

Potential for Sustainable Sea Transport: A Case Study of the Southern Lomaiviti, Fiji Islands

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Abstract

This paper outlines research on the sea transport need and potential options for the future for the islands of Gau, Batiki and Nairai, Southern Lomaiviti, Fiji. Sea transport is vital for this island group, as for most Pacific Island communities, for access to markets, education, healthcare, and for social and cultural connectivity.

The islands lie between 30-60 nautical miles east of Fiji’s capital, Suva yet sea transport is a major limiting factor for the sustainable development aspirations of the islanders. Sea transport is limited to infrequent commercial ferry services and outboard driven punts. Mishaps and tragedies are common with the latter especially when making the blue water passage to the mainland. The Fiji Government subsidises the ferries through its Shipping Franchise Scheme to ensure commercial operators service the route.

The absence of commercial development within the group has meant high biodiversity and cultural values have been preserved and there are a number of projects, especially on Gau, with a common aim of building resilience or ‘climate change proofing’ the communities and their island environments. These projects are focused on supporting local communities to maintain well-being through improved reliance on local and natural assets. It is logical to add analysis of low carbon sea transport options to these initiatives.

Lomaiviti has been selected as representative of a number of isolated Maritime Provinces in the Pacific. This paper is expected to pave the way for greater research in this field and assist in solving the crippling effect of the region’s current fossil fuel dependency.

Acknowledgements

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Vinaka vakalevu.

Acronyms and Abbreviations

ADB	Asian Development Bank
AusAID	Australian Agency for International Development
FAO	Food and Agriculture Organisation (UN)
FAD	Fish Aggregating Device
IAS	Institute of Applied Sciences
IMO	International Maritime Organisation
JICA	Japan International Cooperation Agency
NFMV	Nature Fiji-Mareqeti Viti
NGO	Non-Government Organisation
PaCE-SD	Pacific Centre for Environment and Sustainable Development
PICs	Pacific Island Countries
PIDF	Pacific Islands Development Forum
PIF	Pacific Islands Forum (list countries)
SIDS	Small Island Developing States
SOFI	Spirit of the Fiji Islands
SPC	Secretariat of the Pacific Community
SSTT	Sustainable Sea Transport Talanoa
SSTRP	Sustainable Sea Transport Research Programme
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
USP	the University of the South Pacific

WCS	Wildlife Conservation Society
WWF	World Wildlife Fund for Nature

Glossary of Fijian Terms

bele	<i>Abelmoschus manihot</i> , <i>Malvaceae</i> , edible leafy vegetable shrub
bilibili	bamboo raft; common mode for inshore fishing in villages
dalo	<i>Colocasia esculenta</i> ; taro; a staple starchy root crop
i qoliqoli	communally owned fishing ground
Kacau ni Gau	Fiji Petrel (<i>Pseudobulweria macgillivrayi</i>); endemic to the island of Gau
talanoa	to yarn, chat, relate (a story), usually for entertainment, social amusement.
tikina	district; administrative sub-unit of a Province
turaga-ni-koro	administrative head of a village; village spokesperson
voivoi	<i>Pandanus thurstoni</i> , used for mat and sail making
yagona	kava (<i>Piper methysticum</i>); ceremonial drink in Fiji

1. Introduction

This paper discusses a case study of the local sea transport use and potential options for the future for of three related islands, the Southern Lomaiviti group in Fiji. A comprehensive needs survey building on preliminary assessments on Kadavu Island, Fiji, is being conducted. The sea transport context facing Small Island Developing States (SIDS) in the Pacific is given and the rationale for prioritising baseline survey work at the village and island level explained. The potential of using this assessment methodology in other island locations to build the data sets needed for projects which seek to address the issue of sustainable transport for the Pacific is highlighted.

This research seeks to replicate and extend an initial village scale survey to an island group scope. We believe that such surveys have not previously been conducted for this level in Fiji. It is intended that the survey methodology developed will prove replicable in other Fiji and Pacific locales and can eventually be used as a basis for collating much needed data on the lowest common denominator of the sea transport sector. Our preliminary analysis suggests that fuel used for local level sea transport, as a proportion of national use, has either been discounted or heavily underestimated in previous analysis of Pacific Island Countries’ (PICs) transport need and fuel use.

Issues of sea transport remain universal and primary, a basic human need of Oceanic peoples today and tomorrow (Nuttall, 2013). The region’s transport issues are unique; tiny economies scattered at the ends of some of the longest transportation routes in the world (ABD, 2007; SPC, 2011) and the most challenging network to maintain per capita and per sea mile with the resource base available to support it (Nuttall et al, 2014). Transport is a priority for Pacific Island Forum leaders under the Pacific Plan, the overarching regional policy framework for PICs, and its importance as an essential facilitator of economic growth is well recognised (UNESCAP, 2010).

Sea transport in this region is about much more than facilitating economies and trade. Fijians, like most Pacific Islanders, are highly mobile; maintaining family connections is a vital concern and there is considerable travel between kin throughout Fiji (Nuttall et al, 2014). Any increase in transport costs immediately impacts social and cultural connectivity. The agenda needs to be considered in a wider context than just economics and the research is seeking to provide the basis for an analysis that includes social, cultural and environmental bottom-lines.

This village level research is an essential building block for the University of the South Pacific’s (USP) current research programme on sustainable sea transport for PICs. Analysis of the sector is severely hampered by a lack of reliable and up-to-date data on which to base recommendations for future action. For future solutions to be demonstrated as truly sustainable an accurate picture of both current use and projected need is essential and data availability, especially at the lowest common denominator of the island and village is currently almost entirely lacking.

2. Pacific Island Sea Transport Context

The Pacific region is the most dependent on imported fossil fuels in the world with PICs importing more than 95% of fuel (Woodruff, 2007). Such dependency is recognised as having a crippling effect on national budgets and revenues and impacts on key productive sectors in the region (ESCAP, 2010; Prasad, 2014; SPC, 2011). Various strategies to reduce this dependency are being considered and implemented but primarily target electricity generation. Transport generally has received far less attention, despite being the region’s single largest sector user of imported fuel (75% regional average) (Fifita, 2012). Alternatives to current sea transport options are almost totally ignored in current regional and national debates and the issue has been previously invisible within the policy and donor strategy space at all levels (Nuttall et al, 2014; Prasad et al, 2013).

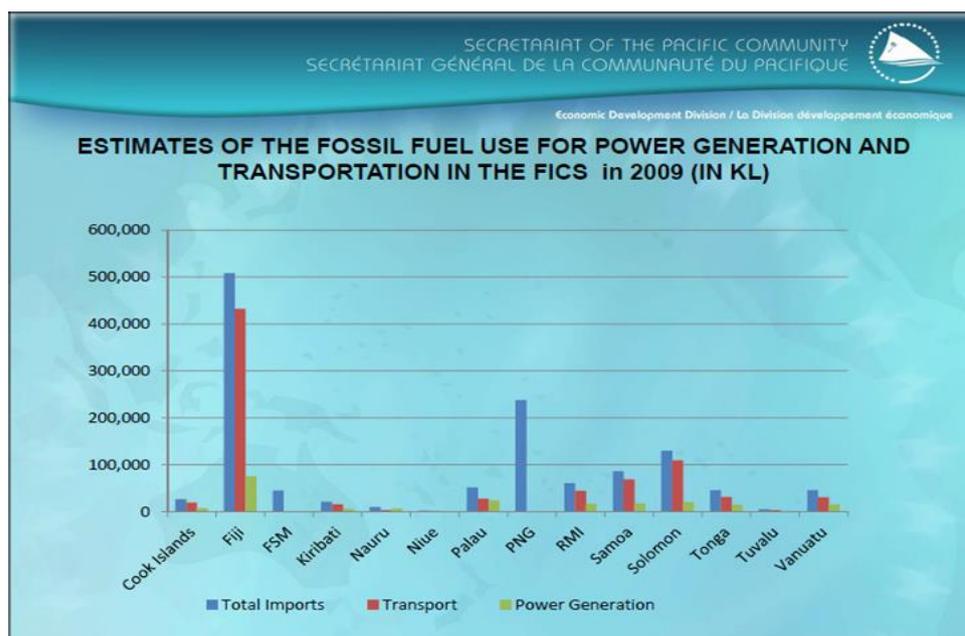


Fig 1: Estimates of Fuel (source Fifita, 2012)

Sea transport is essential at all levels of society from fishing and local transport needs of small isolated islands and villages to inter-regional shipping requirements of nation states. Currently all maritime transport services are fossil-fuel powered and are becoming increasingly unsustainable as operational fossil fuels costs increase. Such increases have considerable effect socially and culturally, as well as being a major inhibitor of development economically. SPC (2011) summarises that large distances, high fuel costs and low economies of scale make the cost of developing and maintaining transport infrastructure relatively high. Issues of constricted markets for local products and reliance on international trade are exacerbated by global developments as well, resulting in fewer employment and livelihood possibilities.

The literature on Pacific sea transport is thin, comprising mainly historical assessments (e.g. Bayliss-Smith, 1988; Couper, 1968, 1973, 2009; D’Arcy, 2006, 2008), some specialised studies (e.g. Anderson et al, 2003; Gibson and Nero, 2007) or the reports of a small number of development agencies (in particular ADB, AusAID, ESCAP, SPC). All agree that it is the intra-country domestic shipping services that are in most dire need (ADB, 2007; AusAID, 2008; SPC, 2011; UNESCAP, 2010). Recently, USP researchers have begun populating the literature base for this field with Nuttall et al (2014) providing the regional overview supported by more specialised findings (Holland et al 2014; Newell and Bola (in press); Nuttall and Kaitu’u (in press); Nuttall, 2012, 2013; Prasad et al 2013).

Throughout the Pacific inter-island and coastal shipping services are usually run by governments or small, independent shipping companies. Many routes are commercially unviable and some are simply uneconomic. Governments are required to subsidise or otherwise provide for these with continually accumulating costs.

This is illustrated using Fiji as an example. Fiji has 332 islands, of which 100 are inhabited, and an area of 1.3 million square kilometres of ocean. For many communities there is no other form of transport except by sea. All maritime transport is fossil fuel dependent. There are a number of private shipping operators serving the major economical routes. However, the Fiji Government’s budget for 2014 includes FJ\$ 1.725 million for the Government Shipping Franchise Scheme² which subsidises

² The shipping franchise scheme was established by the government in 1996 and seeks to provide at least a monthly service to those outlying maritime islands which would otherwise be unserved.

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private sector vessels to ensure provision of maritime transport services to ten identified “uneconomical” sea routes (based on 42% of shipping company operating costs/trip) (Naisara, 2014). For instance, the government subsidy for sea transport between Suva and Rotuma costs FJ\$25,000 per 700 nautical mile trip.

Because the vast bulk of commodities and manufactured goods are transported by ship in the Pacific, and considerable domestic travel is by sea, the cost and quality of shipping immediately affects the welfare of the consumers and producers (SPC, 2011). Additionally, the marginal nature of the industry means that financing shipping investment, either for governments or private operators, is problematic (ADB, 2007; SPC, 2011).

Generally for many PICs at a domestic level, shipping services are restricted to an aging and inefficient fleet. The marginal returns and financing barriers, especially for domestic services, means most operators are trapped in a cycle of replacing old ships with old ships or waiting for donated (and sometimes inappropriate) vessels. AusAID (2008) underlines the dire state of ships in the region. The ships in operation are sometimes unsuitable, and in poor condition. Many vessels do not meet recognised safety standards, and arguably should be removed from service but because they provide crucial services to remote communities, this step is usually ignored (AusAID, 2008). Shipping disasters due to substandard ships are regular events and smaller scale tragedies are commonplace.

Additionally, the global mitigation measures that the International Maritime Organisation (IMO) is currently developing are likely to have an overall adverse impact on PIC shipping and to lead to increased costs and barriers, resulting in a double penalty for no evident regional benefit. Implementation of the MARPOL Annex VI regulations, intended at cutting levels of SO_x emissions from global shipping, will alone contribute an estimated 60% price increase in marine fuel for PICs at current oil prices by 2020 for all vessels over 400 gross ton (Nuttall, 2013).

Domestic shipping continues to use fossil fuel technology because there is a lack of sufficient incentive to adopt new technologies and a lack of research and working models of viable alternatives. Rojon (2013, 2014) discussed at length the barriers to renewable energy use for sea transport. She argued them to be lack of policies and

incentive schemes, lack of financial resources, insufficient collaboration, and conservative and risk-averse attitudes.

That sustainable transport is essential to developing “blue/green economies” is also becoming increasingly recognised. The outcomes from the 2013 inaugural meeting of the Pacific Islands Development Forum (PIDF) include: “Sustainable transport: We prioritise alternatives to existing petroleum driven land and sea transportation that significantly reduce fuel imports. Sustainable shipping approaches are to be promoted and adopted as an alternative to provide effective services for remote island communities.” (PIDF, 2013).

3. Current Research Agenda

The current research project for Southern Lomaiviti builds on a previous single village study conducted in Solodamu village, Kadavu (Newell and Bola, in press). Both studies are situated in the context of a new and developing research agenda being pursued by USP and a growing network of collaborators. The barriers to transformation of this essential sector are complex. In seeking to fill this gap, USP hosted an international “Sustainable Sea Transport Talanoa” (SSTT) in 2012. Resulting from the outcomes of SSTT 2012, USP launched a new programme in 2013, the Sustainable Sea Transport Research Programme (SSTRP), designed to initiate long-term investigation and analysis of the potential for using renewable energy technologies for sea transport for the region (Nuttall et al, 2014; Prasad et al, 2013).

In particular, the one-year research programme focuses on preparatory socio-economic studies using three selected Fijian routes as case studies. The Kadavu and Southern Lomaiviti case studies focus on transport and fuel needs at the lowest denominator, maritime island communities. As discussed above, analysis of the sea transport needs at this level have not been previously explored and it is essential that an accurate and representative picture of current use, need and fuel consumption is constructed before designing more sustainable low carbon solutions.

Building from the methodology developed for the Solodamu survey, the Southern Lomaiviti case study aims to establish the sea transport demand and fuel use of the islands of Gau, Batiki and Nairai. Household level surveys of fuel and transport use

have been developed from the Solodamu templates and conducted in four villages as a starting point to allow comparison between Kadavu and Southern Lomaiviti. Drawing from the survey data, evaluation of transport use and expenditure for transport and fuel will be determined.

Further to gathering data on household fuel use, a census of *fibre*³/outboard boats will be conducted for the three islands where up to 10 representative *fibre* operators will be asked to fill out logbooks over a 6-week period to determine fuel and transport usage by the overall village community. Averaging of these and extrapolation using the *fibre* census data will allow a profile of small-scale vessel use and establish a fossil fuel use profile by sector for the islands. Additionally, by gauging the views at different levels, i.e. village (e.g. *Turaga-ni-Koro*), industry (e.g. Goundar Shipping Services), and government (e.g. Lomaiviti Provincial Council, Department of Transport), through targeted interviews, the information will afford a more holistic view of the country’s transport profile. To the best of our knowledge, this is the first time that structured field research of this nature has been attempted in Fiji.

Adapting the village-based survey to island/national level determines whether the methodology is replicable in other locations or scenarios. This is an integral “missing link” in setting the baseline for transport and fuel data. Almost all attention on new technologies for sustainable sea transport internationally has focused on large-scale, new generation shipping primarily servicing international routes. To date there has been little attention given to the development of alternative energy solutions for the Pacific. All sources agree that the priority for Pacific shipping lies on the domestic front.

The Kadavu and Southern Lomaiviti case studies begin to provide, for the first time, reliable data on village-level transport use, need and fuel consumption in order to start addressing this priority. A key outcome is to develop survey tools that are replicable for other Fijian communities and then wider Pacific application. The survey methodology developed in Fiji has been modified and used for a recent needs assessment of sea transport in Jaluit Atoll, the Republic of Marshall Islands. This work is facilitated by USP Marshall Island campus colleagues and students.

³ A “*fibre*” is a small (23 – 36 ft) open skiff, usually of made of wood or fibreglass and powered by an outboard engine of typically 40 or 60 horsepower.

4. Data Constraints

Regionally and for most island countries, there is a lack of reliable data to calculate what percentage of fossil fuel use is attributable to sea transport. Access to official Fiji records is challenging but it is believed no comprehensive assessment of fuel consumption has been undertaken at local level. The lack of reliable data generally for sea transport and particularly for domestic sea transport constrains analysis and research. It is not possible to determine what proportion of the sector is maritime use. ADB (2007) and the recent Fiji Ministerial Forum (2014) echo similar sentiments on the lack of reliable data for sea transport. SPC therefore, is now working towards establishing a regional data repository. However, efforts have been constrained ironically by the lack of data and reluctance at national level to commit databases to a regional institution.

Whilst there has been significant effort by Pacific countries to reduce fossil fuel used for electricity generation in recent years, there has been little focus to date on the transport sector which uses significantly more fuel (Nuttall et al, 2014; Prasad et al, 2013). Using Fiji as an example, 64% of imported fuels are used for transport compared to 19% for electricity generation (Economic Consulting Associates Ltd, 2013). For some countries the marine sector is believed to be the largest single user, possibly as much as 64% of all use for countries like Tuvalu (Department of Energy, 2012) and 90% for Tokelau (Nuttall, 2013).

In spite of the importance of domestic shipping to PICs, there has been almost no research or programmes to collect the necessary data. Recent work on profiling village transport need and fossil fuel footprints has been non-existent except for the surveys in Solodamu village, Kadavu Island (Newell and Bola, in press).

Indicative assessments from other Pacific locales are that small engine use is likely a high cumulative consumption of overall fuel use. For example, Wade (2004) reported that Tokelau imported 180,000 L of petrol in 2003 and this was almost exclusively used for outboard motors on intra-atoll fishing trips. By comparison, electricity generation via communal diesel generators used 160,000 L of diesel nationally in the same year.

In 2013, the government of Tuvalu released its first ever energy statistical report which provides a comprehensive overview of fuel use (Tuvalu Department of Energy,

2012). Transport overall uses more than 50% of all fuel imported into Tuvalu and of this 64% is used by the maritime sector. 80% of the maritime fuel used is for outboard motors.

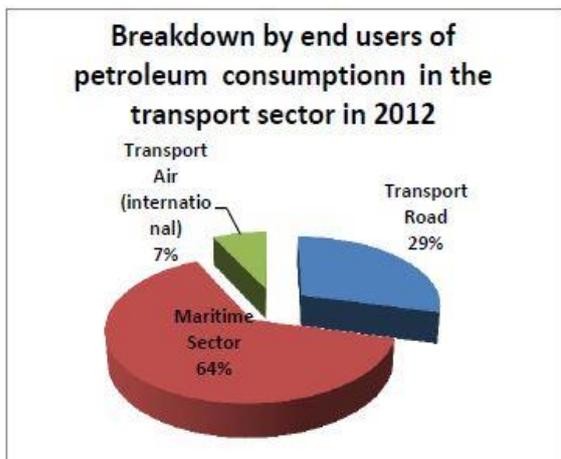


Fig 2: Tuvalu transport fuel use by sector (source: Department of Energy, 2012)

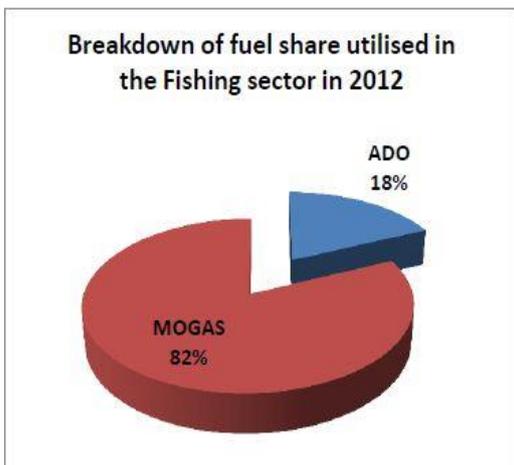


Fig 3: Petrol (Motor Gasoline) vs Diesel (Automotive Diesel Oil) use for maritime (source: Department of Energy, 2012)

Currently the number of outboard engines used for maritime purposes in Fiji is unknown; neither is the proportion of this as a percentage of the national fuel bill; or what proportion of village/island fuel use this comprises. The Solodamu village survey (see below) found sea transport and outboard fuel use to be the majority fuel use for this village and this is strongly suspected to be representative of many maritime/village scenarios. The Southern Lomaiviti survey then is designed to characterise domestic transport fuel use across three maritime islands (comprising 23 individual villages).

Recent publications (ADB, 2007; Ministerial Forum Outcomes, 2014; Nuttall et al, 2014; Prasad et al, 2013; SPC, 2011) have highlighted the need for more data to support research and analysis into the fossil fuel used by the maritime transport sector in the Pacific. Sea transport is vital for access to markets, education, healthcare, and for social and cultural connectivity.

5. Solodamu Village Surveys 2009-2011

Surveys of *fibre* and fuel use have been conducted in Solodamu village on Kadavu, Fiji. The objective was to gauge the overall sea, land, and air transport use by Solodamu village and the fossil fuel footprint of the village by collecting data on a household by household basis and aggregating the totals.

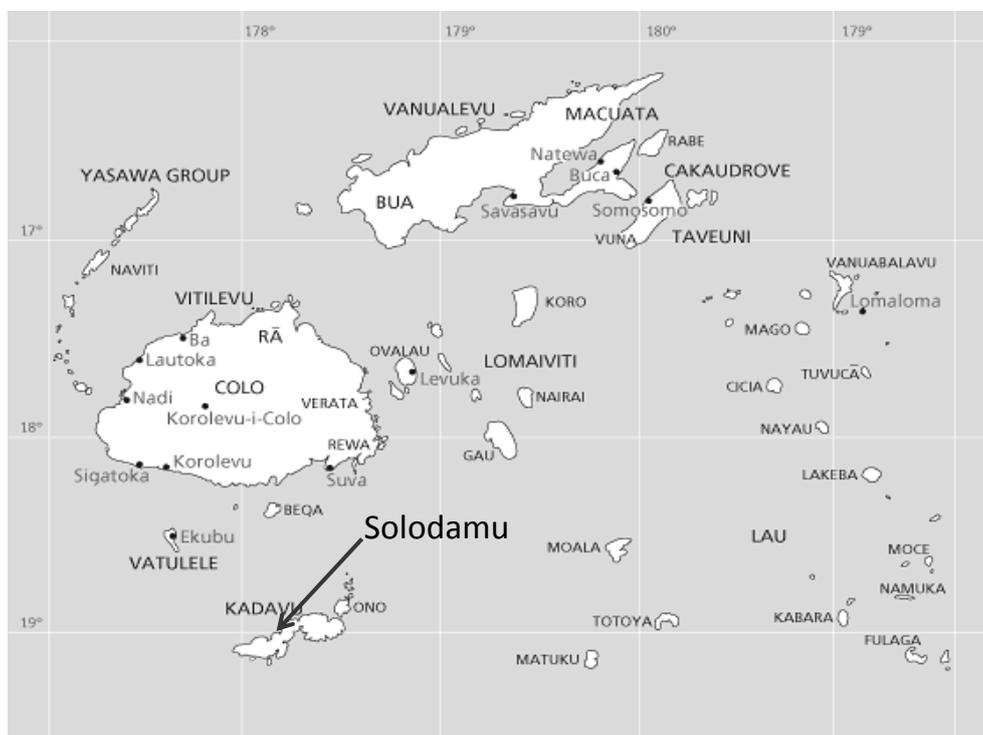


Fig 4: Solodamu Village, Kadavu Island, Fiji (Source Newell & Bola, in press)

Interisland transport is critical for Solodamu. Combined with coastal movements, it makes sea-transport crucial to every aspect of village well-being. It is essential for transport of both people and goods and is currently the single largest user of fossil fuel in Solodamu and is increasing (54% of fossil fuel used in 2011 rising from 33% in 2009). The increase in fuel used was primarily attributable to increased use of fibres for sea transport. It is important to note that the survey only collected data of

the fuel used directly by the villagers and did not include the fuel used by the ferries for sea transport from Vunisea to Suva, or fuel used for air or land transport.

Electricity demand increased up until 2009 but declined by 2011 this being attributable to the decline in use of individual household generators as the cost of fuel increased.

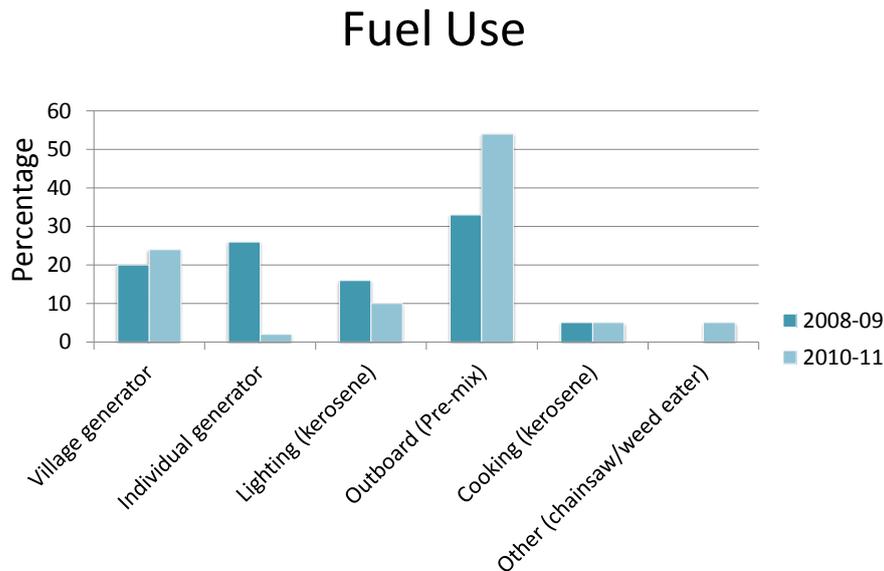


Fig 5: Solodamu Fuel Usage (source: Newell, 2013)

Fossil fuel is an increasingly expensive commodity. After a period of relatively stable prices, the cost of pre-mixed petrol (50:1 oil/petrol mix suitable for outboard motors) increased during the 2008 world oil price hikes to over FJ\$3 a litre in the village for a period. These prices have fluctuated since this extreme and at the time of the surveys was retailing in the village at around FJ\$2.50 a litre in 2009 and 2011. Villagers also reported that it is an increasingly used commodity. A small amount of solar use aside, all electricity is fossil fuel derived. Firewood is the principal source of fuel used for cooking.

This work provides a representative single village case study of the issues faced by many remote coastal Oceanic communities. It underscores the argument that coastal/island communities that are reliant on externally controlled and determined transport are heavily restricted in their development options and are less resilient.

6. The Lomaiviti Island Group

The Lomaiviti archipelago lies off the eastern seaboard of Fiji from the mainland of Viti Levu and comprises of seven main islands and a number of smaller ones. They cover a total area of 411 square kilometres, and had a population of 16,461 at the most recent census in 2007. The islands are at the heart of Fiji's colonial past and are home to the country's first capital, Levuka (1871 to 1877). Some of the inner islands of the central Lomaiviti are well-developed tourist destinations with ample facilities and attractions including diving, fishing, snorkelling and whale watching.



Fig 6: Map of Fiji Islands. Insert: The Southern Lomaiviti Group

The volcanic islands of Southern Lomaiviti, comprising of Gau, Batiki and Nairai, lie some 30-60 nautical miles east of Viti Levu. There is no notable commercial or other economic activity on the islands (Veitayaki et al, 2003). Subsistence farming, fishing and tourism are the mainstays of the islands' economy. Such an economy has been described as “subsistence affluence” to differentiate it from the abject poverty that is prevalent in many other developing countries (Fisk, 1970; Knapman, 1987). While local income is highly limited, the islands and the marine hinterland provide a vital

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and varied source of food and other resources essential to subsistence and maintenance of healthy communities.

Transport is currently by commercial ferries that service them infrequently, occasionally by air via a small airstrip on Gau Island and commonly by a number of *fibres*. Mishaps and tragedies are common with the latter especially when making the blue water passage direct to the mainland. In the 2007 census, of the 3,394 households surveyed in Lomaiviti 217 stated they owned an outboard motor (Waqavonovono, E., email, 19/11/2013). The question however, was ambiguous as it did not specify as to whether these were operational outboard motors.

7. Southern Lomaiviti

Gau Island

The island of Gau, fifth largest in the country, is located east of Viti Levu at 18°04' S and 179°16' E and covers an area of 136.1 square kilometres, with a total shoreline of 66.3 kilometres. Its maximum altitude is 738 metres. It has one airstrip at Lovu at the southern tip of the island, which receives planes from Nausori Airport in Suva. There are three districts (tikina) on the island, Navukailagi, Sawaieke and Vanuaso.



Fig. 7: Prolific View of Gau Island (source: Veitayaki, 2007)

Owing to the island’s relatively pristine condition, the presence of the endemic indigenous bird, the Kacau or Fiji Petrel, a wide range of endemic plants and the historical absence of “commercial development”, high biodiversity and cultural values have been preserved. Because of its proximity to the capital Suva, its lack of

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“commercial development” and its high biodiversity, Gau has been subject to a wide range of studies by local and visiting academics and researchers. Gau has also attracted a range of NGOs seeking to assist with progressing of village development, conservation, marine protection and adaptation to climate change related projects.

USP’s Institute of Applied Science (IAS), the International Ocean Institute-Pacific Islands, the Pacific Centre for Environment and Sustainable Development (PaCE-SD), World Wide Fund for Nature (WWF), Wildlife Conservation Society (WSC) Fiji, Nature Fiji-Mareqeti Viti (NFMV), Frontier Fiji and JICA are but a handful of the many organisations that have projects focused on assisting and supporting local communities in maintaining their well-being through improved reliance on local and natural assets.

USP’s School of Marine Studies is now seeking to coordinate these disparate projects into a single agenda with a common aim of building resilience or ‘climate change proofing’ the local communities and their island environments. Our research looks to synergize sustainable sea transport into this body of work.

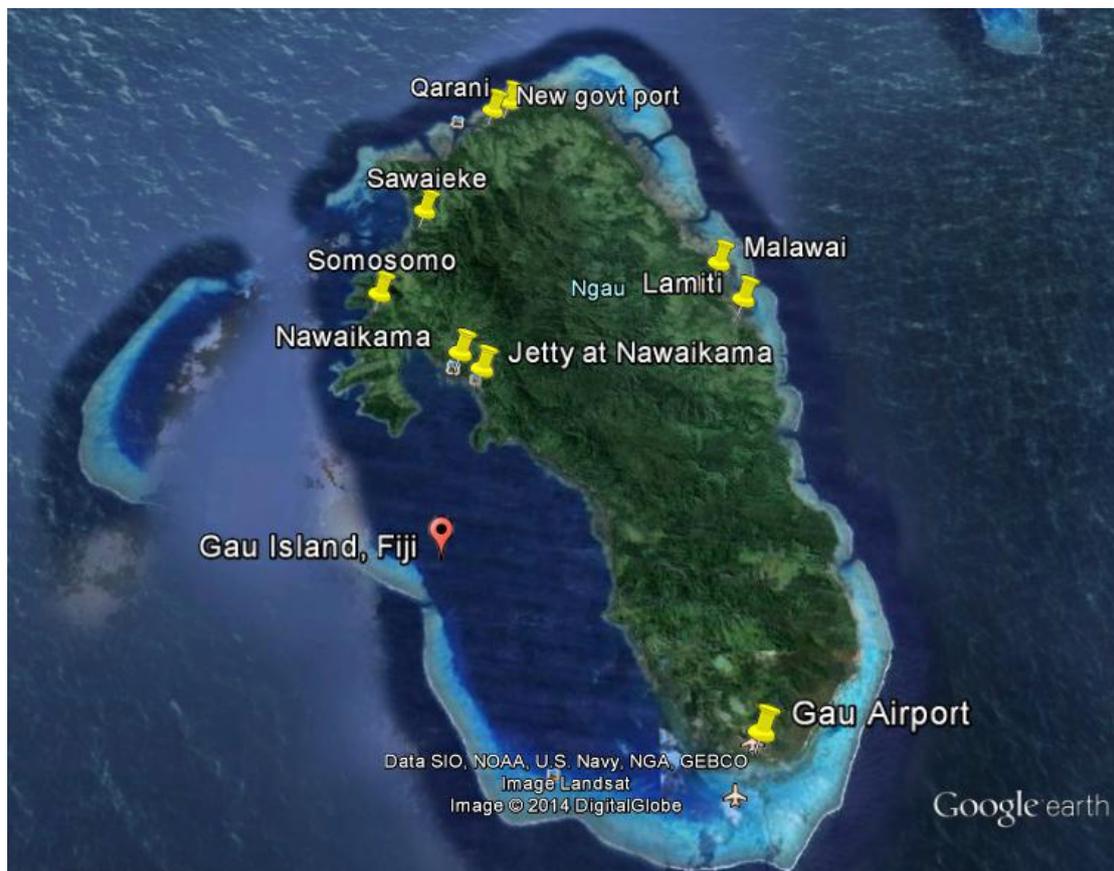


Fig 8: Gau Island (source: googleearth)

Nairai Island

Nairai has a land area of about 30 square kilometres lies at 17°48' S, 179°24' E. Its population of approximately 600 live within five coastal villages: Lawaki, Nataulua, Tovulailai, Vutuna and Waitoga. Economic activity is subsistence farming and fishing; one tourist resort is currently under construction. The island has no airport; transport is by local cargo vessels or small boats. A new wharf is currently being constructed by the current Government, who has been very supportive of development works on this island since 2007.



Fig 9: Nairai Island (source: googleearth)

Batiki Island

Batiki, with a land area of about 12 square kilometres lies at 17°47' S, 179° 9' E. Its population of approx. 300 live within the four coastal villages: Mua, Yavu, Manuku, Naigani.

Economic activity is subsistence farming and fishing. The island has no airport; transport is by local cargo vessels or small boats. There is a primary school with ~50 local students and four teachers. There is also a small nursing station. Cases the nurse

cannot manage are referred either to Qarani Health Centre on Gau Island (~14 km away) or Levuka Hospital on Ovalau Island (~18 km away). There is also a small local postal agency-deal with mails, telegrams, money transfers etc. Transportation is mainly *fibre* boats.

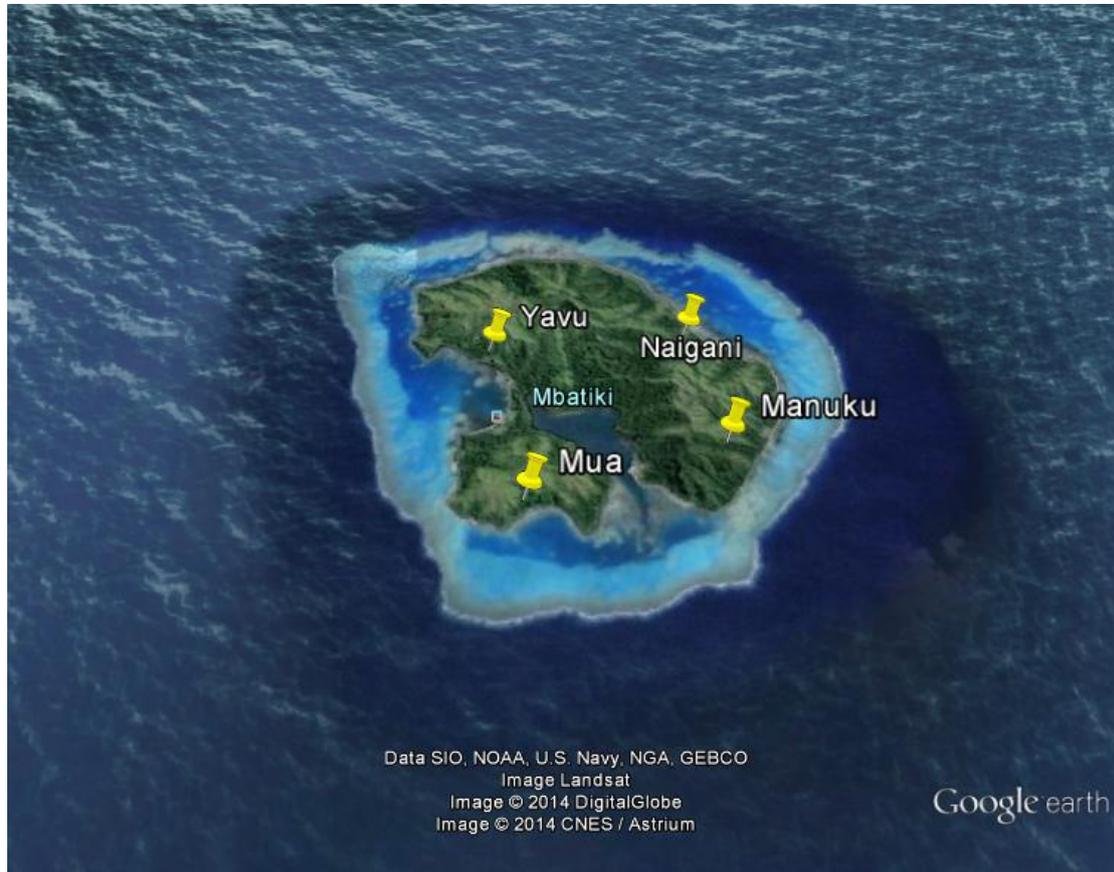


Fig 10: Map of Batiki (source: googleearth)

8. Current Sea Transport Profile of Southern Lomaiviti

Like many islands in the Pacific, Gau is encircled by a barrier reef which constricts bigger ships entering its waters because of its shallow depths and narrow reef passages. There are currently four available ports on the island, at Lovu village, Nacavanadi village, Nawaikama village and Qarani village. Qarani is the site for the government’s planned port infrastructure improvement although the existing jetty is at Nawaikama. There are two ferries that are licensed to service the island through the government’s Shipping Franchise Scheme, the *MV Spirit of the Fiji Islands (SOFI)* of Consort Shipping Services and the *MV Lady Sandy*, a converted fishing boat, of Seaview Shipping Services. The *MV Lady Sandy* calls to most of the villages while the *SOFI* only makes port at Nawaikama. The *SOFI* has been inoperative since hitting

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a reef near Koro Island earlier in the year whilst the *MV Lady Sandy* last visited the island two months before the commencement of this survey.



MV Spirit of Fiji Islands (SOFI)



MV Lady Sandy

Fig 11: Ferries that service the islands under the Government Shipping Franchise Scheme (source: <http://www.shipspotting.com/>)



Figure 12: Children returning home from school in a fibre (Newell, 2013)

9. Baseline Survey for Gau

An initial baseline assessment was conducted in July 2013 of five of the 16 villages on Gau to gauge the current transport demand and need.

On average, 10 households per village were surveyed with similar numbers of men and women being interviewed. This sea transport survey was conducted jointly with JICA’s Grass-roots Cooperation Program for the Sustainable Development and Governance of Gau Island follow up study. This trip was to site a possible launch area for a FAD (Fish Aggregating Device).

During the survey, Think Pacific (an international volunteer organisation) were constructing houses in Malawai village and assisting in the Lamiti-Malawai Primary School. Additionally, it was noted throughout the island the growing number of households installing solar power for lighting. This highlights the peoples’ commitment and eagerness to improve their livelihoods.



Fig 13: Household solar panels in Somosomo village

Throughout the five representative villages surveyed, it was found that the main mode of transportation is by fibres, whether to Suva or around the island. Fibres are the primary source of travel because of the ill-maintained road on the island, infrequent air services and irregular ferry services. It is well understood by the locals that this is a risky mode of travel, and this may be a contributing factor why many don’t make frequent trips, but it is the only dependable means to move goods and people. Villagers journey to Suva mainly to sell farm goods at the Suva municipal market or for family obligations



Fig 14: Nawaikama jetty

The main commodities include *yaqona*, mats or bundles of *voivoi*, watermelons, copra and root crops especially *dalo*. These items have steady demand which regular shipping services could help establish into markets for the islanders. Somosomo villagers seem to be the most frequent commuters as they have a stable, abundant supply of fish and seaweed from their *i qoliqoli*. Upon arrival in the village, the team had just missed two *fibre* boats bound for Suva with a chest freezer each full of fish. The fish are kept in one of the four ice boxes in the village and are transported every week or as soon as weather conditions are favourable. The FAD project will likely increase this supply. Fishermen and *fibre* operators were observed to be the wealthier of families in the community.

Most of the cargos brought back are household groceries, farm supplies and building materials. Shops and small canteens found in the villages have irregular and declining supplies of stock because of the poor shipping services. This becomes problematic not only for the community but also for the two schools, in particular the boarding school at Nawaikama. It was noted that most of the villagers depend heavily on these imported goods particularly the young generation who prefer these to the readily available staple foods grown or harvested on the island.

Fares and Fuel Usage

The initial interview calculated that there were a range of fares charged for the frequent routes.

Table 1: One-way fares from various routes within and out of Gau island

From	To	Air Travel (F)	Shipping Franchise (F)	Fibre Boat (F)
Gau (Lovu)	Suva	\$130.75 \$107.75 (2yrs -11yrs) \$70.75 (babies-1yr 11months)	\$70/\$75 Adult \$25 Child	*dependent on village
Somosomo	Suva	-	\$70/\$75 Adult \$25 Child	\$600-\$700 vessel hire \$70/passenger
	Nawaikama /Port	-	-	\$30/passenger
	Sawaieke	-	-	\$250 vessel hire
	Lovu/ Airport	-	-	\$250 vessel hire
Nawaikama	Suva	-	\$70/\$75 Adult \$25 Child	\$600-\$700 vessel hire \$70/passenger
	Lovu/Airpor t	-	-	\$80 vessel hire
	Qarani/ Govt Services	-	-	\$80 vessel hire
Lamiti, Malawai and Sawaieke	Suva	-	\$70/\$75 Adult \$25 Child	\$400-\$500 vessel hire \$50/passenger
	Nawaikama /Port	-	-	\$200 vessel hire
	Qarani	-	-	\$100 vessel hire

* ‘-’ = Not Applicable

It is obvious that villagers pay more for moving around the island than they do to get to the capital and this reflects the impact of the government’s shipping franchise scheme. The dirt road on the island is accessible to most villages but it has become unkempt and difficult to travel except by foot. There is only one medium duty truck that accesses the dirt road from Nawaikama village to Qarani village. The cost of hiring a *fibre* boat may be split between the numbers of passengers, depending on

load and capacity. Alternatively, villagers may negotiate to pay for fuel where the operator is a relative. This can range from FJ\$30-FJ\$35 for 10-15 L drums. These are village shop-based prices which are notably higher than mainland prices. *Fibre* operators use an average of 10–15 litres per week for *fibre* operations. Figures will be truthed during the in-depth field survey later in the year. Significantly, for this survey trip alone, a total of 800 litres was used (Suva-Gau-Suva).

For each of the villages surveyed, except for Somosomo, one or two *fibre* boats were operating and all available for hire to commute to Suva. Two boats take the weekly supply of fish to the market. As well as the fibres, *bilibili* or bamboo rafts are used for fishing expeditions to the reef. Somosomo village has four or five *fibre* boats operating; reflecting their weekly fish supply run to Suva. A *fibre* boat with 15 horse power outboard was donated to the villagers by the Ministry of Education for transporting school children. A ticketing system similar to the ones bus operators follow is used.

Cargo prices are dependent on their weight or size. Besides paying for fares, passengers have to pay extra charges for baggage and cargo. These charges varied but were all of a similar range in the five villages. For instance, a small carton or sack of groceries cost around FJ\$5 while a bag (luggage) between FJ\$5-FJ\$10. A bundle of *dalo* was cheaper (at FJ\$5) than a bundle of *bele* which was around FJ\$10. Watermelons were the more expensive of the commodities to transport at FJ\$25 a sack. The pricing of fish transportation in Somosomo was unable to be determined. In total, a farmer willing to sell his goods in Suva may pay up to FJ\$200 alone for cargo aside from hiring the *fibre* boat for shipment. For the two ferries operating under the franchise scheme, cargo prices range from FJ\$20-\$100.

Villagers' buying power is limited by these costly fares. It is a common practice to buy small cartons of food rations that may last only for a week since it is too expensive to pay for bigger bags. Farmers mostly pay for *fibre* boat hire to Nawaikama port to wait for the ferry to ship their crops rather than hire a fibre to go directly to Suva. Irregular ferry services however result in their goods sitting at the jetty rotting. The Patterson Brothers Shipping Services' *MV Ashika* serviced the island during 1980s-2000s; it made port at Nawaikama every Tuesday. Farmers suffer greatly now with crops wasted anticipating a ship that rarely comes.

10. Ongoing Research

Working from the preliminary survey, the in-depth survey will repeat and expand to include comparison of Gau, and Batiki and Nairai. This is scheduled for the end of July 2014. Initial findings will be truthed and further surveys will provide a larger spread of data.

This largely quantitative exercise will be supported by qualitative, open-ended interviews with participants on all three islands. As discussed earlier, the on-island survey work is being complemented by a series of semi-structured interviews with key actors in the transport sector. Interviewees include representatives of current shipping operators servicing Lomaiviti, and government planners and regulators at district, provincial and central levels. The qualitative focus of the exercise is to gauge the expectation of both islanders and wider related industry as to what future options are expected to be employed for Southern Lomaiviti.

11. Conclusion

Shipping is the lifeline linking PICs with the outside world, with each other and within their own countries. It is a vital means of achieving sustainable development and regional co-operation; thus economic development trade and maritime transport are inextricably linked. Despite the vast expanse of the Pacific region, varying infrastructure and level of expertise, the small Pacific island nations and territories have much in common. Of these are their fundamental maritime character, the small size of their economies, and their remoteness from major markets (Asian Development Bank, 2007).

The initial sea transport survey of Gau found that intra and inter-island sea transport is critical to every aspect of well-being. It affects access to health, education, and markets, and social and cultural practices. It also highlights the importance of the very small boats such as the *fibres* as an essential part of the maritime transport network, owned and operated at the village level; the ones which are often missed from the research and development agenda.

Regionally, and within Fiji, the majority of renewable energy projects currently target electricity generation. However, for most island and coastal communities it is, based on our initial research and from available data, probable that sea transport is a

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significantly greater user of fossil fuel. This is despite tried and tested renewable energy technology for shipping being available (Nuttall et al, 2014, Nuttall, 2013).

Since 2006 the Fiji government has embarked on an ambitious infrastructure development program for Fiji’s many outlying islands, including substantial funding for new, upgrade and extension of wharves and jetties (including at Qarani village on Gau) and purchase of government landing craft to service the Maritime Provinces. This aggressive agenda is predicated on a strategy of continuing use of fossil fuel driven vessels, increasing use of maritime transportation and represents a significant proportion of Fiji’s development budget. How this infrastructure development will interface with low-carbon technologies is unclear. It is also uncertain if government planning has considered their potential use.

It is important for community-based initiatives to look at how fuel is used when determining the priorities for renewable energy projects to ensure focus is given to the area of greatest need. Compiling and analysing reliable data on transport need is an essential pre-requisite for determining appropriate solutions for sustainable sea transport, and such data is scarce. Data collection and analysis of sea transport is a priority if we are to truly tackle the Pacific’s dependency on fossil fuels. The replicability of the survey methodology developed for this Southern Lomaiviti focused research to assess transport and fuel usage in Jaluit in the Marshall Islands is encouraging, and offers a starting point for other PIC communities in tackling the issue of sustainable sea transport.

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