentioned that they are not longer able to access the only bait fishing area. This happened after fishers gave consent to a private company to built a jetty near the bait fishing area and now the whole area was being claimed as private property.
- **Lack of communication:** Several fishers highlighted having communication problems especially with the *iTaukei* communities regarding access to fishing grounds, landowners on accessing roads to landing sites and with Ministry of Fisheries regarding a range of issues. It was also highlighted that to raise issues regarding anything related to fisheries, the communication channel was never clear and easy to follow. If they have communication problems with *iTaukei* communities, there was no support from the government to solve such issues. Some fishers also raised concerns on the responsibility and role of fish wardens as this was not clearly explained to them. Some of the fish wardens do not have any identification cards yet stop Indo-Fijian fishers to inspect their boats and even take their catch.
- **Boat and engine safety:** An important concern many fishers raised was security issues for boats and engines at landing sites. Theft of boat engines and safety equipment was highlighted as the being the main security issue.
- **Other problems:** Some older fishers also mentioned they have developed health problems due to lack of implementation of health and safety rules in the sector. Boat owners have raised concerns about dealing with crew members and specifically boat captains as mentioned earlier. Having the boat licence under the boat captain's name has been problematic especially if the boat captain was unwell or not willing to go fishing then the whole trip gets cancelled. Some boat owners also mentioned disciplinary issues with boat captains and crew members taking drugs, drinking kava during working hours and coming back with an empty boat on a fishing trip. There was no assistance from enforcement agencies to deal with crew member and boat captain disciplinary issues.



4 CONCLUSION

Indo-Fijian fisheries actors play an important role in Fiji's small-scale fisheries sector and provide significant contribution to the national economy. However, prior to this study there has been little documented on their roles and contribution to the fisheries sector. The authors hope this baseline study will inspire others to expand their investments to include all ethnic groups that engage in the sector. The long-term sustainability of Fiji's fisheries will depend on the engagement of all those who are dependent on the sector for food and livelihoods.



Tom Vieras

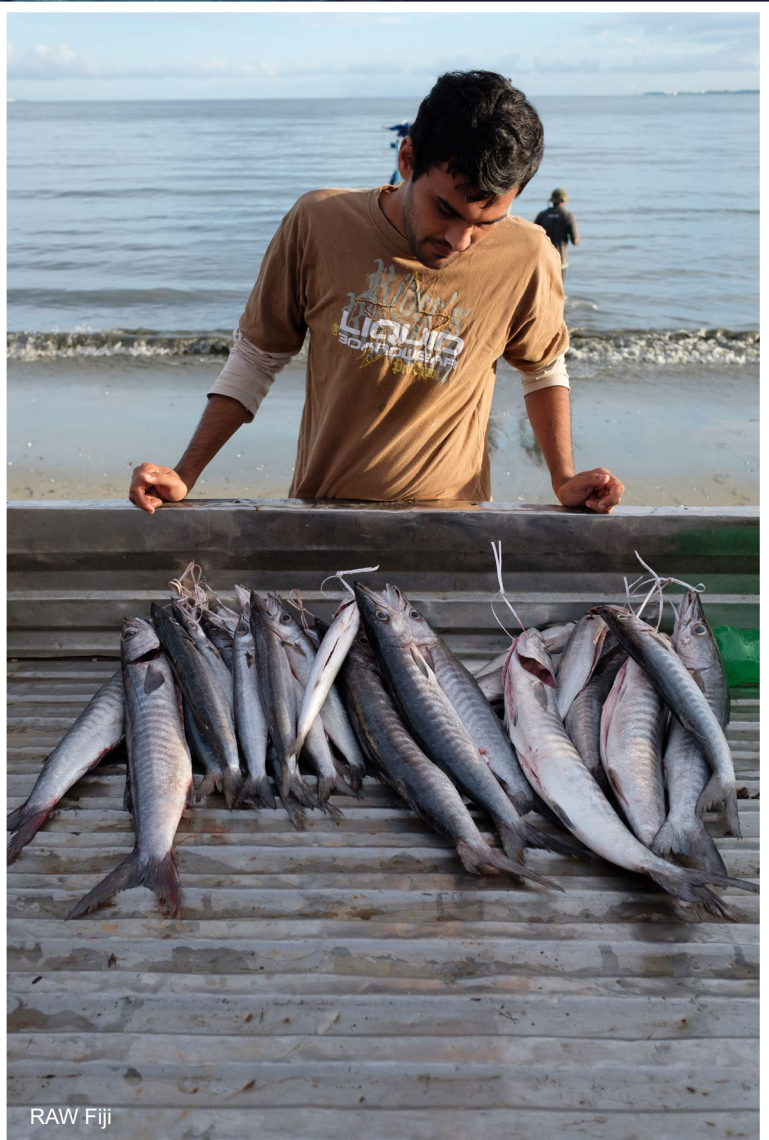
5 REFERENCES

- Ali A (1979) Girit – The Indenture Experience in Fiji. Bulletin of the Fiji Museum, No. 5. Retrieved from http://girit.org/?page_id=1152
- Askew N, Fox M, Jupiter S (2011) Ecotales from Kubulau. A guide to the cultural and natural heritage of the Vatu-i-Ra Seascape. Wildlife Conservation Society, Suva Fiji. 99 pp.
- Bureau of Statistics (2018) 2017 Fiji population and housing census :administration report / Fiji Bureau of Statistics. Suva, Fiji. 260 pp.
- Choo PS, Nowak BS, Kusakabe K, Williams MJ (2008) Guest editorial: Gender and Fisheries. Development 51:176–179
- Dalzell P, Adams TJH, Polunin NVC (1996) Coastal fisheries in the Pacific Islands. Oceanogr Mar Biol an Annu Rev 1996 34:395–531
- Fache E, Pauwels S (2016) Fisheries in the Pacific: The Challenges of Governance and Sustainability.
- Fiji Bureau of Statistics (2018) 2017 Fiji population and housing census: administration report/ Fiji Bureau of Statistics, Suva, Fiji. 260 pp.
- Firth S, Naidu V (2019) Understanding Oceania: Celebrating the University of the South Pacific and its collaboration with The Australian National University.
- Lee S, Lewis A, Gillett R, Fox M, Tuqiri N, Sadovy A, Batibasaga A, Lalavanua W, Lovell E (2020) Fiji Fishery Resource Profiles. Information for Management of 44 of the most important species groups. Gillett, Preston and Associates and the Wildlife Conservation Society, Suva, Fiji. 240 pp.
- Mangubhai S, Nand Y, Ram R, Fox M, Tabunakawai-Vakalalabure M, Vodivodi T (2016) Value chain analysis of the wild caught sea cucumber fishery in Fiji. Wildlife Conservation Society and Fiji Department of Fisheries. Report No. 02/16. Suva, Fiji, 66 pp.
- Mangubhai S, Fox M, Nand Y (2017) Value chain analysis of wild caught mud crab fishery in Fiji. Wildlife Conservation Society. Report No. 13/17. Suva, Fiji. 100 pp.
- Mangubhai S, Sykes H, Lovell E, Brodie G, Jupiter S, Lal R, Lee S, Loganimoce EM, Morris C, Nand Y, Qauqau I, Rashni B (2019) Fiji: Coastal and marine ecosystems. In C. Sheppard (ed.) World Seas: An Environmental Evaluation Volume II: The Indian Ocean to the Pacific. Elsevier. pp. 765–792.
- Ministry of Fisheries (2019) Fisheries Sector Investment Guide August 2018/July2019. Ministry of Fisheries, Level 1 Takayawa Building, Suva Fiji. 49 pp.
- Naidu V, Matadradra A, Sahib M, Osborne J (2013) Fiji: the challenges and opportunities of diversity. Minority Rights Group International, London. 44 pp.
- Purcell SW, Mercier A, Conand C, Hamel J-F, Toral-Ganda MV, Lovatelli, Uthicke S (2013)
- Sea cucumber fisheries: global analysis of stocks, management measures and drivers of overfishing. Fish and Fisheries. 14: 34–59.

- Purcell SW, Polidoro BA, Hamel J-F, Gamboa RU, Merciet A (2014a) The cost of being valuable: predictors of extinction risk in marine invertebrates exploited as luxury seafood. *Proceedings of the Royal Society B*. 281: 20133296
- Purcell SW, Lovatelli A, Pakoa K (2014b) Constraints and solutions for managing Pacific Islands sea cucumber fisheries with an ecosystem approach. *Marine Policy*. 45:240-250
- Prasad R (2004) *Tears in Paradise: A personal and historical journey, 1879–2004*. Galde Publishers, Auckland.
- Rai S C (2010) *In exile at home: a Fiji-Indian story*. Doctoral dissertation, The University of the Western Sydney.
- Reddy C (2019) *Indo-Fijian fishing communities: relationships with Taukei in coastal fisheries*. Master of Science dissertation, Victoria University of Wellington.
- Thomas A, Mangubhai S, Fox M, Lalavanua W, Meo S, Naisilisili W, Ralifo A, Veitayaki J, Waqairatu S (2020) *The critical contribution of women fishers to food security and livelihood in Fiji*. Report No. 02/20. Wildlife Conservation Society, Suva, Fiji. 136 pp.
- Veitayaki J (1998) Traditional and community-based marine resource management systems in Fiji: An evolving integrated process. *Coastal Management* 26(1), 47–60.
- Vitukawalu B, Mangubhai S, Berdejo V, Naleba M, Nand Y, Leli P (2020) Addressing barriers and constraints to gender equality and social inclusion of women seafood sellers in municipal markets in Fiji. *SPC Women in Fisheries Information Bulletin*. 31: 30–25.



Shiri Ram



RAW Fiji

Founded in 1895, the Wildlife Conservation Society (WCS) saves wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature by conducting wildlife research and conservation projects in more than 60 countries.

As part of the Melanesia Program, WCS Fiji Country Program (WCS Fiji) has supported land-sea planning and management across Fiji since 2001. WCS Fiji focuses on supporting community-based natural resources management and building of local capacity within the Vatu-i-Ra Seascape, covering four Provinces: Bua, Ra, Tailevu and Lomaiviti.



Wildlife Conservation Society Fiji Country Program
11 Ma'afu Street, Suva, Fiji
(679) 331 5174
infofiji@wcs.org
fiji.wcs.org

Printed on 100% recycled paper