Pacifically Specific Power

A Social Power Analysis of Coconuts as a Renewable Energy Source in the Pacific.

Master's Thesis

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Abstract

The purpose of this thesis is to identify the current social power relations in the Pacific in order to anticipate for a possible regional shift to the use of coconut biofuel as an alternative to the use of fossil fuels for energy production. A proposed multi-national and multi-actor project by the Economic Development Division of the regional development aid agency Pacific Community (SPC), suggests that such a shift can bring about: the alleviation of Pacific Island Countries and Territories' exuberant annual spending on fuel imports and increase economic development for rural Pacific islanders who are to participate in the production of the necessary natural resources. This thesis sets out to analyze the historical and cultural connection of the main actors who will be involved in the project, with the coconut and its (former) exploitation, through documentary analysis of secondary data and varying literary sources. The aim of this thesis is to ultimately form a coherent and illustrative study of the (theoretical) context in which development projects such as SPC's Coconut to Biofuel seek success. By showing the differing stakes and intentions of these actors, this research showcases the necessity of using a broad and interdisciplinary scope in procuring viable, multilateral development efforts.

Keywords: Human Ecology, biofuel, coconut, copra, alternative energy, electrification, dependency, Pacific, power.

Pictures on title and dedication page (II) are personal pictures from the author's internship on Fiji from August to December 2015.

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For Fiji

(I can’t be more pacific than that)

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Finally, I wish to give a warm and grateful thanks to my dear friend Liza Kozowyk, who during these mentally trying times kept me sane with mandatory tea breaks and good company. A good neighbor is worth double if it is also a close friend.

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Figure 1: Map of the Pacific Ocean countries (SPC 2016)

Pacifically Specific Power

1.1 Introduction

Smallness is a state of mind. (Hau'ofa 1994: 153)

Twenty-two Pacific countries and territories, a total of around 7,500 islands, of which 500 inhabited, in a vast ocean stretching over 30 million sq. km (see Figure 1; ADB 2011: 2). Are they islands in a far sea or a sea of islands? (Hau'ofa 1994: 153). The Pacific is generally perceived as a dependent part of the world. Since decolonization in the 60s and 70s, most Pacific Island Countries and Territories (PICT)[1] have been dependent on money from overseas; both from remittances by - temporary or permanently - emigrated islanders and foreign states alike. Since the 1960s net official development assistance and foreign aid to small Pacific island states (including Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) have increased gradually, recently accounting for almost 1 billion US$ (World Bank 2010). A perpetuating stigma that Pacific islands will always be too small, too poor and too isolated to become financially independent and developed nations, will eventually lead to a devastating self-fulfilling morale (Hau'ofa 1994). The common perception that global periphery regions who depend on the wardship of developed core nations to maintain or even increase the wealth of the West and widening the gap, diminishes any hope for Pacific islands. Aiming to stray away from this dependency cycle, development aid organizations increasingly aim to create development through empowerment. 'Learning a man how to fish' may not, literally, be a priority to Pacific islanders, but the incentive to empower rather than one-way aid is a popular approach.

Amongst several issues, empowerment through energy sources is a high priority. Both at the macro and micro level, the Pacific is struggling to keep its lights on: over two-thirds of the households in the Pacific does not have access to basic electricity (Dornan 2014). And on the national level, national budgets of Pacific governments are tightly stretched in order to import fuels. The PICTs are a small and inaccessible market for fossil fuels. Table 1 illustrates

[1] As illustrated on the map (see Figure 1), the PICTs served by the Pacific Community (SPC) are: American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Wallis and Futuna (SPC 2011). Protectorate laws concerning special territories have included some (e.g. American Samoa and Guam, USA) or excluded (e.g. Easter Island, Chile; Hawai'i, U.S.A. and New Caledonia, France) from this list. This thesis concerns a project lead by SPC and therefore focusses mainly on their member states. For a discussion about the terms 'Pacific', 'South Pacific' and 'Oceania', e.g. see Crocombe 2001)

a selection of PICTs populations numbers, land mass and rural electrification percentages. New Zealand is included as a comparative nation. It is interesting that half of the countries indicate the same rural electrification numbers. With the exception of Papua New Guinea, these numbers do illustrate the limited import market capacity of these islands which is further enhanced by their low electrification.

Table 1: PICTs Countries, Population, Rural Electrification (%) & Land Area (km²) (adapted by the author from World Bank 2010).

Countries	Population	Rural Electrification (%)	Land area (km²)
French Polynesia	268,065	42,7	3660
Fiji	859,952	42,7	18,270
Vanuatu	236,299	15	12,190
Solomon Islands	526,177	9,8	27990
Marshall Islands	52,428	42,7	180
Kiribati	102,648	42,7	810
Papua New Guinea	6,847,517	7,6	452,860
Tuvalu	9827	29	30
New Zealand	4,350,700	100	263,310

However, this fact may misrepresent the importance of fuel to the livelihoods of this small world population; produce such as food and drink that cannot be locally produced, medicine and subsistence goods and materials are only available to remote islands by ship or aviation. Also, the islands are often too small for established energy grids, making electricity generation solely reliant on oil imports for generators. Suboptimal technology and material size results in high losses of electricity capacity, making energy costs sometimes double those of industrialized countries. It is therefore not surprising that Pacific countries' national budgets are largely spent on imported oils (World Bank 2010). This issue is a result of a modernization process where people increasingly have got desires for electrical equipments such as refrigerators, television, electric lights, etc. Problematic is that in and among the islands there are rarely competitive markets to drive prices down; urban grids are often fed by a single government owned or private, investor-owned utility company. Unfortunately, for many rural areas this is still to no avail, since an estimated 70% of the rural population in the Pacific has no access to electricity (Woodruff 2007). Governments excessive, yet ineffective spending on oil imports is considered a major obstacle to further economic development

across the region (Dornan 2014). It also increases the region's vulnerability to a global oil market in which, due to its small market share, they have little to no say, yet which determines their economies and industries. Past crises like the 2002-2008 oil price rise significantly increases PICT's level of economic vulnerability[2] (ADB 2009: 11-12) leaving them further dependent on foreign aid. Table 2 shows an Oil Price Vulnerability Index, analyzed by the ADB, which draws together various local factors such as economic growth and intensity of oil use that affect the nation's vulnerability and exposure to oil price fluctuations. While their ranks are only in relation to one another, ADB has declared that all seven countries were in the top 10 of a list containing 39 other developing countries. On the microlevel, the high costs of fuel and its transportation to the (outer) islands requires, in many cases, additional subsidization from governments. These financial schemes create a multilateral dependency: If the governments do not have the funds to subsidize or even import fuel, the urban areas can run out of electricity and retailers are unable to sell oil to outer islands. The outer islands are in turn unable to purchase oil for their island generators from the retailers, let alone go to the urban areas or mainland to collect them, since all transportation via boats runs on said fuel.

Table 2: Oil Price Vulnerability Index for Selected Pacific Countries (ADB 2009: 12)

Country	OPVI	Rank
Fiji	0.79	3
Kiribati	1.00	1
Papua New Guinea	0.66	7
Samoa	0.73	6
Solomon Islands	0.74	5
Tonga	0.80	2
Vanuatu	0.76	4

Pacific countries and territories are keen to change this. But not only for financial or development reasons.

> The Pacific is ready to lead. We have put forward ambitious contributions, and if developed countries mobilize the required means of implementation, we are prepared to do more. Making the transition to renewable energy is a particular priority, which will also bring far-

[2] The Marshall Islands had to declare an "economic state of emergency" due to the government-owned utility company's inability to pay for fuel, resulting in soaring inflation and increased food prices (ADB 2009: 34-35).

> reaching sustainable development co- benefits. We also have innovative plans for building our resilience to climate impacts - often using homegrown solutions. Our countries are ready to demonstrate what a resilient and zero-carbon future looks like. But we cannot do this alone. Our total emissions are minuscule. All countries must step up, with much more ambitious efforts.

With these words, the President of the Republic of Nauru, Baron Waqa, representatively signed the Paris COP agreement on behalf of 12 Pacific Small Island Development States (SIDS) April 22nd, 2016 (UNWEBTV 2016). Direct climate change consequences like rising sea levels, extreme weather patterns[3] and loss of marine life urged many Pacific islanders and organizations to join ranks in the streets of Paris to voice their concerns for their livelihoods (SPREP 2015; SPC 2015). With the rest of the world, the Pacific is looking towards alternatives for energy sources to replace the reliance on fossil fuels, which has led to devastating consequences. Both commercial and academic agencies seem to be engaged in a technical race to develop a reliable, renewable and adaptable alternative that is also, importantly, financially competitive to non-renewable resources. A one-size-fits all solution generated through natural sources, however, is unfeasible: Hydro-power in Saudi Arabia is as unlikely as solar power generation in the Arctic. The key is thus to focus on locally available sources.

Amongst the riches of the Pacific, in line with Waqa's premise of homegrown solutions, are its generous resources of palm trees. Dubbed by many as “the Tree of Life”, the coconut palm (*Cocos nucifera)* is a common sight on almost all of the Pacific islands. The coconut palm has provided Pacific islanders with numerous uses as a source of nutrition, building material and cultural expression (e.g. see Engelhardt & Fenner 1996). However, in recent years, the use of coconut as a biofuel has revived academic and economic interests to explore its exploitation capacities as an energy source.

One of the global competitors to fossil oils is the use of vegetable oils as an alternative in diesel engines. The original diesel engine, successfully operated for the first time in 1897 under Rudolf Diesel’s patent, was said to be designed to run on peanut oil. While this statement is unfortunately false, Diesel did test and confirm the successful use of various types of fuels, including Arachide (earth nut or peanut oil), with positive results (Pacific

[3] Recent examples were Cyclone Pam in 2015 (Vanuatu) and Cyclone Winston last February, 2016 (PDC 2015, 2016). Both cyclones were considered abnormal in its intensity and left trails of destruction of property and human lives.

Biodiesel 2016). Throughout the 20th century, the diesel engine has been tested and found fit for many types of vegetable oils. Due to its unique vaporizing injection system[4] that sets it apart from traditional petrol or gasoline engines that need fuels of a very specific volatility quality, the possibilities of what can be used as fuel for these engines has been thoroughly tested. Scientific research and technical innovations in the field of conversion (*transesterification*) of vegetable oils over the past decades, have given us a list of viable contenders. For as Diesel himself said: "the use of vegetable oils for engine fuels may seem insignificant today [1912], but such oils may become, in the course of time, as important as petroleum and the coal-tar products of the present time" (quoted in Wei et. al. in Cheng 2010: 339).

Hence the Pacific's revived interest in developing coconut biofuel as a regional alternative to fossil fuels. Pitched during the 2015 Pacific Energy Advisory Group meeting in Suva, Fiji, the Pacific Community's (SPC) Economic Development Division aspires for a Pacific-wide initiative for regional production and distribution of coconut biodiesel as an alternative fuel source. While the project proposal, coined the 'Coconut To Biofuels' project (SPC n.d.), is still in its infancy, the concept of converting coconut oil into a biodiesel for industrial or micro scale electricity generation is not new. Over the past few decades, development organizations, such as SPC, have explored and funded small and larger scale projects using renewable energy sources for electrification. The South Pacific climate and islands' geology allow for energy sources from wind, solar, hydro, geothermal, biomass and wave. Coconut is now added to this list.

Historically, coconut plantations were among the few agricultural factors of interest to foreign powers. European traders and settlers became interested in buying locally produced coconut oil and selling it to the European market (Campbell 1992). Coconut oil can be used for cosmetics, nutrition, industrial lubrication, detergents, soaps and shampoos and candles. As European and American influence increased in the Pacific region in the second half of the 19th century, so did the production of coconuts. However, due to the volatility of oil barrels on the ships and the high labor and equipment costs of extracting the oil locally, this step was abolished. Instead, the traders would only collect dried coconut, called copra, which could be (more) safely transported over longer distances to overseas mills. The production of copra

[4] The diesel vaporizing injection system allows for fuels of differing viscosities. For instance, coconut oil has a significantly lower viscosity than rapeseed oil (28.0 to 44.9 cP at a temperature of 100 F). This is a serious shortcoming for the use of straight coconut oil in diesel engines, since the oil then needs more heat (i.e. power) to heat it up to a workable viscosity. Below 75 F (23.9 C) coconut oil is solid (Noureddini et.al. 1992: 1190).

was considered a labor intensive and long process and was therefore initially only done by islanders to earn some extra money by selling it to trading agents who called upon the islands. It wasn't until later, due to civil unrest between locals and settlers, and increasing imperialist tendencies from Western powers that the Pacific islands - most of all due to their geo-strategic location in between Asia, Australasia and the Americas- were annexed and ultimately colonized. This led to a more regulated and larger scale of production of copra. The copra industry continued well into the second half of the 20th century until the low market prices for copra forced many plantation owners to abandon the practice. Especially since the production costs were relatively high compared to those of petrol and competing vegetable oils, such as palm and rapeseed oil. Furthermore, after the WWII, many Pacific islanders became migrant workers overseas, providing relatives and communities back home with remittances. These remittances were often sufficiently high for islanders to abandon work on their coconut plantations. The established coconut mills would in some cases continue, albeit temporarily, by importing coconuts from elsewhere. This was the case in Tonga in the late 1980s, where no coconuts were gathered for industrial use anymore in the island, despite their abundance, but were rather imported from Christmas Island (Thomas Malm, pers. comm.). Ultimately, most mills closed down.

Thus, in order to revive the mills for the production of coconut biofuel, they need to be “simply collected from the ground” (Whistler 2000: 25). In a coconut shell, that is what SPC’s project strives for. The current proposal encompasses a three phase plan: Phase 1: Identifying past learnings; Phase 2: Developing Regional Cooperation and Coordination; Phase 3: Implementation of country activities for coconut biofuels production. Since the proposal is still in development, the parameters of the project have not been fully defined. However, the regional initiative will be open to any country willing to participate. The wide scope of the project makes it unique, but also complex. The intent is to ultimately establish a Pacific regional production and consumption market for coconut biofuel. However, in accordance with SPC’s Framework for Action on Energy Security in the Pacific (FAESP in SPC 2010), it is of strict importance that only countries with an adequate excess of coconut resources will be allowed to join. Meaning, food security and environment are not to be compromised in the pursuit of economic development (SPC 2013). While the main focus of the project is on diminishing government spending and creating a viable renewable fuel industry, the proposal conditions that a “fair share of the bulk of the economic benefit will flow

to the primary producers, such as rural villagers, and minimize or mitigate any undesirable consequences" [5](*Draft* SPC n.d.: 3).

As a whole, the Pacific seems eager to invest in alternative fuels and, as such, divest from fossil fuels. This has two clearly stated reasons. First, as President Waqa indicated, the Pacific is eager to take a leading role in setting the example as a united territories, in making the deliberate choice to start undoing the environmental damage done by our reliance on fossil fuel. Second, both national governments and (inter)national development aid agencies predict, and hope, that a switch to alternative coconut fuel will decrease government spending and dependency on foreign aid, leaving more funds for social and economic development in other areas in the region. Whether this will be an accurate assumption will be revealed as the project phases continue. However, this thesis proposes that there is a third motive for the switch to local fuel sources. Currently, the passive position of many Pacific countries to the global oil market illustrates a prevailing power relationship, namely one that illustrates small versus large countries; periphery versus core; wealthy versus poor; Global North versus Global South; and so on. In whatever way you would like to call out the disparities that has left PICTs dependent on foreign aid, there is a power relation. A possible switch to a locally produced energy source will thus bring about a shift in power dynamics. This, however, may in turn have implications for other involved parties, such as the Pacific Islanders and development aid donors. In this thesis I wish to lay bare these implications and study these power dynamics.

1.2 Aim, Research Questions and Methods

1.2.1 Aim

The aim of this thesis is to ultimately form a coherent and illustrative study of the (theoretical) context in which development projects such as SPC's Coconut to Biofuel seek success. Whilst working in development, I noticed that all too often projects are set up with a singular scope of interest. Such limitations often result in failed projects because of structural problems from excluding crucial standpoints on culture, gender, financial aim or local collaboration. And unfortunately all too often, funders lose interest in refunding a similar, yet altered project in the same place afterwards. Five years, one strike, and, it seems, you are

[5] This quote concerns a preliminary draft and should therefor not yet be postulated as an official statement by SPC. However, ensuring the involvement and respect of all societal and cultural aspects involved in economic development of the PICT's is in line with SPC policy. SPC is owned and governed by its 26 member countries and thus represents the Pacific Community and its norms and values.

out. Therefore, making that first hit count requires extensive and in-depth study of all the parameters. As an interdisciplinary field of study, Human Ecology combines the strengths of several disciplines to provide a perspective lens on cases such as presented in this thesis. Large scale development projects should never be approached from a single discipline, but should account for all cultural and social aspects of the involved peoples; mind historical events; take into account biodiversity; and also acknowledge the role of economics in facilitating a balance in development disparities. Going beyond my interests in these matters in the Pacific, this thesis is also a contribution to the global concern about alternative energy sources. The global intention to gradually shift away from fossil fuels will alter a global power dynamic that has formed since the start of the Industrial Revolution. The possibilities in economic and social development that oil, coal and gas posed for the global community, are now put upon different energy sources. Renewable energy sources are expected to be as effective and low-cost in order for it even to be considered viable. Coconut is now considered as such a potential source. But like many other natural energy sources, we have to consider the cultural and social setting from which we wish to extract them. Whilst the scope of this thesis does not allow for a full background study for the proposed project, a first theoretical approach can be considered a good start.

1.2.2 Research questions

The overarching research question in this thesis will be:

In which ways does the transition from fossil fuels to renewable energy sources, like coconut biofuel, affect and challenge the social power dynamics in the Pacific?

To help answer this question, the main body of the thesis will focus on answering these sub-questions:

1. What is the relation of Pacific Islanders with coconuts and its derived commodity, copra?
2. What power dynamics can we identify in the current situation for many Pacific island countries and their inhabitants?
3. What types of social and cultural implications will the coconut project have on this power dynamic?

1.2.3 Methods

A possible shift in power dynamics between the parties involved in our case relies on many factors. The social and cultural dimensions that need to be illuminated in order to a give reliable evaluation would require extensive ethnographic research and data collection. While this is beyond the scope of this research, this thesis will prove this necessity and will convey this to the proposers of the Coconut to Biofuel project. The approach in this thesis will thus, for now, be a theoretical one. In order to understand the current power dynamics and to anticipate for future ones, we need to look at some of the historical, social and political aspects of the Pacific and how these stand in relation to the coconut. I wish to do this through the main method of documentary analysis. I will use personal observations and communications from my internship at SPC's EDD in 2015 to understand and convey the impact and influence that large development aid agencies have in the region. I will use secondary data provided by some of SPC's affiliated researchers, and independent academia to provide answers to the subquestions and the main research question in the following chapters.

As a white and western researcher, I was often confronted with misconceptions and a lack of understanding of the cultural values and practices in Pacific countries, such as Fiji. For my part, I have much to learn about my own Western positional bias and misgivings on 'the Pacific way'. Several of the authors used in this thesis are members of the Oceanic community who address these Western ontologies and epistemologies. To secure the success of the Coconut to Biofuel project, and for any type of development aid for that matter, it is crucial to be aware of this bias and to take it into account when pursuing this as a contribution to this field.

1.3 Thesis Outline

In the following second chapter, I will outline the theoretical framework in which we will review some of the classical and more contemporary theories concerning power. Because this thesis concerns the power relations in the Pacific coconut biofuel case, we need to establish first what we understand by power and how we can recognize its use in the case study. In chapter 3: A Humble Coconut, we will look at the Oceanic regions and their inter-connectivities in exploration, trade and their relationship with our main object of interest, the coconut. In this chapter we will look at historical, and even legendary, significance of the fruit.

Furthermore, I will list some of its uses in the Pacific and how it is processed, to understand how the fruit is used in everyday life across the region. In chapter 4: Coconut to Biofuel, I will elaborate on the 'Coconut to Biofuel' project and the practice of producing this biofuel. The fact that the Coconut to Biofuel project is depending on islanders for cooperation and collaboration in the production and processing of the fruit, signifies how the project is aimed to be multilateral. Two previous projects, both coordinated by SPC, discussed in this chapter, will set a precedent. Also, in this chapter I will explain the commercial processing of the coconut. In chapter 5: Copra, Colonialism and Control, the copra production during colonial occupation can pose as an even earlier precedent. A historical review will highlight the relationships between 1) the Pacific islanders and (colonial) state authority and 2) Pacific islanders and copra. Both these relationship form crucial links to the success and sustainability of the project. Going beyond this, I will include a theoretical base that will help explain the historical and contemporary societal and social political structures in the Pacific. In chapter 6: Analysis, we can thus aim to answer the overarching research question and the related sub-questions. The enveloping discussion in alternative and renewable energy sources, macro- and micro-level development and the relations between those that wish to exploit and explore them for financial benefit, should be a stepping stone to future research in sustainable energy development. In the final conclusion I will summarize my findings and make suggestions to benefit the (coco)fruitful continuation of the Coconut to Biofuel project.

1.3.1 Pacific Concept

The terms Oceania and Pacific region pose geographical difficulties concerning the focused area of this thesis. Geographically, the Pacific encompasses islands ranging between Asia and the Americas, including Japan and the Philippines. These larger and generally more wealthy and developed nations are not of concern to this thesis. A solution to this would be to use the more narrow definition of Oceania. Oceania includes the three island regions Micronesia, Polynesia, Melanesia, and Australasia (Australia and New Zealand, the latter culturally a part of Polynesia) (National Geographic 2016). The first three regions are of matter to this thesis. However, in development aid projects and documents, Pacific island countries and territories are commonly referred to as the Pacific. Most notably in the term Pacific Island Countries & Territories (PICTs) which does concern the intended region for this thesis. Thus taking into the account that the term Pacific is geographically broader than the intended island regions, in development terms the term Pacific is deemed most appropriate. Later on this thesis I will further discuss the cultural and social dilemmas concerning these two terms.

2. Theoretical Framework

Working within the Human ecology framework, the concepts of power, culture and sustainability are all tightly bound to the case study presented here in this thesis. The Coconut to Biofuel project is a major undertaking for the Pacific region to enable not only economical sustainability, but also environmental sustainability. What this thesis sets out to do is to illustrate the importance of incorporating the second concept, culture. Development aid, and especially in sustainability, does not have a one-size-fits-all solution. Different peoples across places and through layers of society, hold different values and priorities. This is where the concept of power comes into play. Development aid always has a direction, meaning that one agent or group proposes a project or investment for other agents to benefit from. Whether it be top-down or grassroots aid, there is almost always a relation between giver and receiver. And this indicates that there is a power relation: whether that be driven by money, force or goodwill. In the Coconut to Biofuel case, but also in events further back in history, we will most certainly be able to identify the sources and consequences of such power relations. To do this, we need to define for ourselves what power is, where it can stem from and how it can be wielded. Through the examination of classical and contemporary power theories in this chapter, I wish to provide a clearer picture of this complex concept. However, before this, we will take a quick look at the intent and aim of the project, to understand 'why' we are so interested in power dynamics in the first place.

2.1 Pacific Dependency

2.1.1 Empowering Through Empowerment

The Coconut to Biofuel project proposes a number of tangible and long-lasting benefits to individual PICTs and the Pacific region, of which two are of most concern to this thesis. Namely, the "reduction of fossil fuel imports" and the "reduction of poverty through the main economic benefits […] flowing to the PICT rural sector" (SPC n.d.: 3). Both of these benefits relate to the dependency on (foreign) aid, both on the macro (government) and micro (rural islanders) levels. In the case of energy sources, currently the rural islanders are depending on their governments for price regulation and subsidizations. The governments in turn, rely on foreign aid to import fuel from the global market to power their electricity grid and to provide aforementioned welfare to its peripheries. Should PICTs shift to locally produced alternative energy sources, such as coconut biofuel, this should, in the best case scenario, absolve them from further dependency on foreign aid for their energy use. This would create

an internalized dependency cycle between governments and their rural population, wherein the state relies on its periphery for the supply of natural resources (coconuts). In turn, the periphery requires the state to regulate a national or regional market for which they are producing, in order to secure fair and reliable financial returns. The starting capital to ensure this shift would however, as the project indicates, rely on donor funding. The pressing question then is, whether a power balance between Pacific islanders and their state governments for such a market, is likely.

2.1.2 Dependency

Contesting this possible 'equal' dependence relationship is the Dependency theory. The theory was introduced and gained popularity among social scientists in the 1960s and 1970s for its recognition of this metropole-satellite (Andre Gunder Frank 1966), or (in World Systems terminology) core-periphery relation (Wallerstein 1974). The theory mainly came as a response to the evolutionist modernization theory that stated that all societies go through similar stages of development, ultimately leading to a higher, or even 'Western' level of development. This idea presumed that development aid from societies further up the 'development scale' could accelerate this process for developing nations such as PICTs, through investments conditioning Neo-liberal structural adjustments; privatization, trade liberalization, government deregulation, tax reform, etc. It was the pre-requisite to development equity that stemmed from a type of guilt: non-Westerners were considered helpless without the help of the West. The dependency school of thought contested both the homogenization of societies and effectiveness of 'the development of underdevelopment' (Frank 1966), especially since world poverty did not seem to decline. Worse even, they concluded that these 'aid attempts' were intentional to widen the gap between the European and United States' core economies and developing peripheries, creating "monopoly capitalism" (Peet & Hartwick 2009: 164). While the dependency theory has since lost popularity due to criticism on its radical view of disparities (id.: 172), it is still regarded as fundamental to global economic politics and new theories such as unequal exchange, environmental load displacement and world systems theory. Where before, peripheries in developing nations might have been exploited by their own cores, elites or states by opening up to the global market, whole countries were now becoming exploited peripheries to the Western core.

While the dependency theory poses an interesting look on the core-periphery and developed-developing relations, its application to the biofuel case should be contested. The

main objective of the theory is that the intervention of developed nations forces developing countries to open itself up to the global market, leaving them vulnerable to exploitation. In our case, the opposite is the intention: through the help of development aid, the PICTs intend to withdraw themselves from the global oil market and internalize rather than externalize their aims at economic development. On a smaller scale however, the dependency theory sheds light on unequal exchange relations between the core and peripheries in the Pacific. Peripheries providing the state with the needed coconut oil resources and the required labor, could be indicative of an exploitive relationship, should it not increase economic development in these peripheries. Connecting the Pacific's development to classic imperialistic development theories is ultimately quite risky. The reason why dependency theory fell out of grace is partially because certain areas of the world did not seem to follow this dependency model, thus including the Pacific. Which model it does follow, we will find out throughout the remainder of the chapters. In this following chapter we will now look at the concept that flows throughout these dependency relationships; power.

2.2 Power

2.2.1 Power Flows

As Russel (1938: 11) expressed it, "Of the infinite desires of man, the chief are the desires for power and glory". Power has been exuberantly written about in the past. It has driven, restrained and determined our movements as human beings on this planet. Rarely do the history books make mention of those that have not altered the span of history, simply for the reason that they did not have enough power to do so. Whether 'might makes right[6]' can be contested, but it has made history. Theorists concerning themselves with the structure, sources and scales of power *have* been abundant: Karl Marx, Max Weber, Robert Dahl, C. Wright Mills, Thomas Hobbes, Pierre Bourdieu, Niccolò Machiavelli, Antonio Gramsci, Talcott Parsons, to name but a few well-known. Ongoing scientific debate and research on this concept are continuously fed and contradicted by human and societal development. Which leads us back to the question to what power actually is.

The social power aspect is one of a relational connection. Max Weber defined power as the chance (not per se a *probability*) within a social relationship to impose one's will, if necessary against the resistance of other, "regardless of the basis for this chance" (Weber 1964: 38). Indicating that power is relational limits Weber's definition to *power over,* connoting power to

[6] Well known English proverb.

be a measure of domination. Adopted by most notable political theorists (e.g. The Prince by Machiavelli [1532]; Leviathan by Hobbes [1651]), this is a predominant model of power in Western political theory. This is not surprising, since the display of power in European history was mainly brought about by coercion, force and control in social conflicts (e.g., the French Revolution and countless wars). Robert Dahl palliated the definition to a less dominant construct: “A has power over B to the extent that he can get B to do something that B would not otherwise do” (Dahl 1969: 81). This definition allowed for a power analysis in behavioral terms of both A and B. It focused on power as a tool rather than a direct human relationship; *power to.* Overarching the possible capacities of individuals to exercise power to, however, is a structure of norms and tendencies. Bourdieu’s *habitus* has been created over time in society due to an interplay of free will and structure, “without any deliberate pursuit of coherence… without any conscious concentration” (Bourdieu 1984: 170). Habitus guides individual and societal structure, thinking and practices towards norms, values and appropriate behavior by and towards those in it. While habitus is not fixed, changing it may take long historical periods. Current example of this is the human attitude towards the environment. The threat of climate change, wherein our destructive relationship with our environment may cause our own demise has proven difficult to change. For a long time now, humans have created and lived in a habitus which encourages distance from nature in order to exploit. Since the Industrial Revolution, this exploitation is held in high esteem since it creates power through capital. Material capital however, is not the only form of capital to gain power to or power over. Social, cultural or symbolic capital are equally important in maintaining or creating social relations and hierarchies (Bourdieu 1986). Different forms of capital contest the capitalistic notion that whoever holds the means of production dominates the social sphere. Cultural, social and symbolic capital leave room to believe that power is not necessarily materialistic.

Debated by political and social theorists is whether the concept of power is tangible or stagnant. This, in part, is answered by Foucault with his concept of Biopower. Biopower lies hidden in the ability of the state to “foster life or disallow it to the point of death”, through a perception of force (Foucault 1990: 138). Considering humans as a collective species, the act of discipline as a threat to a population, becomes a threat to individual bodies. Meaning that through controlled strategic politics, entire populations can be controlled. His analysis of the Panopticon prison design (see Foucault 1975) is a classic example of how the threat of force from a small elite can put in motion a technology of power, a political apparatus, that makes subjects control themselves. If shaped over a long period of time, this exertion of power can even be written into the human habitus. Albeit Biopower can be habituated, the

one(s) wielding the apparatus can change very quickly. Foucault stresses that power cannot be held or entitled by anyone: 'power is everywhere' and 'comes from everywhere' (Foucault 1998: 63). It is an intangible and invisible thing that flows continuously through the natural sphere. This flow is also not limited to the state apparatus, but flows through the economy as well. Capitalism embodies this with its notion of competition and free market, rising and falling business enterprises in and out of power on a daily basis. In his book, *Understanding Foucault*, Geoff Danaher illustrates Foucault's nature of power by an "empty suit" (Danaher et al. 2000: 71-72). The empty suit stems from a scene in a movie about the French Revolution, wherein a maid at the royal court is found kneeling in front of the clothes on a horse stand belonging to the recently beheaded king Louis XVI. The scene depicts the human tendency to attribute power, or better said, determine our own subjugation to it, to whatever we choose. Populations have disposed of but also created rulers and tyrants, making power flow from one person to the next. This could indicate that while the majority controls power, it relinquishes it into the hands of the few, to (ab)use onto the majority again. The only difference between the monarchal suit of the 18th century and the business suit of the 21st century, is the improvement of the zigzag stitch.

2.2.2 Bases of Power and Capital

Now that we have an idea of what we can define as power we need to look at how power is used and where it stems from. Accordingly, Weber states that power is socially determined, related to, but not necessarily dependent on material inputs, and defined in relation to the ability of others (Russel et.al. 2011: 251). It is simply too obvious, but also empirically incorrect to assume that only money buys influence. Then which other socially determinants can we identify?

The work of John French and Bertram Raven (1959) formed the basis for modern practices and tactics in persuasion and leadership. Working from the definition of social power as 'potential influence', they interpreted two dimensions through which the success of potential influence was determined: [1] Social dependence and [2] the importance of surveillance (Raven 1992). An example: A supervisor (agent) has several resources to bring about change among his employees (target/subject). In the best case scenario the change will occur without constant supervision and will continue after the supervisor leaves the workforce. One way to influence his employees is to convince them through arguments, logic and information that this new work method increases productivity and will benefit all involved. The workforce should be willing to accept this and will internalize the change, making it

socially independent and needles for surveillance. Should the supervisor opt for a forceful resource, for instance the threat of dismissal, the change will be likely socially dependent - for as long as the influence agent is present - and require surveillance. Similar results will occur, should the supervisor use a reward to enforce change. This determination model can be used similarly on development projects. Best case scenario; when a project team leaves a site, it is reflective upon their capabilities that the changes they have set in motion will continue to improve the well-being of the people without the need to keep supervising or funding. Through this method, Raven and French were able to distinguish six sources of influence potential, or as they called them “Bases of Power” (French & Raven 1959, Raven 1965): Informational, Coercion, Reward, Legitimacy, Expert, Reference.

In Western history, coercion is the most referenced base of power. War, oppression and incarceration of subjects were a common means to subjugate (new) populations. Going beyond this obvious base of power, however, French and Raven made a distinction between personal and impersonal coercion. The latter results in the subject’s belief of physical, monetary or social degradation if not compliant. The former could be considered a softer, but in fact a more powerful base. Personal coercion relates to the fear of rejection or disapproval of someone who is held in high esteem by the subject. Combinations of personal and impersonal coercion are common when societal leaders who are chosen for religious or spiritual prestige, execute punitive punishment on their subjects. Reward power is exercised through offering or withholding material, social, emotional or spiritual rewards to others to create wanted behavior. Again, a distinction is made between impersonal or personal rewards, the former meaning some reward increasing a subjects material wealth or social stature. The latter can entail praise or actions that strengthens personal relations (e.g. marriage or sexual promises).

Contemporary western politics are most acquainted with a legitimate power base. Going beyond the legitimate power that comes from a formal position (e.g., politician, police officer), this power base recognizes more subtle forms that draw on societal norms. Legitimate power of reciprocity for instance: Quid pro quo. More notable, however are equity and dependence (or responsibility). Equity bids the subject to accede to those that have suffered losses or worked hard. It is built upon the inclination towards ‘compensatory damages’, or ‘righting a wrong’ for those that have been wronged by others or have suffered hardships. The legitimate power of equity is crucial in the contemporary acknowledgement of colonial

heritage. ‘White guilt’[7] has been a driving force behind many development endeavors over the past century. The legitimate power of dependence is fed by tendencies that the subjects are otherwise helpless. However, rarely do postcolonial countries use equity to demand aid. Rather, it is the other way around; Western countries impose their ideas of how to become developed on those that have been wronged by them, as a means of helping them. Development incentives for empowerment of underdeveloped countries and their peoples have brought alive the phrase “power of the powerless” (Raven 1992: 16). We will come back to this later on in the thesis.

Intellectual merit, skill, experience or talent is the base for Expert power, or rather the perception of it by the subject. The agent influences actions and imposes trust in the subject to make decisions for them through a claim on achievement or expertise. Referent power is used similarly, consequently by using the status achieved through their affiliation with others, like well-known and powerful people or organizations. Individuals working for development organizations, such as SPC, are held in high esteem and are respected for their opinions or presence, regardless of professional or intellectual worth[8]. Both for referent and expert power, French and Raven incorporated a ‘negative’, coined due to the ‘boomerang effect’ of both power bases (Hovland, Janis & Keley 1953 in ibid.). Both can result in the opposite desired influence, due to recalcitrance, envy or simply being overwhelmed.

Raven has later stated that while some bases of power may impact the subject more negatively than others, the intent or “mode” of influence is often equally determinative (Raven 1992: 17). The *manner* in which influence is conveyed can positively impact a change, regardless of what the power relation is between agent and subject. For example, an order can be shouted or relayed with kindness; it doesn’t change the relation between the one giving the order and the one receiving it, but the outcome can be quite different. For informational and expert power bases this is imperative in the climate change debate. The effects of using fossil fuels or excessive (ab)use of electricity can be conveyed to consumers through expert/informational power, but if done in a condescending or scorning manner, it will most certainly encounter resistance[9].

When power takes place on an informational base, influence can be expressed by providing

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[7] Mentioned in a Washington Post article from 1978 about con artists using “white guilt” in order to sell phony ads (Washington Post Jan. 16 1978: “Phony Ad Salesmen Prey on 'White Guilt'”).

[8] From personal experience.

[9] Many people still do not consider climate change as a threat or think of it as a political ruse to raise taxes (Ipsos Mori 2013)

or withholding information. This basis of power was added later by Raven, because according to French there was not enough distinction from Expert power. Informational influence is different from the other bases, in it being dependent on the content. As soon as information or knowledge is shared, the agent loses its power. This notion of knowledge as power has created a technocracy that has considerable influence in contemporary society. Knowledge, like many intangible human products, can been commodified into a form of capital.

Pierre Bourdieu (1986) is widely known for distinguishing different types of capital: cultural, economic, social and symbolic capital. Capital, which consists of accumulated human labor assuming a material or integrated form, is understood by Bourdieu in the sense of resources and power. Going beyond his original notions that capital is purely gained in economic assets, Bourdieu elaborates the human field of influence further into the cultural and social settings. Similar to Expert power, cultural capital can be exercised through qualifications, skills and competencies to attain cultural authority. Chiefs, elders or religious leaders are examples of individuals who have gained authority by, but also, only within their own cultural setting. However, cultural capital starts and ends with the individual - which is dependent on its place and heritage in society - in regards to class and other determining circumstances. This relativeness of cultural capital is illustrated by Bourdieu with the phrase “being able to read in a world of illiterates” (Bourdieu 1986: 18). Social capital extends beyond this and, like referent power, is encapsulated by the integration into social networks: “the sum of active or potential resources that are connected through the possession of a network of permanent relations of mutual acquaintance and recognition, which are more or less institutionalized, or, in other words, with the inclusion into a group” (Bourdieu & Wacquant 1992: 119). Later distinguished as a separate type of capital, symbolic capital embodies neither material nor integrated power, but relies on the perception of the subject. Symbolic capital stems from the ability of the agent to create (mis)recognition of an existent source of capacity or worthiness by the subject (Bourdieu 1986: 27). Prestige, honor and attention, but also equity and dependence, whether attributed accordingly, are sources of symbolic capital.

Bourdieu’s and French & Raven’s theories are important for this study, because it shows that a) power can stem from different non-materialistic sources, b) capital can be gained and used as much by a lone individual as by a collective society, class or group, and c) that influence through a power base or by capital is equally dependent on the perception of material or merit, by the subject. Moreover, both the historical, cultural and social setting of the subject and of the agent are decisive.

2.2.3 A Coconut Commodity

While bases of power are thus not always connected to material capital we will see later that both the colonial rulers in the Pacific and its ensuing contemporary dependency on foreign aid, surely vouch for the importance of having financial or material wealth. This material wealth can take any shape or form. The reason for including or excluding PICTs from the Coconut to Biofuel project based on their excesses of coconuts, exemplifies that in this case the coconuts can be perceived as a material capital. Thus, in order to gain this capital, both Pacific islanders and their governments need to commodify the coconut similar to colonial practices. This, however, may require a considerable neglect of the cultural value of the fruit.

The idea that the commodification of natural resources is a necessary development in order to meet the needs of a developing nation, has led the global economy into a severe case of commodity fetishism. Karl Marx's use of the term was mainly a critique of the extreme commodification of social relations between humans and with (natural) produce (Marx 1992). "Whence, then, arises the enigmatical character of the product of labor, so soon as it assumes the form of commodities? Clearly from this form itself" (Marx 1906: 82). Both human time (labor) and produced or natural goods (commodities), were economically valued (*subjective* - to *objective value)* to the point where every aspect of human life and human interaction were given a price tag. Variations of Marx' commodification theory, such as "valuation of nature" (Harvey 1996), "capitalization of nature" (O'Connor 1994), "production of nature" (Smith 1996) have been developed in response to continued large scale exploitation of various natural resources across the world. These are often referred to as 'commodification of nature' theories.

During colonial times, both natural resources and human labor were economically valued to the point of abuse (e.g. slavery). For the Pacific islanders, commodification of nature was a problematic consequence of the copra industry that was dominant across the region. The commodification of the coconut into copra required a moral neglect of its cultural and social value. Arguably, Marx' theory makes a gross distinction between the use value and exchange value of things and commodities. According to his rationalization the coconut (thing) would have use value, whether it is cut down for private consumption, or for trade. In the latter, it would also gain exchange value, turning it into a commodity (cf. Marx 1992: 27-30). However, in order to add additional (exchange) value, the coconuts require labor for selling: the processing of coconuts into copra. The exchange value of a product is dependent on the labor needed to prepare the commodity for market (id.: 30-38). Any process or material

included in the production process is added to the exchange value, determining the market price that will result in the most profit (id.: 42-46). Depending on the circumstances, this could also include biodiversity offsets or any other environmental costs. Problematic about Marx' distinction between value, use value and exchange value is that while it respects the subjective and objective values of things, it cannot fully account for the loss of cultural and social significance once it is commodified. This narrative could be applied to the coconut. As soon as a natural product is price tagged it starts to be seen as a way to make a living, instead of it pertaining to life itself. It becomes evaluated as a number rather than for its value as a produce to the owner. No economic model thus far has been able to quantify intrinsic value, because as soon as it is quantified, the purpose is lost; it is missing the point. Going into the discussion of the existence of intrinsic value of the coconut, is opening Pandora's box and will be left for another time and place. However, it does lead us to the question of whether material capitals, or even objects, when used to exert power, can therefore be described agency? In the following section we introduce the object that is considered the most powerful capital in the previous two centuries: the machine.

2.2.4 Physical Power vs. Social Power

The power of the machine that has so greatly contributed to climate change since the Industrial revolution has warped our perception of power. As we have now seen, much has been written about the concept of social power. However, few attempts have been made to connect the physical power of the machine and its driving force, fossil fuels, to social power relations between human beings (Hornborg 2001, 2011; Malm 2013, 2015). Is it, consequently, only a coincidence that the term 'power' happens to have two meanings in the English language? Is it just semantics, after all? Or can we try to find a relation between the two etymologies? Current global events force us to acknowledge that who wields the power of physical strength produced through oil, commonly also hold considerably economic, political and overall social power[10]. Power, in the physical etymology of the word, can be defined as the "rate at which work is done" (Gates 2011: 82). Important in this definition is the addition: "measured in Watts, or less frequently, horse power". This definition is clearly made after the Industrial Revolution; physical power, thus work, was formerly increased by adding more men, or horses. However, after, simply increasing the application of oil instantly increased the rate and amount of work, making human labor obsolete. Through oil, physical

[10] For examples, as one of the largest oil producing countries, Saudi Arabia is believed to control oil prices on the global market by over-flooding or withholding oil (EIA 2016); Shell has been in numerous battles with peoples whose environments and health have been compromised by their practices (i.e. Nigeria see CCR & ERI 2012); TransCanada energy company is still pushing for the Keystone XL pipeline across Eastern Canada and U.S., despite a consistent veto by the Obama administration (New York Times 2015).

power could instantly be harbored by the control of as few as one person. Requiring less human labor to do the same amount of work empowered the factory owner to decide the economic and social fate of his workforce. Thus, the machine, the power of one, could exert power over many. The stability of this relationship has many historical examples since the expansion of capitalism (e.g., the October Revolution in Petrograd, Russia in 1917). Can a single entity hold power over so many?

The connection between physical and social power is not only illustrated by the Industrial Revolution and the machine, but also, in a way, by physics. To clarify this we will look at the first and second laws of thermodynamics. The first law of thermodynamics states that while energy can constantly change form, it can never be destroyed, or for that matter, created (Schneider & Kay 1994: 3). Due to outside forces, energy can 'flow' into different forms[11] and is therefore not a constant. To illustrate, let us look at a diesel generator, since that is required for our Coconut to Biofuel project. To create power ('the capacity to do work') a diesel generator needs energy, or rather *exergy*. Diesel fuel is used as an energy source which the generator transforms into kinetic energy (motion). However, not all the energy from the oil is transferred to motion. The generator also heats up, 'creating' thermal energy, which simply dissipates. This form of energy, *anergy*, is useless for the creation of the desired power. Compared to man- or water power, however, fossil fuels were extremely energy efficient. The concentration of energy in order to produce power is much higher in the machine than it ever was by human hands. Hence, man's fascination and obsession with both fossil fuels and the machine. While the powering of the diesel generator would not be described as natural by many people, the tendency of energy to dissipate into different forms, *is* natural. The second law of thermodynamics measures this tendency in entropy. Entropy is the measure for configurations within a closed system that will ultimately lead to the maximum level of microscopic states, or, 'disorder'.

Essentially, the natural world, stated by physics, prefers energy to be in as many different states as possible, not concentrated in one. The diesel generator for instance, has a favored low entropy, i.e. a high concentration of energy, in order to more effectively generate power. However, the second law states that "the more energy that flows into a system, the greater the potential for degradation… Stressed [eco]systems […] will reside at some distance closer to thermodynamic equilibrium" (Schneider & Kay 1994: 19-20). Due to its low entropy, the

[11] The two basic forms of energy are kinetic and potential energy. Kinetic energy can be divided into motion, thermal, sound, electric and electromagnetic radiation. Potential energy can signify gravitational, chemical, nuclear and elastic energy (EIA 2016).

generator is in a ‘controlled’ state of stress. But, if given the chance, it will dissolve into a diffused state. Overheating of engines could be considered a solution to a stressed system. When a generator overheats and breaks, the concentrated energy can dissolve into multiple forms of energy. The second law of thermodynamics can therefore caution us about the natural state of energy and power in the social sense as well. If maximum entropy is destined to prevail in social power too, power can never stay limited to one source forever. Thus while the question ‘who holds power’ is crucial, the next question should be “how long can it maintain in that state before it is crumbled to disorder”? Do the laws of thermodynamics testify for complete representative democracy as opposed to power concentration in an elite?

2.2.5 The Power of the Machine

When we apply the laws of thermodynamics to human social relations, we need to first look back on the strength of perception (e.g., *Biopower)*. Like expert power and symbolic capital, creating the perception of power of an agent towards the subject, is an equally powerful tool. As we questioned earlier, can this agent also embody an object? The physical power of oil and the machine as a means of production has showcased that while these are in the hands of humans, their acquisition leads to social power. Then what binds the human belief in the social power of physical power? A crucial link that is missing in this testament is Alf Hornborg’s theory on machine fetishism. Machine fetishism, like commodity fetishism, stems from the human notion of attributing value to non-living attributes. As argued by Castree (2003: 289):

> the tangible non-human world thus affects the construction of social and economic relations and practice, inscribing ecology in the dynamics of capital. While some "natures" are readily subsumed by capitalism, others "resist" complete commodification, displaying a form of “agency”.

By doing so, we allow these attributes to enter into our network of economic and social exchange; we produce them and use them for trade or further production that help establish social relations. According to Hornborg (2001: 2), humans attribute the machine three types of power: 1. power to conduct work; 2. power over other people; 3. power over our minds. All three types indicate a similar relation as social power between humans. This modern day fetishism, i.e. our attribution and subservience to the agency of an object is, according to Hornborg, the driving force of capitalism. Regardless of the negative or positive power the machine has over our lives, the machine embodies less physical labor for humans. As an

extension, oil can embody that same principle. Both the machine and oil were created to do work for us, creating the illusion that we have power over *it*. However, by creating this dependency, human beings gradually allow themselves to be dictated by it; it becomes a thing of magic that provides for us; it drives us to work, it cooks our food and it fills our supermarkets. Hornborg predicts that this illusion will only be shattered once the system collapses (Hornborg 2011: 39). Like the notion of the empty suit, humans have the capacity to put their faith and trust in either a person or a machine (object or subject), but once we strip it down to its core, it will lose its perception of power.

What this analysis means to our case, is that we have to assume that both the individuals or groups owning the oil (petrol or coconut oil) or means to its production, have the capacity to alter the power dynamic. More importantly, we have to consider the possibilities that both the coconut and its oil can be ascribed agency, either because of its cultural and economic value. Furthermore, the physical laws of thermodynamics illustrate that a power structure that has low entropy, meaning that energy is concentrated in a low number of states, is likely to ultimately dissolve in disorder, returning energy to a majority. What both of these theoretical approaches can tell us, is that the balance of power among the actors involved in the Coconut to Biofuel project requires their equal involvement and access to its created benefits. Owning the means of production for the project, the coconut, and thus its ascribed agency will, hopefully, give Pacific islanders enough power to ensure their equal involvement. Too often, the people at the microlevel draw the short end of the stick and end up a marginalized group, due to their involvement in natural resource exploitations (e.g. mineral extractions leading to violence in Papua New Guinea (see Filer 1990) and New Caledonia (see Ali & Singh Grewal 2006). In the following chapter we go back to our natural resource of interest: the humble coconut.

3. The Humble Coconut

3.1 Oceania or Pacific islands

To understand the coconut, we need to first understand the setting in which it grows; the environment, region and people. The intermittent use of the terms Pacific and Oceania are not only problematic geographically, but more so socially. The prevalent use of Pacific connotes “small areas of land sitting atop submerged reefs or seamount” (Hau’ofa 1994: 153). Trapped by water, these areas are isolated, helpless and dependent (Matsuda 2006: 760). This imperialist view refuses to acknowledge that to the people inhabiting these areas, the ‘waste’ of water that supposedly limits them, has always been a transit to places beyond their familiar land masses. Oceania stands for a sea of islands, inhabiting people that are at home with the sea and have been for a long time. Wealth, skills and arts were shared in a large exchange community by peoples from what are now Fiji, Tonga, Samoa, Rotuma, Niue, Tokelau Tuvalu, Futuna and Uvea (Hau’ofa 1994: 154). And they were not alone: all across the Pacific Ocean, islanders travelled in ever expanding social networks through trade and marriage.

Looking at the map of Oceania, we are thus spatially conflicted to see the possibilities of its nation states. 18th Century continental men from Europe were the first ones to draw lines across the map of the Pacific Ocean, dividing its surface into manageable sizes that they could understand. The Europeans and Americans - after sailing for weeks, or months even - who came upon the islands introduced the idea of “islands in a far sea” (Hau’ofa: 153). This idea still stands today when we call the PICTs small, isolated and restricted pieces of land, clearly in need of aid because of this. Its inhabitants however, had never seen their existence in such limiting terms. Rather than “islands in a sea”, they recognized and expressed their own potential by referring to themselves as what Hau’ofa called “a sea of islands”. For nobody but them and their ancestors were truly more familiar with the vastness, and more importantly, richness of all its surfaces, when they spread across its distances[12].

While many exact migration patterns of its early inhabitants are as of yet uncertain, one thing is for sure: at the sight of land at the horizon, its sea venturing peoples were surely comforted by the familiar sight of the Tree of Life on the new shores. Doubtlessly, the first European

[12] This leading paragraph is part of a major discussion on the issue of isolation and remoteness in the Pacific region. Many critical voices against Hau’ofa’s perspective, point out that there are in fact many isolating factors in Oceania today. While this grander discussion is not the central point of this thesis and beyond its scope, it is certainly a determining factor in the wider perspective on the Pacific and Oceania. For further readings on this issue see Margaret Jolly’s ‘Imagining Oceania’ (2007).

voyageurs were greeted by a similar sight. For example, in 1777 the British explorer James Cook wrote:

> On the 24th about half an hour after day break, land was discovered bearing NEBE 1/2E; which upon a nearer approach was found to be one of those low islands so common in this sea; that is a narrow bank of land enclosing [sic] the sea within; a few Cocoa nut trees were seen in two or three places, but in general the land had a very barren appearances (Cook 1999 [1777]: 527).

While many ships flying different nation flags, had already anchored offshore several of the islands, the Pacific peoples' ethnic composition was an enigma to European voyageurs for a long time. Settlers had always assumed that cultural differences between peoples were relative to their distance, as was the case on the European continent.

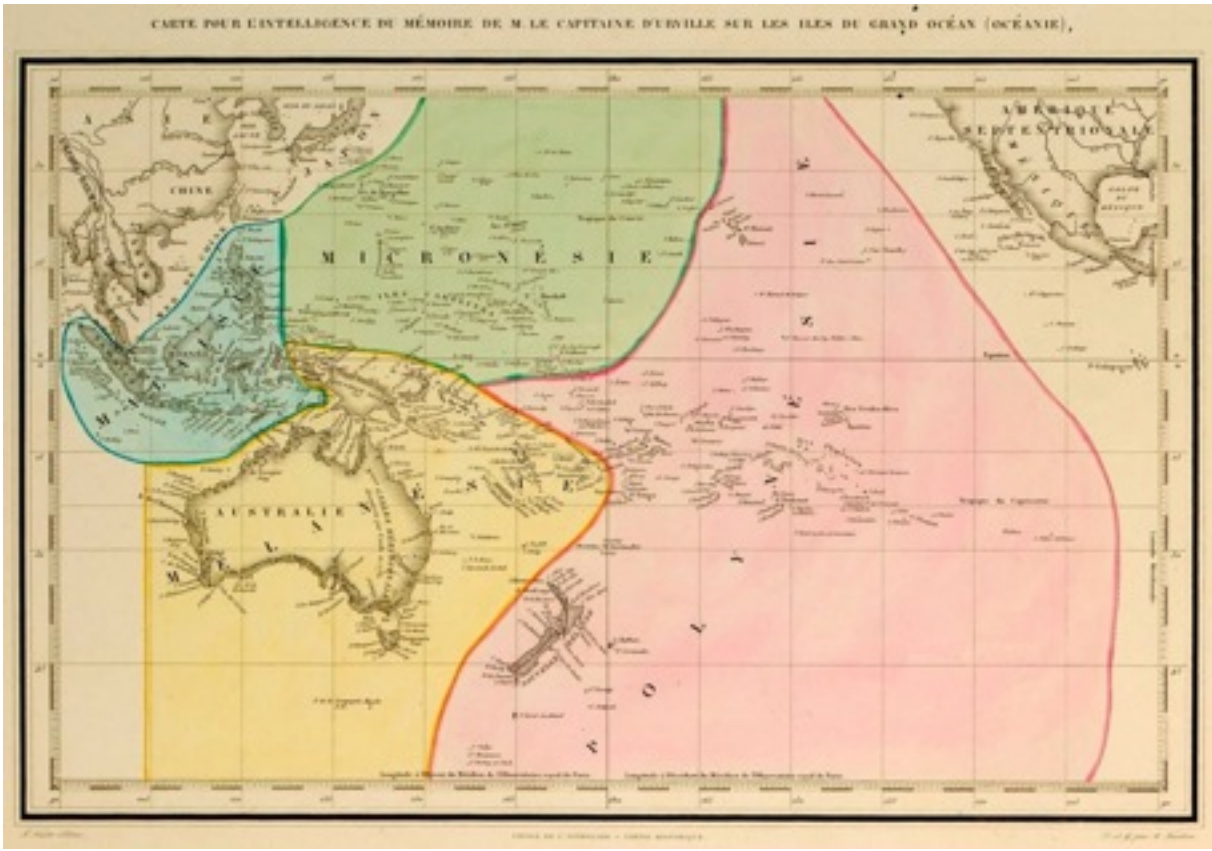


Figure 2: A presentation of the subdivisions Malaysia, Micronesia, Polynesia and Melanesia across the Pacific (wider) area by Dumont D'Urville in 1832 (Tardieu 1833)

Polynesia (*meaning* 'Many Islands'), which were famously documented by Cook, completely disproves this notion. "Where did they come from?" (Campbell 1992: 28). Reaching from

Hawaii to New Zealand, all the way to Eastern Island closer to South America, the physical and cultural commonalities between their inhabitants earned them the common term of Polynesian (Dumont d'Urville 1832). Etymology studies have indeed shown strong similarities in Polynesian languages, confirming a shared history. A widely accepted explanation for this among Pacific islanders now, is that this was simply because they travelled. European voyageurs deemed this impossible without any advanced navigation technology, which these peoples clearly did not have the resources to produce. Any notion that different means of navigation or simply the Pacific islanders' superiority in ocean traveling to great lengths and staying in contact, was not considered feasible (Hau'ofa 1994). Comparable to the Polynesians, the inhabitants of Micronesia ('Small Islands'), though equally far-flung over a vast area, show similar homogeneities. As similar as the Polynesians and Micronesians were regarded, the peoples of Melanesia ('Black Islands') were collectively named so, despite their immense diversity (Campbell 1992: 13). While those islands are relatively close, their vastly numerous languages (totaling 1,300 distinct ones) fascinate anthropologists till this day to find common ancestral origins (Landweer & Unseth 2012: 1).

Surprisingly then, the words commonly translated as 'coconut' or 'coconut tree', are similar in many Polynesian, Micronesian and Melanesian languages. Among the examples are (according to Chan & Elevitch 2006: 279):

niu (Polynesia, Papua New Guinea, Fiji)
ni (Pohnpei, Marshall Islands)
niyog (Guam)
nizok (New Mariana Islands)
nu (Chuuk, Cook Islands)
te ni (Kiribati)[13]

Few plants on this earth grow so well on inhospitable and infertile lands as the Cocos nucifera, the coconut palm (SPC 2011: 2). While perfectly adapted to the sandy and often dry atolls[14] of the Pacific, the coconut palm is not indigenous to the region. It is believed that the first coconuts either floated or were transported there by seafarers from Southeast Asia , where all the indigenous people of Oceania have their ultimate origins (Oliver 2002).

[13] These translations are simple and singular versions of a far more extensive vocabulary for the coconut. Most Melanesian, Polynesian and Micronesian languages have multiple words referring to different stages in the ripening phase of the coconut or even coloring of the fruit. These chosen translations are simply to illustrate that there are commonalities in the multitude of languages of the region, and their assumed connectivity to both one another and the coconut.

[14] A coconut palm only requires about 1,5 cubic meters of water a year (Matthieu 2008)

3.2 A Nutty Legend

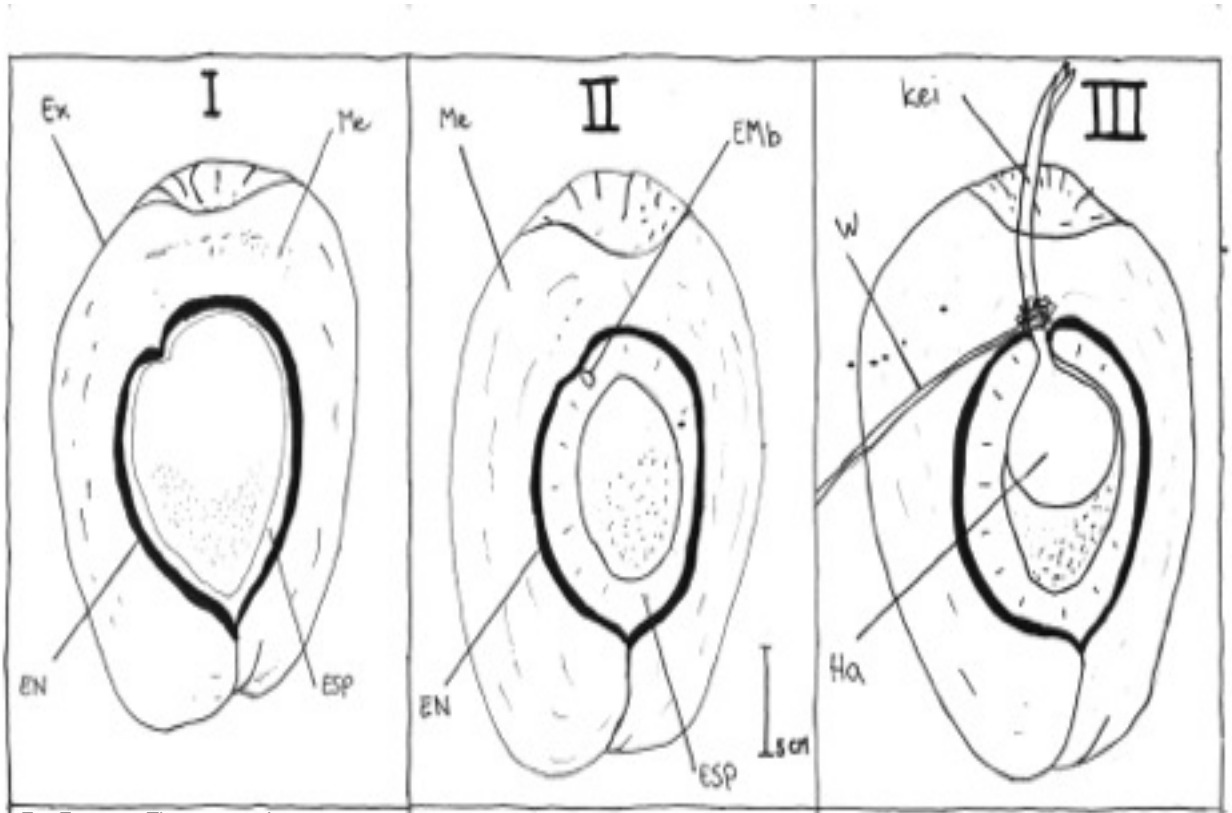
Polynesian legend, however, has it that the coconut palm came to the Pacific, for, [how else would legend have it?], love. The story of Hina and Tuna has many variations[15], short and long and is still a popular tale across Polynesia today. According to one version, Hina-Moe-Aitu, the daughter of Kui-the-Blind, lived on the raised coral island of Mangaia (Cook Islands). Often she would bathe in a pool below a cliff near her house, where many eels lived as well. One day a large eel approached Hina and teased her with its tail. Over time the eel became more bold and touched Hina provocatively below the water, which she allowed. One day, as Hina was gazing at the eel's face, it shifted its shape into a handsome young Mangaian. The young man revealed himself to be Tuna, God of Eels, and proclaimed his love for her beauty. In human form the two lay together that day and many more times after that. After each time, Tuna would change back into an eel and leave Hina, until their next encounter. One day, Tuna warned Hina that he would not return because the following night would bring heavy downpour which would flood and destroy the taro fields of the village. Tuna instructed Hina that as the water would reach the threshold of her house, he would swim up to her and lay its head on the sill. She was told to cut off its head and plant it on the high ground. Hina did just that and as she visited the place where she buried Tuna's head every day, she saw first one and the next day two shoots grow out of the ground. Guarding the two unfamiliar shoots, they eventually grew into two tall and firm trees bearing two fruits: coconuts. From then on, the coconuts provided food, drink, oil for the hair and skin of the people in the village, and materials from the husk and tree. In the empty coconut shell you can still see the three holes, two eyes and a mouth, from the God-of-Eels Tuna, providing for his love (Alpers 1970: 73-75).

3.3 Coconut Uses

In both history and legend, the coconut fruit has been a vital part of Pacific life. Especially before the cultivation of pearls (in the 1980s and onwards), copra was a highly valued natural source for export purposes. The fruit, shells, fibers, leaves, bark and wood were, for example, used for building-frames screens, containers, cordage, matting, roof thatching, caulking material, weapons and armor, cosmetics and medicine (Oliver 2002: 74). In fact, a Sri Lankan proverb claims the coconut has 99 uses, but a 100th will undoubtedly be found as well (Grimwood 1975: 18). Foremost however, the coconut is of high nutritional and culinary value. The coconut can be consumed in all stages of its life: young, adult and 'old' (see Figure 3). The white meat in the mature coconut can be grated and cooked in traditional

[15] There are more erotic, Freudian, versions of the legend, where Hina becomes impregnated by the eel (pers. comm. Thomas Malm).

earth ovens or eaten straight from the shell; the water of the big green coconut in particular is high in calories and electrolytes, making it an excellent thirst quenching drink that is both easy to carry and sterile; home made coconut oil can be used for cooking, as well as for cosmetic care of hair and skin, providing it protection against the Pacific elements. If used properly, the sum of its components has the highest economic value of any palm tree (Bawalan 2011: 2). Thus, this “tree of abundance”, despite its commonality, is a highly valued Pacific natural resource.



Ex: Exocarp. The commonly green outer peel. Me: Mesocarp. The fibrous husk surrounding the stone fruit that most people recognize as a consumable mature coconut. En: Endocarp. The brown, hairy shell of the fruit. Esp: Endosperm. The white flesh inside the fruit. Young coconuts have a thinner, more slippery endosperm.	As the fruit matures, the Endosperm becomes thicker and harder. A small Embryo (Emb) has now developed in the endosperm and is starting to feed off of the water and endosperm in the fruit.	Ha: Apple. The embryo has grown off of the nutrients inside the fruit and grown to sprout. W: a root has grown out of the developed embryo and will grow until it finds root in the soil. That is how a coconut can take root whilst not in the soil. The other end of the embryo sprouts a shoot (Kei). The apple (cotyledon), dissolving and absorbing the endosperm, can be eaten as a spongy and sweet snack.

Figure 3: Cross cut of young, mature and ‘old’ coconut (drawn by the author from Rehm & Espig 1984: 87)

The cultivation of the coconut palm is fairly simple. It can be as simple as carrying a sprouted coconut to the desired spot and placing it on the ground. Many palm trees in unexpected places are thought to have been put there as proof by climbers or hikers (Whistler 2000: 25). To prevent having it grow at odd angles, though, the fruit is placed into the ground with the shoot pointing upward. From the time of planting the seedling, a coconut palm takes around

5 to 10 years to mature and start producing coconuts. Between its 12th and 20th life year the tree produces at its peak; depending on the conditions in which the tree grows, the number of fruits can range between 40 to 60 nuts a year (Matthieu 2008). While harvesting could be as easy as just picking them off the ground, the fruit cannot be used past its maturity. Seeing as how the coconut's embryo can start to form on the tree already (at which point it will start to germinate, diminishing the quality and quantity of the white meat inside), the coconut has to be collected immediately from the ground or picked off the palm. Notably, collection and carrying coconuts to the place of consumption is done by weaving a single palm leaf into a carrying basket. This is done on the spot by just using a machete to cut off the long leaf and trim the finished basket.

Figures 4a-d: Husking a coconut (a); Use of a traditional scraper (b); Common equipment for personal coconut grating (c); Mechanical grater (d). (pers. photos of author 2015, Fiji).

Extracting the meat for either personal or commercial use has several steps (see Figures 4a-d). For personal use, the husk of the coconut is first removed by impaling the outer layer of the fruit on a sharp stick or metal rod thrust into the ground. Steadying the impaled fruit with one hand, the other hand thrusts off the loosened husk (a). While to outsiders this process will look like a sure way to get oneself an undesired stomach hole, most children are taught this at an early age, enabling them to husk a coconut in under 10 seconds (Whistler 2000: 26). After, the coconuts are split open by a machete. For the production of copra, the split coconuts (*with* the husk still on) are laid out in the sun to dry. Drying the meat inside the husk makes it easier to scoop out afterwards, by using a flat bladed tool. After the copra is placed in burlap sacks, weighed, sold and shipped to oil refineries abroad. Each standard sack would hold about 55 kg of copra, totaling about 100 coconuts (Matthieu 2008). For personal use, the split coconut is directly scraped out (b, c). However, nowadays many islanders prefer to grate out the meat with a machine (d).

4. Coconut to Biofuel

The Coconut to Biofuel project endeavors to similarly process the coconuts for large scale oil extraction from the meat and making it available for a regional market. Research that suggests that the coconut oil is both a viable and less costly alternative to imported diesel, formed a starting point for this project (e.g. Cloin 2007; Walton 2008; ADB 2011; Singh et. al. 2010). Pitched by the Petroleum Advisor of the Economic Development Division of SPC, the *Coconut to Biofuel: Pacific Islands Regional Coordination* is planned to take place over a period of seven years. In those seven years the project, coordinated by SPC, will endeavor to establish inter-PICTs working groups and regional coordinating councils consisting of members of targeted government departments or ministries, and members of the private sector. These members' tasks consist of coordinating the necessary activities and structures in order for the coconut biofuel to be collected, produced and marketed within their own states, and collaborate to establish a regional market. PICTs willing to participate in the project must agree to a number of conditions set by SPC and project partners. One of these project partners includes the Pacific Power Association (PPA(a)). The PPA is an inter-development agency and member of the Council of Regional Organizations in the Pacific (CROP), consisting of 25 electric power utilities' representatives operating in 20 PICTs. Other project partners are future donors and participating PICTs governments and their energy departments. As currently proposed, the project will initially only be presented to the heads of Department of Energy of Fiji, New Caledonia, Papua New Guinea, the Solomon Islands and Vanuatu. This is due to these countries' availability of excess coconut resources that could be converted to biofuel in a sustainable manner (SPC n.d.: 5). Table 3 illustrates these countries' current coconut production numbers (New Caledonia's figures are as of yet not included).

Table 3: PICTs current coconut production numbers (SPC n.d.: 5).

Country	Coconut area (ha)	Coconut production	
		Millions of nuts	Copra equivalent (tonnes)
Fiji Islands	60.000	150	25.000
Papua New Guinea	221.000	1.101	132.000
Solomon Islands	59.000	100	20.000
Vanuatu	96.000	308	61.000

4.1 Case Studies: Lomaloma and Welagi, Fiji

The proposed Coconut to Biofuel will build its policy framework on previous experiences with coconut oil production. In 2000 and 2001, two small scale community-based projects were set up through French government funding in a collaboration with CIRAD Energy Unit, SPCs Rural Energy Development Programme and the Fiji Department of Energy. The project sites were chosen to be on two rural outer islands, Taveuni and Vanua Balavu. The projects were aimed to demonstrate the viability of small scale production of coconut oil for use as a diesel substitute in rural electricity generation (Woods et. al. 2006: 476-482).

In the village of Lomaloma, on Vanua Balavu, an agreement was made with a local chief who owned a coconut oil mill to provide oil for an installed generator that would supply electricity to 200 consumers across three villages. At the evaluation in 2004, it was clear that some crucial miscommunication had led to the failure of the initiative: it turned out that the propositioned mill was in such dire need of repairs - for which the owner was less than motivated to pay - that the allocated committee decided to feed the generator with left over oil barrels lying around the oil mill. When this oil ran out, rather than abandoning the mill, they remained true to the faith of the project in the hail of coconut oil. The committee thus started importing barrels from a commercial mill in Savusavu, on the neighboring island of Vanua Levu, despite this costing more than regular diesel. A more important reason for this was that they had been told that the generator was only to be run on coconut oil, which they mistook to mean that the generator was only *able to* run on coconut oil. When the committee was told that the generator could in fact be run only on regular diesel by the Fiji Department of Energy, they neglected the coconut oil altogether. The Lomaloma case was certainly not helped by the lack of funds to compensate the involved islanders, which ultimately gave them little incentive to keep the costly project going. The project over in Welagi on Taveuni tried to mitigate this problem by making the collection of coconuts for the oil part of the villages youth's community service to their clans (*matagali*) (id.: 478, 480). Each weekday a different *matagali* would collect coconuts to feed the small mill equipment provided by CIRAD. Unfortunately, due to cyclone Ami in 2003, coconut resources were vastly diminished on Taveuni, which meant that, once again, coconut oil was imported from other islands to keep the generator running. Eventually, the evaluation team in 2004 encountered a well willing - but struggling to comply - community due to clashes between *matagalis.* Also they encountered a broken down generator that needed repairs and parts.
What both projects illustrated was that the project initially worked well on paper. However, miscommunication, lacking supervision, poor maintenance and unclear accountability of the

islanders were decisive to its lacking success. However, the reasons why the generators are either currently non-operational or fully running on regular diesel, have no connection to the viability of using coconut oil as a substitute in generators. What the Coconut to Biofuel project *can* learn from these precedents, is that more thorough analysis of available labor and material resources is needed if the project wishes to become sustainable.

4.2 Oil Extraction

Precedents like these help to work out the kinks and warn for obstacles in the implementation process. The technical side of producing coconut oil has had a longer practice run. Expelling coconut oil from raw coconuts can be done in multiple ways (Bawalan 2011). However, two methods are most commonly used: traditional mill and DME. Traditional milling has been common around the Pacific in the past and has been the base method for previous biodiesel production (Woodruff 2007; Mohanty 2012; Cloin 2005). An alternative method of oil expelling is Direct Micro Expelling (DME), which requires less industrial sized installations and has been proven to be successful in small scale businesses close to the coconut plantations. SPC and their partnership with the South Pacific Applied Geoscience Commission (SOPAC)[16] have previously issued research and guidelines on (sustainable) coconut oil production and refinement. Whatever method of production will be used, SPC does extend a few criteria to be considered in this matter: “yearly coconut plantation yield; yearly demand for coconut oil; quality of oil desired and end use; skilled labor required to operate and maintain the equipment; [and the] location of production plant in relation to the coconut resource” (SPC et. al. 2010).

4.2.1 Traditional Mill

In traditional copra mills the process starts with the collection, husking and drying of copra. The copra is usually dried over the stretch of a few days, using the husks and shells of the coconut as fuel for large dryers. In the mills, an oil expeller extracts the oil thereafter. Weighing occurs first to determine the percentage of oil to be pressed. The copra is then cut by a copra cutter, with revolving blades, that chops the fed shells into tiny pieces. If necessary, at this stage the cut copra can continue processing or can be stored or transported. The oil expeller is a (powered) machine that screws the cut-and-dried meat through increasingly smaller volumes, compressing it until it releases its oil. Typically, good quality coconuts yield 55% oil. The remaining 45% is called copra meal, which has been

[16] SOPAC used to be a separate intergovernmental regional organization supporting sustainable development through technical and scientific research. Since 2010, SOPAC’s activities have been transferred to SPC and the Pacific Regional Environmental Programme (SPREP).

found to be a nutritious and fattening food substitute in animal fodder (Bawalan 2011: 85). The next step is the oil refining: the crude oil requires filtering to bring it down to 1 micrometer (1 micron). To ease along this process, the oil is commonly left to settle, allowing the larger particles to sink to the bottom. It is thereafter pressed through either a Filter Press or Vacuum Filter. The Filter Press works similar to the oil expeller in the previous stage: the oil is compressed and pressed through a series of filter chambers. The Vacuum Filter uses a vacuum pump to suck the oil through the filter elements. A third type of filter, which is more expensive and therefore less used, is a Centrifuge filter. It does eliminate the step of settling the oil for a few days. The centrifuge filter is a conical bowl that uses spinning motion to separate substances of varied densities, leaving the less dense, refined oil on the top (SPC et. al. 2010). All three types of filtering fall under the denominating term: expeller press.

4.2.2 Direct Micro Expelling

A relatively new technique of producing coconut oil is Direct Micro Expelling. Dan Etherington invented the DME technique as a promising method for use across the Pacific on even the smallest islands. The process requires a smaller and cheaper (AUS$25,000) DME installation that presses the oil within an hour from breaking open the nut (Kokonut Pacific 2016). After husking, the flesh is grated out of the shells by a powered grater (*Figure 4d* earlier on in the thesis illustrated this). The grated flesh (*not* copra) is scraped and scooped around a heated stainless steel table. The table is heated by burning husks and shells underneath. Thereafter, the grated and dried flesh is packed into capsules which are compressed in a presser. Any worker can use the presser by putting their weight on a foot handle, pressing out the oil. Thus hardly any heavy machinery or electrical power is needed to produce the oil.

Etherington and his social enterprise, Kokonut Pacific, have set up viable and profitable small scale businesses in the Solomon Islands (ibid.). The small installations do not require migration of peoples between islands for the industry and keeps the business family and community oriented, limiting the risk of outside exploitation or unreliability of labor. It is also low in waste production and, once purchased, low in maintenance costs (Cloin 2007: 24; Kokonut Pacific 2016). Currently however, the oil produced through DME is of high Virgin Coconut Oil (VCO) quality, making it an expensive oil to use for biofuel. While DME oil has been used in 50/50 blends with regular diesel on some islands, the high priced virgin oil is more suitable for luxury products like soaps, cosmetics and cooking oils (Cloin 2007: 24-25). Etherington has acknowledged that while it has proven to work on small scale electricity generation, copra oil - which is generally of a lesser quality - would be better suited for

biofuel (Kokonut Pacific 2016). The reason why this technique was included was to show that small scale coconut oil production like the DME installations in the Solomon Islands, that are reliant on a small but local workforce, has shown great signs of success. Larger copra mill initiatives on the other hand, have been less successful (Woods et. al. 2006). While this may not have been due to the technique used to extract oil, the scale and intent behind the initiative can be determinative.

The final steps to be taken in producing biofuel is its use in a diesel engine. There are three means to use refined coconut oil: Pure Plant Oil (PPO), blending and transesterification. PPO uses pure refined coconut oil without any type of modification. While PPO has a low enough iodine level to be used without damage to a diesel generator, this is not suitable for colder climates, because of the solidification point of the oil (25 °C). Blending is a solution to this, where diesel ensures a fluid mixture without clogging. The last biofuel production method, whilst scientifically the most difficult one, has the highest energy yield and requires no blending or warm climate. The chemical process of transesterification was first conducted in 1853, long before the diesel engine was up and running (Lin et al. 2011: 1022). Transesterification is a process of reacting a catalysis (e.g., caustic soda) and an alcohol (e.g., methanol or ethanol) with coconut oil, which removes the free fatty acids, giving it similar properties to fossil diesel (SPC et. al. 2010). Notably, Fiji has a large sugar cane industry, which is a product from which ethanol can be derived. Using this process to transform vegetable oils into biodiesel became theoretically possible from 1937 on, when a Belgian scientist Chavanne first used the concept of biodiesel. The techniques and chemistry were further perfected until the end of the century, but were hard to put into practice due to high subsidization of the petroleum markets. It were growing environmental concerns that boosted the installments of biodiesel plants around Europe in the 1990s. Due to its local supply, Asia was the leading region of coconut oil as a biodiesel (id.: 1023). Clearly though the transesterification technique requires more transportation of oil or copra to central processing plants, which requires a large financial investment.

5. Copra, Colonialism and Control: A Historical Review

5.1 At the Copra…

Going by the accounts of seamen like Captain James Cook, the early European voyageurs, marveled in the beauty of Pacific peoples and their islands. As a transitory position between the Americas and South East Asia, the Pacific islands had become a strategic layover and refueling point for Western ships. Along the way, traders initiated contact with locals for bartering. This included sandalwood, beche-de-mer (sea cucumbers), mother-of-pearl and coconut oil. Later, in order to lower the risk of combustion of the oil aboard the ships, the coconuts were first dried and sold as copra. The commercialization of the coconut was therefore never a Pacific feat, rather was it urged by the incentive of these visiting traders. When European trading ventures initiated a more permanent settler practice by the 19th century, political reformation was taking place in many of the Pacific Islands, especially in Polynesia (Campbell 1992: 40). Pacific islanders traveling across the region in social exchange networks had set changes in motion to the existing political structures. These exchanges led to gradual shifts in rules of kinship, territory, law and hereditary legitimacy. Centralization and unification of political power and establishing hegemonies signaled what looked like the early signs of state formation, thus gradually restructuring Pacific island cultures (id.: 40-67). This ultimately led to many clashes and conflicts between fractions and tribes across the region.

This formed a challenging base for the early coconut traders. Eager to share with the rest of the world the value of the palm and its coconuts, European traders were often faced with unstable and changing tribe dynamics. On the one hand, competing tribes were eager to make occasional deals with passing European traders, who provided them with foreign, but popular goods such as tobacco, matches, cloth and iron materials. However, arriving at an inconvenient time (e.g. war) could mean a bloody and abrupt end for the traders. Individual copra traders were therefore a dynamic breed: reluctant to overstay their welcome, they moved between the islands by catching occasional rides from passing ships, to establish new relations on the next islands. One such trader, William Crossan, left us with his diary in which he recounts his trading practices and relations with the Solomon islanders. His diary shows that many traders those days lacked significant cultural understanding of their local relations, often ending in bloodshed (Crossan 1886, in BaylissSmith & Bennett 2012: 32). For example:

> The Bushmen have just killed one Boy belonging to Chief of Lunichena, a return just back from Port McKay. So much for civilized San Christoval [Makira], this is no. 4 that has got his quick dispatch, with one white man, in 4 months, that I know of.

Fortunately, both his benevolent relation with local chief Johnstone of Hada Bay and a strong sense of foreboding allowed him to survive through his trading years. Though unsafe at times for the copra buyers, the early and small scale trades could be considered mutually beneficial; the traders bought and then sold the bags of copra at larger trading posts across Oceania and the local islanders enjoyed the benefits of new materials and produce, without too much interference in local politics. Granting that the native islanders used the palm and its coconuts, copra was never directed towards a local market. The only influence the traders had on local politics, was if neighboring tribes disliked or begrudged the trade agreements.

> There is great enmity between Johnstone's crowd & the other natives. They all seem to be very jealous of white men staying here [in Hada]. The chief [at Tawaraha] offered me a nice piece of ground if I would come and stop.

After the 1840s, however, small scale trading by individual agents became a thing of the past. Due to some scientific developments on the European continent, coconut oil became a more widely applicable product. The coconut had already proven its worth as a lubricant for railroads and machinery, and as an illuminant in lamps and candles (Shurtleff & Aoyagi 2004). Using coconut oil as the main component in candles was thanks to French chemist Michel-Eugène Chevreul, whose research led to a better understanding of animal and vegetable fats. He was able to distinguish two strands of triglycerides (fatty acids), *elaine* (liquid) and *stearine* (solid), that determine a fat's viscosity at room temperature (AOCS 2011). His research allowed for a broader use of vegetable oils, leading to the eventual development of margarine. Due to the perfection of the refining process of coconut oil from copra in Europe and America, the demand for soaps, candles and coconut cooking oil increased exponentially (Campbell 1992: 97).

This rise in demand for the 'exotic' oil proved the requisite to the success of the copra industry in the region. This led to an increase in copra traders, which was previously considered an unattractive commerce as opposed to higher value Pacific commodities such as sandalwood or slaves. German trading company Godeffroy und Sohn of Hamburg, transformed the copra trade and ultimately the Pacific economic history, in a revolutionary way. Through corporate capitalistic ventures, Godeffroys undercut the individual traders by

recruiting its own agents to buy land for the private cultivation and exploitation of coconut plantations through wage labor (ibid.). This technically simple business model led the industry to boom in the Pacific halfway through the 19th century. Until well into the second half of the 19th century, these plantations and trading posts were still technically operating on indigenous land, *not* colonial. Because of a lack of highly valuable (read: mineral) resources in the Oceanic region there had been little colonizing initiatives from European nations. Establishing colonial rule seemed unprofitable and pointless. Besides, the settlers, regardless of a lack of colonial administration or policy, seemed to profit well. There were cases (e.g. Samoa) where clashes with rivaling fractions were an inconvenience to the trade; attempts at establishing a mixed or indigenous governments often failed, but were yet not dire enough for governments to intervene (Campbell 1992: 95-100). However, over time, these established plantations gradually brought about more permanent and larger settlements of whites on the islands. Godeffroy und Sohn's not only encouraged the European settlers to create plantations and produce, but also encouraged the local islanders to produce for them. Sporadic collection of coconuts was a seemingly easy way for islanders to make fast money or acquire trade products. The annual economic yield of a single coconut tree was estimated to be at $1 per year (Matthieu 2008).

5.2 The Colonial Era

In his book, sociologist Dietrich Rueschemeyer sets out to illustrate how the development of a centralized state power is closely linked to the division of labor and social differentiation in developing societies. Defying Adam Smith's claim that "the division of labor is limited by the extent of the market", Rueschemeyer recognizes the more dominant role of political power, i.e., colonial settlements, in controlling supply and demand, rather than market exchange (Rueschemeyer 1986: 5). This is proven by what Rueschemeyer called "simpler societies", having limited access to competitive markets. For local islanders this was also the case in the copra production and trade on their islands. While thus far in their encounters with Western powers they had participated to a certain extent in the copra industry, they had no access to the global trading network themselves. This was due to both a general lack of interest on their part and because the whites dominated the trade. Different trading nationalities (e.g., Australians, Germans) were competing for the largest market share at the time, allowing the locals no access at all. Rueschemeyer states that with the extension of a state or central power, what follows is the emergence of organized domination; the further the central power structurally differentiates within a society, the larger the need for stratification and commodification of its economic and natural resources. The German

occupation in Samoa exemplifies this process, though rather in reversed order. The Germans were heavily invested in the copra exploitation in these territories (Goddefroy und Sohn). Their numerous settlements and plantations that exploited the coconut resources, ultimately created a need for a central power structure. Encouraged by other Pacific regional treaties with Western powers and countless imperialist concessions back on the European continent, the Germans established a government. This also ended the Samoan strengths that had thus far been resistant to the growing German occupation of Samoan land (Campbell 1992: 95-100).

Should such state development prevail through the means of trade and industry, deemed by Rueschemeyer as ‘free choice’, rather than coercion and war, they form the foundation for a capitalist society (Rueschemeyer 1986: 8). Talcott Parsons calls these ‘evolutionary universals’ (Parsons 1964). Like the Samoan case, settler plantation owners and trading posts in other Pacific territories were similarly becoming more concerned with establishing central powers structures to protect trading ventures. Annexation of the islands eventually proved inevitable, when national and international turmoil on the European continent reached the Pacific in the last decades of the 19th century. Gradually most of the islands were taken over by France, the USA, Germany, Great Britain and the Netherlands, but a “scramble for the Pacific”, alike the African continental rush, failed to occur.

The unwillingness and incapability of Pacific islanders to set up commercial businesses from their food products, like copra, established a false sense of superiority among the settlers, who did. This fed into the European popular view of racial superiority at the time, giving the settlers a false sense of ownership over both Pacific lands and its resources. Alike other colonies, demoralization of the local populations in the Pacific was high. The introduction of unknown (venereal) diseases across the region had diminished tribe populations and further urbanization left the hind lands even more empty.

Despite these ‘classic’ colonial symptoms, it seems indeed so that the colonization of the Pacific diverted from the traditional European imperial narrative in several aspects. First the Pacific islands were never considered a wealth in natural or mineral resources. Though sandalwood, mother-of-pearl, turtle shells and coconut products were popular in the West and East, they were luxury items and did not require major rearrangement of land and people. Copra was the only exception to this. Due to cultural and societal encroachment by the settlers and missionaries, the local indigenous islanders became limited in their traditional substance lifestyle. They were thus forced to participate in the copra industry to

earn some extra means. Enslavement of the local population for the copra industry was not commonly done, since much of the needed workforce was shipped over from colonies in Asia ('blackbirding' of Pacific islanders did occur: e.g., see Maude 1981). After the region had been divided, most Pacific islands were sufficiently reformed to allow for either a colonial or mixed government. However, colonial policy proved for many PICTs a continuation of pre-colonial policy. Imperial countries whose main stake was in the exploitation of resources, only intervened in politics to keep facilitating this. Second, the islands were small and dispersed, and therefore harder to unify under imperialist rule. Setting up trading posts and collection/distribution depots was sufficient to keep business ventures going, however small. And since much of the labor on the larger plantations was imported from other Pacific islands or colonies across the world, contact with the local population was comparatively low. For instance, Christian missionaries who followed suit after the initial voyageurs, had a bigger impact on rural social life.

5.3 A Niu Beginning

After the WWII, decolonization impulses gradually also reached the Pacific. Spurred by Marshall plan conditions, European colonial powers - with the U.S. and France as major exceptions - started preparing indigenous administrations and politics for a withdrawal of European dominance roughly between the 1960s and 1980s. Few countries were prepared for this, and thus most would ever since be dependent on foreign aid. PICTs were helped as far as the great powers were able to allow to spare without forsaking their own interests back in Europe and the U.S. Much like the colonization process, the decolonization of the Pacific occurred under pressure from other western forces and rarely included any say or collaboration of the local population (Campbell 1992: 156-169). Like the morale in the Pacific, the commercial copra industry was faring badly halfway through the 20th century. Between 1950 and 1990 the global price for copra, though fluctuating, decreased from over US$1400 per ton CIF[17], till below US$400 (FAO 1995). By the 1990s many plantation owners were leaving their coconuts unharvested (e.g. Fiji, Tonga, Samoa, French Polynesia). The plantations or small farm-holds that survived mostly did so because they were heavily subsidized by public authorities to prevent desertion of the atolls (Matthieu 2008).

There were several reasons for the drastic decline in the copra production in the Pacific. First, despite national funds to counterbalance the international price fluctuations, the average wage for copra laborers had dropped below the national minimum wage in many

[17] CIF: including cost, insurance & freight

Pacific countries[18] (FAO 1995). Second, copra and coconut oil could not compete against other edible oils like olive-, soy-, canola-, pepper-, corn- and palm oil. Competition from these oils became even more dire when the U.S.'s Centre for Science in the Public Interest (CSPI) urged the Food and Drug Administration (FDA) to ban the use of tropical oils. This incentive was based on (as of yet) incomplete research linking the increasing cases of heart diseases and high cholesterol, in the second half of the last century, with saturated fats (Associated Press 1986, 1987). As to this day, cardiac specialists remain skeptical towards the health benefits of coconut oil claimed by many (Etherington 2006: 6). Third, while economists at the time predicted a viable future for coconut as an industrial and edible oil, its popularity would depend on a steady supply of the product, which the Pacific could not guarantee (FAO 1995). Due to the price fluctuations for several decades, fewer efforts were made by PICTs to replant and manage the plantations, resulting in aged and senile trees, producing below minimum capacity. Furthermore, the size of plantations from high producing capacity countries like Malaysia, India, Thailand and the Philippines secured lower production costs, making them more resistant to low global prices. Lacking manpower and available land kept the Pacific from becoming one of these bigger powers.

Finally, the reason why many coconut plantation workers left the business was because of remittances from relatives abroad. Following in their ancestors footsteps, WWII caused a growing diaspora of Pacific islanders to form overseas and, afterwards, urging many islanders to travel for either education, work or social relations (Hau'ofa 1994: 157-158). Workers on other islands or even other continents - Australia and New Zealand have a major annual influx of seasonal workers from e.g. the Cook Islands and Fiji - sent home their earnings for families, enabling them to leave the unstable copra business. However, alongside increasing financial foreign aid after independency, these remittances earned Pacific islanders their current stigma of dependency. The MIRAB - migration, remittances, aid and bureaucracy - concept, incepted in 1985, supposedly dictates the evolution of Pacific Islands economies. For example, the Cook Islands are often called MIRAB, as development studies publication Te Amokura states: "Cook Islands Exports to New Zealand in 1992 totaled $2.6 million and imports from New Zealand NZ$38.7 million. The deficit was met by remittances, aid and borrowing" (Te Amokura quoted in Crocombe 2001: 396). While this statement was deemed financially untrue, it shows that the outside perception of its dependent position is demoralizing, undignified and belittling. According to Hau'ofa, this largely stems from the imperialist, or Western, perception of dependency. Proclaimers of the MIRAB and dependency concept fail to take into account the social centrality of reciprocity,

[18] In Western Samoa the minimum wage was at WS$0.65, while the copra wages were at WS$0.56 in 1989.

which is at the core of Oceanic culture (Hau'ofa 1994: 157). Workers abroad do not simply financially support their communities back home, but rather nourish a social network for future generations and kinship. The same as what ancestral islanders did by traveling across the ocean to expand their social networks (see Poirine 1998).

While some PICTs still maintain a moderate copra and coconut oil producing industry today, the extensive exploitation and commercialization of coconuts predominantly came and went with the westerners. A new type of westerners have partially taken their place, yet no longer in copra mills off shore, but on lounge chairs on the beaches. Tourism exemplifies a neocolonial imposition on the Pacific and its coconut palm (Thomas 2003: 6). Consuming the ideal and romantic image of the Pacific, westerners need and crave the image of the coconut, yet only if its removed. Not only for the purpose of consuming it, but also for reducing any risk of it causing damage to western interests. Or heads.

5.4 A Hegemonic History

Clearly the colonial era marked many major changes for the Oceanic countries. Restructuring of social and political power relations were deemed necessary to enable production and trade between the Western powers and the island territories. Colonialism forcibly halted and altered the already strained indigenous politics at the time, by eventually implementing their own idea of a political structure. One of its consequences was the demoralization of Pacific people concerning their own stake and potential in their development. And even more was due to dependency and MIRAB theories, aimed at explaining the post-colonial position of many developing regions such as the Pacific. What occurred then, and what could occur again, was the establishment of a cultural hegemony that favored the 'outsider', who, through religion, wealth or claims of superiority in race or development stature, convinced the Pacific islanders that this was justified.

The cultural hegemony concept describes society ruled by ideology, rather than economic class distinctions alone. It "is the local construction of reality, [defined mainly to the system of social relations and expression of local values], that determines and defines social interaction" (Vergara 2013: 45). This Neo-Marxist theory, led by Anthony Gramsci, aimed to 'soften' Marxist economic determinism by attributing much more value to culture in determining societal power structures (Dowding 2011: 336). Ideology is set forth by the ruling class to both unite and earn consent for their legitimacy from the majority. A classic example of this is the deep seated influence of the Catholic church in continental Europe and other

parts of the world, including the Pacific[19] (Pew Research Center 2015). This ultimately creates a perpetuating circle for norms and values that create and encourage class separation and continuance of the status quo. Cultural hegemony accounts for a wider variety of societies, including non-industrialized or 'traditional' societies, as was the case in the Pacific. While Gramsci does not dispute that there is a ruling class, aspects like intellect, religion or kinship are also big contributors. In both traditional and modern societies, 'new' spheres like the academic, technical or development spheres gain more importance and reverence every day.

> Since these various categories of traditional intellectuals [administrators, scholars and scientists, theorists, non-ecclesiastical philosophers, etc.] experience through an esprit de corps their uninterrupted historical continuity, and their special qualifications, they thus put themselves forward as autonomous and independent of the dominant social group (Gramsci quoted in Hoare & Nowell-Smith 1971: 7- 8).

In this statement we need to recognize the relevance of cultural hegemony today in the case of the Coconut to Biofuel project. The reverence of academic and technical organizations such as SPC, who will be overseeing this grand operation, can once again contest the legitimacy of Pacific political structures. This brings us to the larger overarching question as to who rules or *Who Governs?* (Dahl 1961). To clarify this further, we need to look at the structures through which they are most commonly seen in contemporary society. The basis of power in modern societies is commonly congregated in varying forms of human organization. These are created out of a collective desire to create purpose in everyday life and to prevent crumbling of the social structure. Political sociology has over time created five base theories on who controls these power structures: Pluralism, State Autonomy, Elite Theory, Marxism and Class-Domination Theory (Vergara 2013). These theories range from power in the hands of a few to power in the hands of the majority. In the following section we will discuss several off these that are most likely to be of relevance to the Coconut to Biofuel project.

One theory that urges focal power positions such as in cultural hegemony is the elite theory. The Elite Theory was used as a counter theory to Pluralism (e.g. Dahl), disputing the idea that multiple *equal* power exist to balance the input of the masses in order to create democracy. A small number of 'powerful' people, the elite, likely holds more power derived

[19] According to survey research by Pew Research Center, the average Christian percentage across 20 island states in the Pacific is 92,4%. Exact percentage numbers are: Cook Islands (96%); Fiji (64.4%); French Polynesia (94%); Guam (94.2); Kiribati (97%); Marshall Islands (97.5%); FSM (95.2%); Nauru (79%); New Caledonia (85.2%); Niue (96.4%); Northern Mariana Islands (81.3%); Palau (86.7%); PNG (99.2%); Samoa (97.5%); Solomon Islands (97.4%); Tokelau (99.8%); Tonga (98.9%); Tuvalu (96.7%); Vanuatu (93.5%); Wallis & Futuna (97.4%)

from policy planning and economic gains separated from the (democratic) state system. These theorists therefore believe that democratic systems in contemporary society (read: capitalist societies) do not hold enough power to determine and represent the wishes of society. This opposes the Marxist view that, under capitalism, a majority (the working class) will ultimately gain class consciousness, generated by the divisional and destabilizing nature of capitalism, and rise against the elite. Elite theorist Floyd Hunter brought this analysis of minority vs. majority power to the regional level, identifying key actors in business, local politics, religious institutions and other societal groups and their interconnectivity operating within a city or region. His aim was to identify the 'real' holders of power, not those in official positions. This consequently contests the theory of State Autonomy, which accounts the government as an independent force and power center (Skocpol 1979, 1985). This theory does not assume that governments represent the interests of the people, rather that they pursue their own autonomously *from* them, under the cover of legitimate power as opposed to illegitimate sources of power. Hunter's functionalist approach to identifying social and political power contests the efficacy of an urban democracy. Whether accurate or not, pluralism vs. elitism could help identifying false notions of democracy in policy making. It can be argued that similar tendencies could be identified in development. Like elitists, development organizations are not chosen under a democratic system. People hired in this field are not representatively chosen, nor are the funds allocated by NGOs, intergovernmental organizations and other development aid agencies necessarily provided by public funding. It is often technical and scientific merit (i.e. Expert and Referent power/ symbolic capital) and its application to development projects that have 'earned' them their positions of power (e.g. SPC, SPREP). Sociologist Daniel Bell claims that this is where the elitist theory particularly applies. After the Industrial Revolution, the power network of elitism silently shifted to a technocracy. While the crucial decision and policy making will come from government, they will be based on cost- and risk analysis and development research by a technocratic elite, diminishing any possible risks of losing face or moral from the people in the democratic system.

> ”If the dominant figures of the past hundred years have been the entrepreneur, the businessman, and the industrial executive, the 'new men' are the scientists, the mathematicians, the economists, and the engineers of the new intellectual technology” (Bell 1973: 344).

This technocracy in a way poses as a shield to protect the knight (government) from any direct blows. However, should a blow circumvent the shield, where in the past the battlefield

of (global) politics has encountered plenty of ‘mis-informed’ or ‘ill-advised’ politicians, it is ultimately the knight that will bear the wounds and fall; not the shield. Going from Bell’s convictions of the elite theory, we need to acknowledge that, in many places around the world the cultural hegemony has not only incorporated, but elevated intellectuals into the dominant social group (e.g. SPC). This technocracy has proven itself to hold considerable persuasion in policy making, and shows that from a selection of power sources, intellect is potent.

Concluding, the proposed fifth power structure theory, the Class-Domination Theory of power, by G. William Domhoff might offer our case study a more flexible option in identifying the power structure at hand in the Pacific. Reason for this, is that the Class-Domination Theory is widely supported by theorists such as C. Wright Mills, who see shortcomings in all four previous theories (Domhoff 1978). Class-Domination Theory, unlike Marxism or State Autonomy, focusses not on a single organizational power, but on a combination of the political and economic sphere. Class-Domination further states that while power is in the hands of small elites, between these groups there is no equality of power (i.e. pluralism), rather a definite hierarchy. However, these elites by no means control the whole society; their power stems from their ability to set the parameters and terms under which other groups and classes must act. Domhoff’s theory has advantages to the other theories since it takes the occurrence of exceptions into account; it does not limit the structures of power to one sphere or single class, but rather accepts that the structure or hierarchy can be shaped by cultural aspects and time. This theory leaves room for a wider and slightly more diverse application to real life. A power structure a hundred years ago can vastly differ now, just like a power structure in the USA can differ immensely from one in the Pacific.

6. Analysis

So far, we have discussed two spheres of science; our theory and our practice. In the case of theory, we have examined a multitude of theoretical views and abstractions considering power. Our practice obviously concerns all the empirical concepts connected to the Coconut to Biofuel Project. In this chapter we will bring these two spheres together; I will use social and physical power, machine and commodity fetishism, bases of power and capital, and theories on dependency, division of labor, use and exchange value, cultural hegemony and societal power structures to identify the power dynamic amongst the four major groups of actors connected to our case study. Ultimately, this will aim to answer my main research question: In what ways does the transition from fossil fuels to renewable energy sources, like coconut biofuel, affect and challenge the social power dynamics in the Pacific?

6.1 Pacific Players

There are many parties in the Pacific that have historically, and are currently benefitted by the coconut. The proposed Coconut to Biofuel project has not yet been officially pitched, meaning it has not been approved funding nor has it been presented to Energy Department Heads or Ministers. So as of yet, there are no definite opponents or proponents. However, we can identify four major actors who have a stake in this project. First, Pacific governments are said to be able to cut majorly on government spending. Both on import of fuel for grid power and on subsidizing diesel costs for outer island uses (Woods et. al. 2006). However, the local copra production too has been/is being subsidized by national governments, making an offset of one subsidy over another unclear. Second, development aid agencies such as SPC, who are non-profit - i.e. they will not have a financial stake as such - stand to ‘win’ from the (economic) empowerment of Pacific islanders and governments, for this would leave more funds for other development projects. Whilst it is probable that more development aid agencies, like SPREP and CROP will become involved should the project expand into other sectors of development, it is currently only SPC that is proposing and pushing for this regional switch to coconut oil. In the following analysis I will thus mainly focus on SPC’s power position. The third, and biggest, group are the Pacific islanders to be involved in the production of the coconuts for the biofuel. While many of the target plantations with excess coconuts are in the hands of individual owners or families, a local workforce will be hired. Community involvement is therefore required and have, in precedence, been the decisive factor in the outcome of Pacific coconut oil production (Kokonut Pacific 2016; Mohanty 2012;

Woods et. al. 2006).

A final group of actors in this project, are electricity providers collected under the Pacific Power Association (PPA(a)). The project proposers are currently looking for sponsors. During the earlier pitch of the project in 2015 (PEAG Meeting, Suva, Fiji), a possible solution for start up capital, transport and production techniques is the involvement of electricity providers or established power utilities companies and corporations, like the PPA. Currently many islands have existing contracts with such companies, most of which are represented in the PPA. During the PEAG meeting, attending members were reminded that many of the existing power sources and utilities are owned and operated by these PPA member corporations (e.g. Enercal, PNG Power Limited, UNELCO Vanuatu Unlimited, see PPA 2012). Their technical know-how and maintenance capacities make them a vital actor to the project; The aspects of setting up necessary production installations, covering the milling costs, providing technical training of workers and, finally, the transportation costs of the oil, could be settled with these corporations under a Power Purchase Agreement (PPA(b)). A PPA puts the initial costs of an enterprise on the buyer of the energy product in return for a higher percentage of the profits. A PPA can be contracted for a time period of up to 20 years (Jonathan Kahn, pers. comm.). Should the project proposers opt for such a scheme, then this will put energy providers into a noteworthy power position.

Now that we have more clearly defined the actors and their stakes in the transition away from fossil fuels, we need to identify the power relations between them. Using our aforementioned theories concerning bases and structures of power, the following section will try to lay bare the power positions, how they have come about, and how these, in some cases, may change should the Coconut to Biofuel project persist.

6.2 Coconut Biofuel: A Power(ful) Formula

6.2.1 SPC

As stated by Weber, power is the chance in a social relationship of one person to impose one's will, if necessary *against* the will of another. Currently, SPC is the leading actor to push for the switch to coconut biofuel. As a development aid agency, SPC has considerable influence over the other three actors; SPC represents 22 member PICTs, coordinates development in the energy sector in all of these countries and has countless development projects running for empowerment of Pacific islanders in the rural areas. SPC holds a significant number of the five bases of power: As an organization established to provide and

facilitate development through technical and scientific advice, SPC is revered for its expertise and skill. While expert power is equally conveyed through its perception on the subject, this actor has, judging by personal communications with employees and islanders who have been subject to projects coordinated by SPC, earned this base of power. Of course, not every project that runs through SPC has been successful. The case studies in Lomaloma and Welagi showcase this. However, SPC was not singularly at fault here, and lessons were still learned. Lessons that can be implemented in larger scale endeavors such as the Coconut to Biofuel project. The influential position of development organizations such as SPC refer us to the class domination theory by Domhoff and the elite theory approach by Bell. While SPC cannot be classified in either the political or economical spheres - they are non-profit and not democratically elected - which the former theory dictates, they can be considered as a small, yet powerful elitist class in the power hierarchy of the Pacific. As Bell indicated, the increasing power position of the elites after the Industrial Revolution has partially shifted to the technocracy. As a legitimate power however, SPC cannot claim this as it is not chosen or representative of Pacific country populations, despite its name, Pacific Community. That is why, even for the Coconut to Biofuel project, SPC often requires the legitimate power of PICTs governments, as the project first needs approval from Department Heads of Energy. In turn, governmental departments use the expert power of such technical aid organizations to validate the decisions they make on these matters. Thus even in the Pacific, technocratic organizations are used as shields by governments to legitimize their policy decisions. Thus both these actors are highly dependent on one another.

6.2.2 PICT Governments

PICTs governments power position in the case of energy use is a severely dependent one, but not only on SPC. Currently the most dire power relation that can be identified from most PICT governments is the one they have with foreign aid countries. This predicament has largely been dictated by historical relations between Pacific islands and their colonial rulers. Established during or after the rule of colonial powers, PICT governments have been variably successful as stable political structures. Most early indigenous governments were shaped after a Western political model. The transition from colonial to independent rule, starting in the 1970s, was viewed with ambivalence by both expatriates and locals. Countries like Fiji - who became independent since 1970 - which had a considerable share in its own state control from Britain, had a relatively smooth transition, because many governmental areas did not require a transfer from foreign to indigenous hand (Campbell 1992: 197-211). Of course the independence story of Fiji cannot be summarized in a simple ‘success’; many

hurdles such as Fiji's ethnic diversity required much time and consideration of its people to deal with accordingly. Other countries, such as Papua New Guinea (1975) had a more rocky start as independent states and were subsequently the playing field of various international interventions. Urged by the United Nations, colonial countries were varyingly accommodating in the formation of independent governments in their former territories. After independence, government areas that were commonly more stable concerned matters of domestic policy. However, PICTs trade relations with other countries and the global market was much less secure. Colonial rule had locked most of the PICTs into a global system of trade and communications, which ultimately led to their stigmatization and condemnation as MIRAB. A way to deal with the overwhelming global market for the new small island states was through the development of regional organizations. This is why, today, the region is often referred to as a collective, under terms such as PICTs or Pacific Small Island Development States[20] (SIDS).

The PICTs dependency on foreign countries and aid organizations indicate the existence of ubiquitous power relations between these actors. The cultural hegemony established during the colonial era still persists today, in the sense that PICT governments are relying on guidance from western countries. Whether this reliance is purely a perception of symbolic or reverent power of these developed countries on the part of PICTs, their annual budgets leave no illusion that there is a financial dependency. While the colonial powers were no longer politically bound to do so, they had created a state dependency through a division of labor in the production of natural resources, such as the copra industry (Talcott Parsons 'evolutionary universals'). This consequently forced many Pacific islands away from self subsistent living in their traditionally closed markets - that is, if we neglect the social exchange networks established by early Oceanic travelers - which could not simply be reversed.

For this reason, we can ascribe legitimate power in the form of equity to PICT governments. It is not a coincidence that the only non-PICT funding members of SPC are former - or in the case of France and the United States, current - colonial powers. We have to consider that an equity power base, drawing on the 'white guilt' principle, could be the reason for the consistent stream of financial aid since PICTs' independency. Currently we can thus speak of a variation of the core-periphery relationship between these actors. While the core countries aim to 'aid' the peripheries, the peripheries, by no means, *sustain* or increase the wealth of the core through natural resources. Although there is substantial import and export between the PICTs and core countries such as Australia and New Zealand, these mainly concern

[20] SIDS also refers to non-Pacific islands states in other world areas such as the Caribbean, South Sea and Mediterranean.

‘luxury’ products. For example spam, corned beef and other canned foods are large import products in the Pacific, and virgin coconut oil (e.g. Kokonut Pacific) and pearls are exported.

The foreign aid provided by developed countries to the PICTs, as mentioned earlier, is for a large part spent on fuel imports. The incentive for PICTs governments to say yes to a switch to alternative, renewable energy sources, as suggested by the Coconut to Biofuel project, is enormous. While the current power position of PICT governments is based on legitimacy, for they are chosen representatively by its island populations, this base of power is fickle should the countries budgets no longer allow for increasing economic development of its peoples. Foucault’s concept of Biopower, which acknowledges this fluidity of power, indicates that the legitimacy of governmental power is even more relational, since its people are periodically able to take it away - through elections. As the French royal garments, the Pacific people have the capacity to put the suit of power on whomever or whatever they wish to be subjugated to, i.e. that or those that will represent their wishes best. Should a switch to coconut biodiesel increase the economic wealth of Pacific rural islanders, as predicted, then this would surely add to the legitimate and reference power position of PICT governments. A promise of reward then is all that might be needed. Enforcement of the exploitation of coconuts for biofuel through coercion is technically feasible, but would be severely reminiscent of colonial practices.

6.2.3 Rural Pacific Islanders

For the Coconut to Biofuel project to succeed, the involvement of Pacific islanders and communities who have ownership of plantations that can provide their excessive resources to the project, is vital. This automatically marks a heightened power position of these islanders for owning economic capital of the core natural resource, coconuts. However, thus far, the biofuel project has not been able to gather data on the willingness of Pacific islanders to make the switch to production and consumption of biofuel. In many countries, diesel prices are subsidized for remote rural islanders who are not connected to the grid, making the diesel expensive, yet still affordable. And this energy source is available to them without the requirement of their physical labor to produce it. In some cases, government diesel subsidizations are so high - despite the losses in national annual budgets - that it has made attempts at switching to coconut biofuel financially illogical for these people (see Funafuti case in Woods et. al.: 390-399).

What the Lomaloma and Welagi case studies illustrated, is that while the rural islanders were motivated to give the incentive a try, they did not have the biggest stake in its success. In a power relation, this gives this group of actors the upper hand, due to the Principle of Least Interest. While this principle is mostly used in interpersonal relationships, it is applicable to our case study. The principle states that who ever cares the least about the relationship, holds the most power (Waller & Hill 1951 quoted in Strong et. al. 2011: 239-240). To appropriate this principle, we would need to replace the word *care* for *having a stake in*. Through precedences, Pacific islanders have shown themselves least interested in reviving the copra industry. Both historically and more recently, the incentive for the industry came from others meaning to make a profit out of it: the settlers saw a viable trading enterprise in the Pacific, which already served as a port between North America and their other trading enterprises in Asia; and currently, PICT governments consider it their ticket out of dependency on the global oil market, in which they have no influence. The collective switch of both project sites on Vanua Balavu and Taveuni back to the use of diesel, indicate that it was not their intention to be the biggest proponents of a switch to greener power sources. That is not to say that their intent cannot be enforced through (financial) reward, secured by the other actors holding a stake in the project.

The issue with the aforementioned case studies was that, apart from electrification, the projects held no further financial gain for the participating communities. Cases where the production of coconut biodiesel have been successful, such as Kokonut Pacific's enterprises in the Solomon Islands, had financial profits as their intent. They were set up with the intent of producing a luxury good and selling it to an international market, as opposed to personal use of the product. We know this to be a successful model, since it is identical to the model used by European settlers. The earnings from enterprises under Kokonut Pacific could be spent on wider and more diverse communal causes, rather than only on power generation. Like the initial copra trade in the 19th century, local Pacific islanders were more than willing to work for a direct - monetary or product - exchange for processing coconuts. The long term and large scale exploitation proposed by SPC's project, whether that be for economic gains or with the intent of being more environmentally sustainable, has once again not been initiated by the islanders themselves. Future notification and evaluation in the progressive phases of the project will reveal whether the targeted PICT inhabitants share the project's ideology. However, it needs to be taken into account that historical precedents could be decisive to Pacific Islanders opinions. While small scale copra and coconut oil production still occur in several PICTs, the larger scale exploitation proposed by SPC might hold a negative connotation to islanders and be reminiscent of the colonial era.

For instance, people are still encountered with reminders of the colonial copra industry. On most Pacific islands, coconut plantations still dominate the view in large parts of the surroundings. Remembrances of history are thus embodied in the landscape. Vehement about acknowledging the different perceptions the landscape can have on peoples, is Tim Ingold (1993). “In so far as both seek the past in the landscape”, a contemporary Pacific islander and a Westerner - whether that be an expat or a tourist - relate very differently to it (Ingold 1993: 153). Despite it concerning the same soil, tree and fruits, their engagement with the environment and the coconut tree is perceptual. As such, while those plantations might be quantitative and homogenous, the landscape is certainly qualitative and heterogeneous. Regarding its fruits, we have to consider that the coconut is similarly referent of past events.

In this case we need to consider the possibility of ascribing agency to the coconut. Before any type of commodification of the fruit was initiated, legends about its creation (Hina and Tuna) and the importance of its numerous uses to island inhabitants, had already established the coconut’s value as more than a natural object. The Mangaian belief that Tuna, the God of Eels, gave humans the first coconut, can justify the fruit as a divine object. This is where it becomes delicate; In Western belief systems, many objects that have such divine significance (e.g., relics) have the ability to dictate the economic, religious and social behavior of its worshippers. Millions of pilgrims each year are proof that humans are willing to spend money, time and physical effort to visit their resting places. Can we then ascribe similar capacities to the coconut? However, at this point we need to consider our own western bias towards placing objects with Godly attributes into our social networks (e.g., see Actor Network Theory by Latour 2005). The distinction here between agency and value is an intricate, but crucial one. If we attest the coconut as the source of oil, then according to Hornborg’s machine fetishism, we could assume that, like the machine, it embodies the capacity to do work; it produces and provides for us. This, however, might be a bit of a stretch. This discussion does illustrate that, regardless of the semantics, natural artifacts and resources do have crucial social consequences.

Ownership of resources that have such cultural and religious charge, ascribes the holder with a source of symbolic capital. Actors who are subject to either symbolic or economic value, however, may not be one and the same: symbolic capital is dependent on the perception of the target subject. It is unlikely that business enterprises interested in acquiring these coconuts will be subject to the power connected to the cultural value of the coconut. This

could explain in turn why Pacific islanders held little interest in considering the coconut for its exchange value (Marx); it held more relevance as a cultural and use value object than as a commodity.

6.2.4 PPA: Energy & Utilities

The final actor group, energy utilities and corporations under the PPA, will exert most of their power through the bases of reward and information. While not listed under Bourdieu's types of capitals, knowledge, information and skill regarding the maintenance and operation of oil production machinery, gives these actors considerable power. This base of power can be employed by the PPA to secure their involvement in the production. However, once divulged, informational power can no longer be used as a future leverage to regain the power position. While we can consider the PPA to hold a rank in the power hierarchy under the class domination theory, it is less obscure than SPC's position, since they are either government owned or private investor-owned. Either way, their power positions are a lot more clear, since they are either based on legitimacy in reference to their government, or on economic capital. As Foucault already indicated, the flow of biopower can as easily run through the economic sphere as it does through the political sphere. PICT urban populations are fully dependent on them to provide them with electricity from the grid. Moreover, many energy utilities corporations have been diverting from petrol by implementing alternatives for energy production, like solar PV, hydro and wind energy to off-grid rural areas (Woodruff 2007). Coconut biofuel production can now be added to this list. The aforementioned model of a Power Purchase Agreement, in which the PPA would provide the mechanical equipment, technical training and marketing logistics, would give them both expert and reward bases of power. Expert because they develop and distribute skill and technical expertise, and reward because they are the key to start up capital necessary for the project's implementation.

The social power of the actor members of the PPA is certainly linked to its accessibility to and ownership of physical power. As discussed earlier, holding the means of production, i.e. the machine, gave capitalist venturers at the beginning of the Industrial Revolution considerable power over its workforce, and ultimately over everyone who had come to rely on its capacity to provide us with a steady stream of produce or energy. It could determine how much human labor was needed additionally to the awe-inspiring might of the machine. The illusion that the machine can provide labor for us, has not only made the involvement of humans in the production process obsolete, but has also made us physically and mentally dependent. Hornborg's studies on machine fetishism poses a warning to all actors involved, how 1) we

can be blind sided by our dependency on the production of electricity - e.g., the state of emergency the Marshall Islands had to declare in 2008, because its utilities companies could no longer afford to keep its machines running - and 2) our faith in the continuous presence of oil to sustain the Pacific way of life. For however much academia like Hau'ofa contest the notion that Pacific islanders are demoralizingly dependent, much of the 'traditional' Pacific lifestyle nowadays has become highly dependent on oil: travel between the islands is commonly no longer done in traditional seafaring vessels, but via plane or ships, running on oil. This, however, does not always form an obstacle in the continuation of the 'Pacific way'[21], rather a modern addition to a lifestyle that has managed to maintain much of its traditional views on kinship and inter-connectivity in the Pacific.

6.3 Discussion

What we should acknowledge primarily, is that there are two clear levels of operation in this case; First, national governments, and the field of diplomacy in which they operate with international and regional aid agencies and energy businesses alike. This level debates and ponders on the future of the Pacific as states, and as growing economies participating on the even larger global chessboard. Academics, consultants, diplomats, ambassadors, politicians, military, financial/business agents and international donors and lending organizations all contribute and feed a continuous cycle of aid, laws, concessions, trades, investments and defense and security, whether that be financial or energy. The overarching question is whether this cycle is actually making the PICTs less or more independent? The second level concerns the people for whom they claim to work. On the second level, these policies and the like are viewed upon with skepticism. Ordinary people in the rural outer islands of the Pacific are little affected by the macro-level activities mentioned above. Contact between the business or political power centers and the people on the outer islands does not always occur on a daily basis. While internet is often available, it does not affect life there as much as it does in the urban areas.

Macro versus microlevel development is not an easy feat; the incentives and goals can often be as vastly dispersed as the islands in the Pacific ocean and any endeavors to target both levels in one go is, to say the least, a serious challenge. The previous analysis demonstrates that interconnectivity between the two levels leads to an intricate web of relations and interdependency. What this thesis contributes to the larger academic debates and

[21] There are exceptions to this general comment. For example, Tongans used to visit Uvea (Wallis) by double canoes. However, now they have to - I assume because of Maritime legislations and crossing international borders - use planes. However, there are no planes there from Tonga, the costs are high and a Visa is required, thus severely obstructing this former Pacific connectivity (Thomas Malm pers. comm.)

development of the field of alternative power sources, is a social holistic view of the implications involved in making a switch to renewable energy sources. Renewable energy is held in such high esteem and revered to be the solution to all humanity's problems, that we sometimes overlook the possibility that to many global societies it should not be a priority. Countries like the PICTs, whose emissions are already relatively small, should focus on basic electrification first in order to guarantee any kinds of social developments aimed for by aid agencies such as SPC. Issues such as gender equality and education can start to be addressed by providing lights for homework or electrical stoves for women. Top-down development, especially from the macro-level, require thorough and extensive research into matters such has been discussed in this thesis. While the scope of top-down development can be broad, its implementation policies need to be culturally and community specific. While grassroots projects with alternative energy sources are not uncommon in the Pacific, they are mainly isolated to individual islands or communities. This is what makes the Pacific such a difficult area to implement broad and top-down development projects. For while we will not call the islands isolated, it is logistically challenging to include and connect them in regional collaboration. This thesis has pointed out that social relations between the different agencies in the Pacific are an additional factor to consider, whilst coordinating such development projects.

7. Conclusion

In this thesis I set out to give an answer to the research question, *In which ways does the transition from fossil fuels to renewable energy sources, like coconut biofuel, affect and challenge the social power dynamics in the Pacific?*
In order to do this, I set out to answer my three sub-questions: 1) What is the relation of Pacific Islanders with coconuts and its derived commodity, copra?; 2) What power dynamics can we identify in the current situation for many Pacific island countries and their inhabitants? and 3) What types of social and cultural implications will the coconut project have on this power dynamic?

Whilst writing my analysis, I was reminded of a conversation I had with one of my colleagues. She was planning a trip with her two young adult sons to go visit the island of Kadavu in the Southern region of the Fiji islands. Her family had not lived on the island for over two generations, but the rules of kinship still applied: meaning, if her sons were to bring an official visit and go through the rituals and offerings of their ancestral village, they would forever have a home there if they needed it. When I asked her what some of these offerings entailed, she told me that she mostly imports large quantities of petrol and canned produce like spam, corned beef and mutton and Asian noodles. This made me chuckle, because the idea that ancient and traditional relations of kinship and reciprocity were sealed with canned meat and diesel, seemed less than romantic. But, as she said, therein lay my mistaken perception: not everything ancient and traditional needs to be a thing of the past. Pacific islanders have taken their rituals and legends along with them and have adapted them to modern life and needs.

What we have questioned here in this thesis, is whether a switch to coconut as an alternative oil source will still be able to provide for these needs in modern life in the Pacific. If we are to believe the legends, the Pacific islanders have had a fruitful relationship with the coconut. Through the ages it has provided them with food, drink and cosmetics and even the tree itself provided building materials, weapons, carrying equipments and countless more uses. When the European settlers passed by the Pacific islands on their voyages between the Americas and Asia, they saw its similar uses. The 18th century marked the start of frequent and growing exploitation of the fruit as a dried commodity, called copra. Along with other export products, the copra industry eventually led to the annexation and occupation of many of the islands across the Pacific. Therefor, the relation with both European settlers and copra held a

negative connotation for many Pacific countries. The decline in copra production and the eventual decolonization in the second half of the 20th century left many PICTs economies vulnerable and dependent on foreign aid. Since then, the stigma of the Pacific region as an isolated and dependent part of this world had led to a demoralizing relation between them and the West. Eager to break this cycle, PICT governments are therefor quite keen to break this cycle and become self sustaining, at least for their own energy production. The Coconut to Biofuel project as an attempt to both decrease government spending on expensive fossil fuels and increase economic development for Pacific rural islanders, *needs* to account for the negative connotation that the Pacific might still have towards copra, while simultaneously respect the value of the coconut.

By examining the historical and contemporary social power relations between those actors that will be involved, we have created a broader understanding of the issues that need to be addressed, or at least accounted for in its further coordination, and eventual implementation. As most development projects tend to initiate, the aim will be that no parties will stand to lose from this project. The incentive is to economically benefit all involved parties and to appease international aspirations for greener fuel alternatives. Empowerment is the goal; Empowerment of all parties involved should cut through demoralizing and sometimes degrading relations of dependency that are currently hindering attempts at social or economical development in the Pacific.

Using the coconut as an alternative source of energy has to require the acknowledgment of past events. Consequently, the coconut's significance in the Pacific questions whether revived large scale commodification is even salable to Pacific islanders. Past cases have left room for the possibility of their willing involvement, should it truly increase economic development. Thus, whilst we can conclude that the intent towards the global community, as stated by Nauru President Baron Waqa at the COP21, is driven by the Pacific's willingness to do more in the field of renewable energy, the regional reality requires its focus on other pressing matters of development as well; both for PICTs and its people inhabiting its sea of islands.

List of Abbreviations

ADB:	Asian Development Bank
CIF:	Cost, Insurance & Freight
CIRAD:	Centre de coopération Internationale en Recherche Agronomique pour le Développement
COP:	Conference of the Parties
CROP:	Council of Regional Organization in the Pacific
CSPI:	Centre for Science in the Public Interest
DME:	Direct Micro Expelling
FDA:	Food & Drugs Administration
IR:	Industrial Revolution
PEAG:	Pacific Energy Advisory Group
PICTs:	Pacific Island Countries and Territories
PIF:	Pacific Island Forum
PPA(a):	Pacific Power Association
PPA(b):	Power Purchase Agreement
PPO:	Pure Plant Oil
SIDS:	Small Island Development States
SOPAC:	South Pacific Applied Geoscience Commission
SPC:	Pacific Community: formerly known as the Secretariat of the Pacific Community. Established in 1947 as the South Pacific Commission
SPREP:	Secretariat of the Pacific Regional Environmental Program
VCO:	Virgin Coconut Oil

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