From happy hour to hungry hour: Logging, fisheries and food security in Malaita, Solomon Islands

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Front cover: Woman and children on the log pond at Ruarata, East Are'Are 2017.
Back cover: 'Cubic woman' with her timber, Waisisi, West Are'Are 2017.

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The purpose of this report is to inform the Provincial Government of Malaita of the local impacts of logging on food security and general well-being and to support it in decision-making regarding logging. This report could not have been written without support from the premier of Malaita, Peter Ramohia. Alice Pollard, Ronnie Aiwewe, Sepo Ferani, Meshach Sukulu, Margaret Batalofo, Helen Maefasia-Teioli, Chelsia Gomese, Janet Saeni-Oeta and Iven Tonafalea have also all been instrumental in the implementation of the study. Further thanks go to Hampus Eriksson, Pip Cohen, Michelle Dyer, Sarah Lawless, Joelle Albert, Hugh Govan, Gerard Persoon and Terry Sunderland for their academic inspiration and to Joe McCarter for his valuable feedback on an earlier draft as well as for thinking along. Most importantly, we are deeply grateful to the many men and women from Are'Are, Lau and Langalanga who facilitated this study by generously sharing their views and time.

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List of abbreviations

ADB	Asian Development Bank
CBRM	community-based resource management
CBSI	Central Bank of Solomon Islands
CGIAR	Consortium of International Agricultural Research Centers
EIS	Environmental Impact Statement
FAO	Food and Agriculture Organization
FRTUA	Forest Resources and Timber Utilization Act
LALSU	Landowners' Advocacy and Legal Support Unit
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MFMR	Ministry of Fisheries and Marine Resources
MOFR	Ministry of Forestry and Research
NGO	nongovernmental organization
NSO	National Statistics Office
PER	Public Environmental Report
SBD	Solomon Island Dollar
SIG	Solomon Islands Government
TA	technical agreement
TRH	Timber Rights Hearing

Executive summary

The Solomon Islands Government (SIG) has followed a logging-based development strategy for the past three decades. Despite widespread acknowledgment of the unsustainable nature of logging throughout the country and increasing awareness of its social impacts, national log export volumes have steadily increased over the past 10 years. Malaita Province has followed this trend. Logging operations are conducted by foreign (predominantly Malaysian) companies in collaboration with local licensees. These typically last between several months and 3 years, and it is common for multiple operations to take place in adjacent areas, each constructing its own log pond. Evasion of environmental regulations and financial obligations is widespread, and revenues from logging fall short of what they could and should be.

This study assesses the local impacts of logging on food security, fisheries and well-being in Malaita. It is based on qualitative interviews conducted with 172 people (84 men and 88 women) in 23 villages in Are'Are, Lau and Langalanga, between November 2016 and November 2017.

The impact of logging on food security can be understood from two complementary perspectives. During logging, the consumption of imported food, such as rice, instant noodles and canned tuna, increases because people have greater access to money through employment and royalties. However, this change is limited in duration and scope because employment in logging operations is low-paid, male-dominated, short-term and benefits only part of the local population. Similarly, royalty payments per capita are small and exclusively received and spent by men. As a result, logging money does not structurally contribute to household food security.

Meanwhile, logging negatively affects food security through the environmental damage it causes to mangroves, reefs, gardens and forests. Alarmingly, 98% of respondents (n=81) see negative logging-related impacts on coastal and freshwater fisheries. Men most frequently emphasize the decline of reef resources, which is mainly attributed to direct destruction of reefs for the construction of log ponds and wharfs, followed by the smothering of corals through increased sedimentation. Women consistently emphasize the decline of mangrove resources, which is again primarily caused by the clear-felling of mangroves during log pond and wharf construction. In addition, mangroves situated around river mouths get smothered by increased sedimentation, suffocating shells that women collect. Freshwater fisheries are impacted by disturbances from logging machinery, collapsed bridges and increased sedimentation. Oil spills are consistently reported, especially by women, to affect both freshwater and marine resources, as well as human health.

In addition, logging affects gardens by directly damaging them through road construction and felling, as well as by causing productivity problems through the spread of pests and weeds, which is facilitated by logging machinery. Further impacts are felt on wildlife and the availability of construction materials from the forest. Finally, logging activity frequently affects the supply of drinking water, both through contamination of open water sources and through direct damage of existing water supply systems. The combined impacts of logging on food provisioning and water quality put rural Malaitans' nutrition and health status at risk.

Many of the impacts on marine, freshwater and terrestrial resources remain long after logging has ceased, and the fractioning effects of logging on social cohesion compromise the collective action needed to counter them. Logging gives rise to severe social problems, including heightened levels of conflict at all levels. Logging-related disputes over land ownership, decision-making processes and benefit sharing cause deep and lasting rifts between and within landholding groups, villages, families and households. Crucially, logging reinforces gender inequity by systematically excluding women from decision-making and from sharing in the benefits, whether through employment or royalties. Women are also disproportionately affected by the environmental impacts of logging, particularly by the effects on mangroves, gardens and drinking water. A major concern is the sexual exploitation of girls and women by logging personnel. Finally, the widely reported increase in alcohol consumption associated with logging affects entire communities, especially women and children.

In its present unregulated form, logging in Malaita is environmentally and socially destructive. It undermines local food security and social integrity and does not contribute to development at either the village or provincial level.

Plate 1. Woman and child paddle from Mararo village to the log pond at Ruarata, East Are'Are 2017.

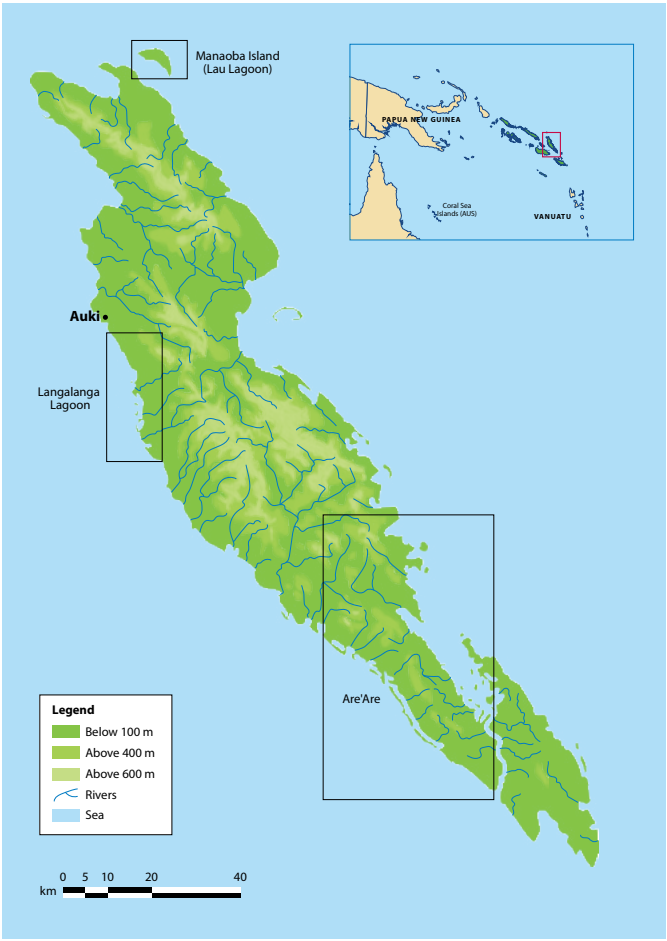
1. Introduction

How does logging impact food security in Malaita? Through a qualitative, ethnographic approach this report documents rural Malaitans' experiences with logging in relation to food and livelihoods, with a specific focus on fishing. Being the most intensively logged area in the province today, the focus is mostly on the Are'Are region. In addition, we explore past experiences with logging in the Lau and Langalanga Lagoons (Map 1).

Logging in Solomon Islands has intensified since the mid-1980s when it expanded onto customary owned land (Frazer 1997). Since then, log production has grown year after year (Katovai et al. 2015), and logging has expanded geographically from Western Province to other provinces, including Malaita. National log exports reached an all-time high in 2016, and estimates for 2017 are similar (MOFR 2017).

Given that logging is now widespread in Malaita Province, understanding its full implications is essential. While there has long been general scepticism toward the structural development benefits of logging in Solomon Islands (e.g. Frazer 1997; Albert 2014), the literature does not yet offer insights on what logging implies for food security in rural Solomon Islands. This study aims to contribute to closing this gap. It documents the opportunities that logging brings, such as jobs, increased cash flow and marketing opportunities. At the same time, it describes the threats that logging brings to food provisioning, livelihoods and general well-being as a result of its environmental and social impacts.

With a rapidly growing population, of which 80% is rural, safeguarding food security is a challenge for the country as a whole and especially for Malaita Province. The population of Solomon Islands stood at nearly 516,000 in 2009 and grew at an average annual rate of 2.3% between the two latest censuses (1999 and 2009) (NSO 2012). The projected population for 2018 is about 667,000, of which some 158,000 people (24%) reside in Malaita (NSO 2018). The province's population density is nearly twice the national average (33 and 17 people per km^2 respectively) (NSO 2012).



Map 1. Study areas.

Malnutrition is a persisting problem in Solomon Islands, notably in rural areas. Of all rural children under 5 years old, over 32% are stunted (low height for age) and over 16% are underweight. This is attributed to long-term deficiency of energy and nutrients, resulting from infectious disease or inadequate food intake, or both. At the same time, high incidences of obesity and being overweight among adults exist, which lead to a range of noncommunicable diseases (SIG 2017, 180 and 198–200; Albert and Bogard 2015; Andersen et al. 2013; van der Ploeg et al. 2016).

Fisheries are recognized as an important contributor to food and nutrition security, particularly in coastal communities (Foale et al. 2013, 175). The SIG has committed to sustainably manage its coastal and marine resources to ensure food security and livelihood development (MECDM/MFMR 2010, 9; 2013, 4). Fish is the primary source of animal protein in Solomon Islands (Bell et al. 2009, 66; Andersen et al. 2013, 10). Moreover, it represents significant economic value, with estimates amounting to over SBD 350 million and SBD 29 million for inshore coastal fisheries and freshwater fisheries respectively (Gillett 2016, 242–43). Like most Solomon Islanders, Malaitans rely heavily on fisheries for subsistence and cash. Maintaining healthy and productive fisheries is therefore vital (Schwarz et al. 2013, 11).

Logging has great downstream impacts on freshwater ecosystems (Wenger et al. 2017) and near-shore reefs (Hamilton et al. 2017; Albert et al. 2014; Peterson et al. 2012). Yet, while there is some recognition of the link between logging and fisheries at the regional policy level (e.g. Pratt and Govan 2011, 45; Chape 2006, 21), it is generally absent from national and provincial policy[1] (e.g. MECDM/MFMR 2010 and 2013; Malaita Province 2015). It is crucial to address this knowledge gap and understand and mitigate the impacts of logging operations on small-scale fisheries (Teioli et al. 2017).

Moreover, Malaitans also heavily rely on land-based activities for food and shelter (Schwarz et al. 2013). Gardens are made on forest land, and forests provide construction materials and a range of edible plants and wildlife. Crucially, intact watersheds are essential for the provision of drinking water (Wenger et al. 2018). Forests are thus essential for the maintenance of food security, health and livelihoods for people in Malaita (see also FAO 2017).

Plate 2. People crossing log pond, Waisisi, West Are'Are 2017.

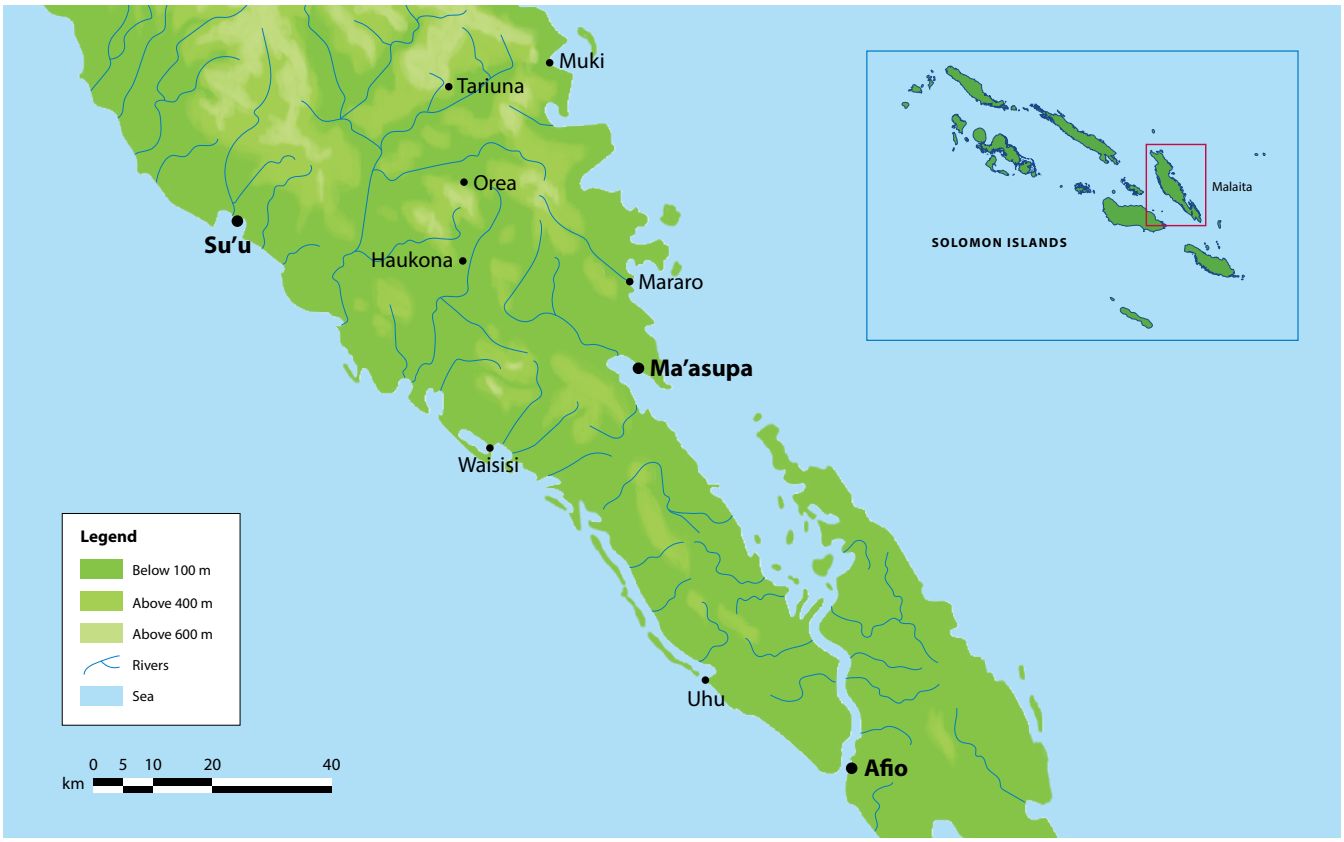
1.1 Methodology

Food security exists when all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It consists of four pillars: availability, access, utilization and stability. Availability is the supply of food through production, distribution and exchange; access is the affordability and allocation of food, as well as the preferences of each member of the household; utilization is the metabolism of food by individuals; and stability is the ability to obtain food over time (FAO 2017, 11).

Interviewing Malaitans on logging and food security naturally implies discussing how logging relates to livelihoods and well-being more generally. This wider context is crucial for understanding people's perceptions on logging, as well as how it affects food security. This report therefore addresses the questions of how logging (1) changes the availability, accessibility and consumption of food, (2) impacts rural livelihoods, particularly fisheries, and (3) affects well-being at the individual, household and community levels.

To understand the long-term implications of logging on food security, we selected sites where logging happened relatively long ago (Bina Harbour in Langalanga Lagoon and Manaoba Island in Lau Lagoon) and sites where logging is currently ongoing (West, East and Central Are'Are) (Maps 1 and 2).

In each site, consent to conduct this study was first sought from the village chief and/or the leader of what is locally referred to as the "tribe" (clan).[2] We emphasized that our purpose was to involve the widest possible range of views and experiences. In some cases, the chief decided to call people together in order for the principal researcher to explain the purpose and contents of our study and for people to ask further questions. During these gatherings, Pidgin was used to provide information, which was in some cases translated in the region's language by locally hired assistants. In addition, written or verbal consent was sought from each individual informant to use the information and views provided in this report. While the basis for this consent was for information to be presented anonymously, several informants insisted that their names be used. Thus, where quotes and images in this report are accompanied with names, this has happened on the explicit request of the informants. Otherwise, each quote is referenced as personal communication, followed by the respondent number and the date of the interview.



Map 2. Are'Are region.

A total of 172 people (84 men and 88 women) from 23 villages[3] in the above mentioned research areas were interviewed for this study. We have taken an ethnographic approach, with a focus on qualitative semi-structured interviews centered around our informants' ability to earn an income from logging, the way logging changed their diets and the way it changed their fishing and other livelihoods. In addition, general information was collected about the past and present of logging operations in each site. This included information on the period of operation, employment, benefit sharing agreements and decision-making procedures. Interviews were held in villages, on log ponds and in logging camps. Depending on the situation, informants were interviewed individually or in small groups. In the presentation of the results, however, the information given is traced back to people's individual views and experiences.

In addition, government officials from the Provincial Government of Malaita and the ministries of Environment, Climate Change, Disaster Management and Meteorology (MECDM), Forestry and Research (MOFR) and Fisheries and Marine Resources (MFMR) were interviewed on their views regarding logging food security and development, and to obtain secondary information on logging operations.

This report is structured as follows: the next chapter briefly sketches the past and present of logging in Solomon Islands and Malaita. Chapter 3 looks into the local impacts of logging operations, detailing both the ways in which our informants (hope to) benefit from logging, as well as the ways in which it affects their well-being. Chapter 4 presents results on the relationship between logging and food security by looking at how logging changes what people earn and eat and how it affects core livelihoods, fishing in particular. Chapter 5 discusses our main findings in relation to the literature, presents the conclusions and offers a number of recommendations.

Plate 3. Nahu village next to log pond, Waisisi, West Are'Are 2016.

2. Logging in Solomon Islands and Malaita

The history of logging in Solomon Islands dates back almost a century, but the industry has greatly intensified over the past 40 years. On Malaita, logging long took the form of extensive sawmilling operations. The first large-scale commercial logging operation started 1982. We will here describe some key characteristics of the logging industry in Solomon Islands and Malaita, as well as discuss several widely held assumptions regarding its economic importance. Next, we will provide an overview of the various case studies that form the basis for this report.

2.1 Solomon Islands

The first logging operations in Solomon Islands took place on colonial state-owned land in the 1920s and continued to take place exclusively on government land until the early 1980s (Katovai et al. 2015). These operations were carried out by a small number of logging companies, in a few isolated locations and under close government supervision. Since the mid-1980s, a different approach was taken that allowed logging to shift onto customary land, which opened the way for foreign, often undercapitalized, companies that operate throughout the country virtually without oversight (Frazer 1997). Initially, most logging activity was concentrated in Western Province, but over the past decade it has expanded to most other provinces, including Malaita.

In contrast with other timber producing countries, most of which only allow for the export of sawn timber, in Solomon Islands the logging sector mainly revolves around the export of unprocessed round logs (Sinclair Knight Merz 2012, i), of which China is the main recipient (MOFR 2014). Presently, the logging sector is dominated by Malaysian-owned logging companies, who are facilitated by Solomon Islander license holders to operate on customary owned land.

The MOFR is responsible for overseeing the management and exploitation of the country's forest resources. It uses two main instruments to regulate logging operations. First, the Forest Resources and Timber Utilisation Act (FRTUA), which was enacted in 1969, is meant to control and regulate the timber industry (MOFR 1970). It also lays out (in Prescribed Forms 1–4) the procedures for obtaining consent from resource owners to operate on their land, of which the Timber Rights Hearing (TRH) is both the most important and the most contentious step. Second, in 2002 the then Ministry of Forests, Environment and Conservation issued the Code of Logging Practice, which spells out key standards for sustainable logging practices (SIG 2002).

The poor enforcement of forestry legislation is widely recognized and is a longstanding problem (see for instance Frazer 1997; Allen 2008; Allen and Porter 2016). Moreover, although the FRTUA has been revised and amended since 1969, it remains "a complex, unwieldy instrument" with "potential for misinterpretation" (ADB 1998, 53), and it "does not cater for modern conventional logging practices" (Pauku 2009, 18). Attempts to come up with a more effective and regulatory instrument have, however, failed: both the 1999 Forest Act and the 2004 Forest Bill were drafted but never enacted (Allen 2008, 286–87) "because the logging lobby perceived it to be against its interests" (Baines 2015, 2).

In addition, logging is in principle also regulated through the Environment Act (MECM 1998). Under this act, all "proponents of development," including logging applicants, must have clearance from the MECDM in the form of "Development Consent." This clearance is given out after the applicant has demonstrated that the environmental impacts of the proposed activities will remain within the limits set by the MECDM. The Environment Act offers two main routes through this process, namely the Environmental Impact Statement (EIS) or the Public Environmental Report (PER), which differ considerably in terms of the depth and scope of the required assessments. While the EIS requires applicants to provide a full description and analysis of the proposed activity, its environmental impacts and the planned mitigation measures, the PER is a much lighter and more limited undertaking.

The director of the Environment and Conservation Division of the MECDM decides which of these two routes is chosen, based on his assessment of the expected environmental impact of the proposed activity (Environment Act sections 17.2 a&b, 17.5, 20, 23; MECDM 1998). While it might be expected that based on such a criterion any logging applicant must provide a full EIS (see also RSIPF 2015, 48), the director commonly requests for the PER instead, as we will further illustrate in Chapter 2.

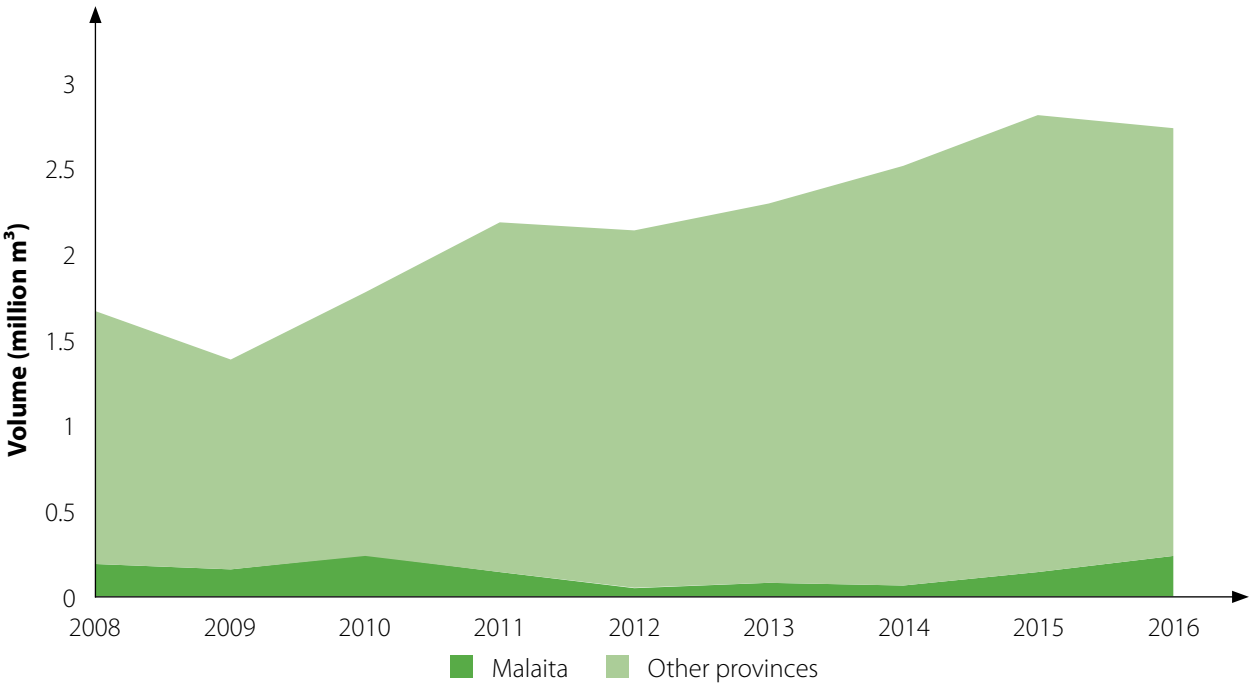
The logging industry in Solomon Islands is often presented as a "sunset" industry. That is, over the past decade the imminent collapse of round log exports

has repeatedly been predicted (e.g. CBSI 2009, 7; CBSI 2010, 7; CBSI 2011, 9; Shearman et al. 2012, 18; MOFR 2017, 19; Laungi 2018a). However, this projected downfall of the forestry industry does not match with reality (Sinclair Knight Merz 2012, iv). On the contrary, the number of operational logging licenses has increased from 92 in 2010 to 156 in 2016 (MOFR 2017, 23), and log production has grown year over year (CBSI 2015, 4; CBSI 2016, 4) (Figure 1).

This growth of log production has happened despite alarm raised over the highly unsustainable nature of the logging industry (e.g. Kabutaulaka 2000; Pauku 2009). According to the MOFR (2017, 19), national forest cover declined from 90% to 78% between 1990 and 2015. In its 2011 Forest Resources Assessment, Sinclair Knight Merz warned, "[…] the potential environmental consequences of the current exploitative logging practices should be considered carefully. They are most likely already contributing to changes in essential ecological functions and the provision of ecosystem services such as provision of clean water, flood mitigation, protection from erosion, food provision, carbon storage, and maintenance of cultural heritage. In the longer term, they may lead to irreversible loss of productive capacity timber and other ecosystem goods and services" (Sinclair Knight Merz 2012, 25).

Yet, premature reentry logging is widespread and logging in remote rugged terrain is increasingly common (Katovai et al. 2015); average log-size has decreased from over 3.7 m^3 per round log in 2011 to 2.8 m^3 in 2017; and despite their protected status, forests in areas above 400 m are currently threatened by logging (MOFR 2017, 19–20). In 2016, the estimated volume of total log exports[4] was almost 11 times the estimated annual sustainable cut of 250,000 m^3. The permanent secretary for forestry, Mr. Vaeno Vigulu, has warned that if this trend continues, "the country has no option but to export undersize logs." (Laungi 2018b).

Importantly, there are also serious countrywide concerns surrounding the social sustainability of logging. As noted by the MOFR itself, logging causes social disruption in many forms (Raomae 2010). The uneven distribution of the royalties accruing from logging within and between communities and the increased availability and consumption of alcohol lead to heightened levels of conflict (Kabutaulaka 2000; Allen et al. 2013). There is increasing evidence that women are, in general, negatively impacted by logging, as they lack decision-making power in logging negotiations and logging labor and because earnings are a male affair (Dyer 2017). Moreover, there are alarming reports on the sexual exploitation of women and girls in logging concessions (Herbert 2007; Allen et al. 2013), and on (teenage) pregnancies resulting from sexual relations between logging personnel and local women and girls (John 2017). While concerns over these issues were already raised decades ago (e.g. Frazer 1997), they have so far received very little attention in discussions about logging. In this study, we will provide new evidence from Malaita to demonstrate the urgency of the problems.



Source: MOFR 2017

Figure 1. Estimated log exports from Solomon Islands by province (2008–2016).

Plate 4. Logging barge, West Are'Are 2018.

Plate 5. Steamer loading logs, West Are'Are 2015.

Plate 6. Steamer loading logs, West Kwaio 2018.

The contribution of logging to the national and local economies

The environmental and social sustainability concerns associated with logging tend to be sidelined by its presumed importance to the national and local economies, and a logging-based economy has since long been advocated by successive governments[5] (Frazer 1997; Bennett 2002; Allen and Porter 2016). The message that Solomon Islands is kept afloat by its timber exports is widely sent out in national statistics (CBSI 2016 and 2017), policy documents (Pauku 2009), media (Osifelo 2016; Smethurst 2018), and government statements (SIG 2016, 17).

It is, however, hard to substantiate such claims because detailed breakdowns of the sources of government revenues are lacking (e.g. Ministry of Finance 2015, 3 and 2016, 7). Moreover, figures presented vary greatly depending on the source. For instance, in the National Development Strategy 2016–2035, the SIG presents the forestry sector as "the most significant revenue earner of the country" (SIG 2016, 17) and according to the MOFR (2017,16) logging contributes "50%–60% to Government Revenue annually through timber export and employment." This is in great contrast with recent figures presented by the World Bank that put the share of domestic government revenue from logging at about 18% for 2015, which exceeded all previous years (World Bank 2017, 71).[6]

Moreover, it is widely understood that the contribution of logging to the national economy falls far below what it could and should be (ADB 2012; World Bank 2017). Most of the timber value leaves the country: logging companies retain 60% of the log export value of each shipment as determined by the Customs and Excise Division.[7] Another 25% of the determined export value consists of export duties.[8] However, over an extended period since the 1980s, lost government revenues have amounted to tens, possibly hundreds of millions of Solomon Dollars each year. This is caused by a combination of two main practices: firstly, tax-exemption measures that benefit the logging industry and its political allies, and, secondly, transfer pricing,

which is the systematic undervaluing of the price of logs in favor of log-exporting companies (Bennett 2002, 10 and 12; Allen 2008, 290–91; Laungi 2018 c, d; Mousseau and Lau 2015, 10).

Another commonly held assumption is that logging fuels the local economy through employment and royalty payments. Again, detailed figures that underpin such assumptions are lacking. Moreover, various studies suggest that the logging industry's actual contribution to local employment is low (Katovai et al. 2015; World Bank 2017, 45 and 56). Also, local royalty shares are limited and rarely used for structural investments in rural development (Frazer 1997; Kabutaulaka 2000; Dyer 2017). The only study that has ever attempted to quantify the contribution of logging money to household income was done in the early 1990s and estimated that commercial logging provided a 15% increase in average household income for 12–18 months (Fitzgerald and Schoeffel 1991 in Frazer 1997, 9). A more recent survey of sources of income among over 3400 respondents (including 1100 Malaitans) found that only 0.1% of respondents reported logging as an important source of cash income (ANU-USP 2013, 76). Our findings confirm the impression that the contribution of logging to the local economy is far below what is often suggested.

2.2 Malaita

The first logging operations on Malaita consisted of locally operated, small-scale sawmilling operations in Langalanga Lagoon and northeastern Kwara'ae. At least one of these, in Buma (Langalanga), was mission-based, while another one in Bina Harbour was a cooperative. We traced the start of these milling operations back to at least the 1970s. Large-scale industrial logging in Malaita took off in 1982 (Frazer 1997, 11) and further intensified in the course of the 1980s and 1990s. In comparison to other economic sectors, the logging sector was relatively unaffected by the "tension" (Pauku 2009, 4)—the period of civil conflict and disorder that befell the country from 1998 to 2003 (Allen et al. 2013). Indeed, as will be illustrated with examples from Lau Lagoon, it seems that the chaos and power vacuum brought about by the conflict facilitated the logging sector.[9] While log export intensity in Malaita has fluctuated a bit, it shows an overall increase over the past 10 years in line with the national figures, and especially since 2014 (Figure 1).

Information provisioning on logging operations in Malaita is highly untransparent. The Provincial Office of the Ministry of Forestry listed a total of 17 logging operations in Malaita for the period 2015–2016 (MOFR 2016) and this number has allegedly increased to 20 in 2017 (Saeni 2018). However, information on each operation's location and harvesting plan is very hard to obtain. The situation on the ground is similarly unclear, and often various companies operate within close vicinity of each other (Plates 7a–f). Logging companies typically operate for only several months to a few years. Many leave suddenly and without fulfilling damage compensation and rehabilitation requirements. Premature pullout is often the result of conflicts with landowners over benefit sharing, delayed payments and damage.

Several respondents have described the situation as "hit and run." Application procedures are rushed or even foregone, including key processes like the PER/EIS, TRH and the associated negotiations between licensees, companies and landowners over the terms and conditions of the operation. While the Operations Section of the Provincial MOFR office is mandated to monitor logging operations, it lacks staff, capacity and support to do so. As a result, environmental safeguards as laid out in the Code of Logging Practice are neglected, resulting for instance in the clearcutting of standing (mangrove) forests right up to the shoreline for log pond and wharf construction, improper road and bridge construction, and a lack of post-logging rehabilitation. Equally problematic is the lack of regard for the impacts on resident communities, which will be further illustrated in the upcoming chapters.

The Provincial Government of Malaita struggles with this fast expansion of largely uncontrolled and highly exploitative logging and the increasing environmental and social costs that it brings. Its inability to regulate logging on the ground fits with a general lack of local-level government impact or presence, which must be seen in the context of the poor support of Malaita's provincial government organizations, unpredictability of funding, lack of oversight, understaffing, low motivation (Park et al. 2014, 133 and 137) and financial mismanagement. The provincial authorities feel overpowered in decision-making on logging operations, and there is deep dissatisfaction about the fact that log export revenues do not flow back to the province. Meanwhile, the province has been unable to ensure that companies and licensees pay their yearly logging fees, which are to be paid to the province. This resulted in a total outstanding amount of SBD 4 million worth of provincial logging fees as of May 2016. In addition, in 2017 only six out of 20 logging operations active in Malaita paid their license fees, representing a loss of provincial revenue of SBD 2.1 million for that year alone.[10]

Plates 7a-f. Various log ponds in Maramasike passage, West Are'Are and East Are'Are 2015–2017.

2.3 Case studies

We now turn to a description of the past and present of logging in the research areas (Table 1). The period in which logging took place varies between cases, and this time gradient allows us to understand the impacts of logging both during and beyond operations.

Area/Sites	Operations		
	Period	Name and origin of contractor	Type
Langalanga Lagoon			
Bina Harbour	~1975–1998	Rafea & Kwaleuna Sawmilling Company (Solomon Islands)	Small-scale, manual selective logging and sawmilling
	1989–1991	Rafea & Kwaleuna Sawmilling Company; Mahoy Brothers (New Zealand)	Selective helicopter logging
	1994–1998	Rafea & Kwaleuna Sawmilling Company (Solomon Islands); Keith Douglas (Australia)	Small-scale selective logging
Lau Lagoon			
Manaoba Island	~1995	Unknown	Small-scale selective logging (one species)
	~ 2000–2001	Unknown (Malaysia)	Industrial clear-felling
West Are'Are			
Waisisi to Haukona	2003–2006[a]	Oceana Trading Company (Malaysia)	Industrial selective logging
	December 2014–present	Rite Trade Pacific (Malaysia)	Industrial selective logging
Uhu	November 2015–present	Sunway (Malaysia)	Industrial selective logging
Wairokai	2007–2009	Sam Lim San (Malaysia)	Industrial selective logging
	2010–2012	Glen Gro (Malaysia)	
	2016	Glen Gro (Malaysia)	
East Are'Are			
Amota'a	2009–2012	Sam Lim San (Malaysia)	Industrial selective logging
Honoa	2015–2016[b]	Sunway (Malaysia)	Industrial selective logging
	November 2017–present	Galeko (Malaysia)	Industrial selective logging
Mararo/ Raroasi	1998[c]	Oceana Trading Company (Malaysia)	Industrial selective logging
	March 2017–present[d]	Mega (Malaysia)	Industrial selective logging
Muki/ Waima'aka to Orea	2015[e]	Pacific Ventures (Malaysia) Apex (Malaysia)	Industrial selective logging
	2016–present 2011–present	Rite Trade Pacific (Malaysia) Sam Lim San (Malaysia)	Industrial selective logging

[a] Court order stopped operation because people were dissatisfied with the benefit sharing agreements.
[b] Terminated prematurely as a result of alleged financial problems and conflict with landowners over benefit sharing.
[c] Terminated prematurely after landowners did not give permission to transport logs through a sacred site.
[d] Operation is being contested.
[e] Terminated prematurely because landowners did not accept the conditions of the operation.

Table 1. Past and present logging operations in research areas.

Langalanga Lagoon: Bina Harbour

Experiences with logging go back furthest in Bina Harbour (Langalanga Lagoon). Interestingly, Bina also constitutes the only example that we have come across on Malaita where the operation was (at least initially) solely Solomon Islander-owned and involved a significant sawmilling business, generating substantial local employment.

The Rafea & Kwaleuna Sawmilling Company was a cooperative with shareholders, which was set up in 1974 and closed down in 1998. It started off with a small portable sawmill imported from Australia, and harvesting focused on lowland forests within around 1 km of the sawmilling area. After several years, a large permanent sawmill and logging machinery were bought and a log pond was set up at Bina Harbour, which increased the efficiency and scope of the operation. At this stage, the number of local people permanently employed amounted to about 70 people, with an additional 20 working in shifts. By the late 1980s, the lowland areas surrounding the sawmill had been harvested of mature trees, and from 1989 to 1991 the enterprise shifted to higher ridges through helicopter logging, operated by the New Zealand Mahoy Brothers. From 1991 to 1994, the focus shifted again to skidding and sawmilling in the lowlands, but by 1994 a small-scale logging operation was initiated.

This operation suffered from competition from a number of foreign-owned commercial logging operations immediately to the south in West Kwaio. These included the highly controversial Kayuken Pacific Limited operation, which was investigated by the ombudsman, who found that through mediation of local politicians the logging license was given out illegally, for a quota three times the volume recommended by the Forestry Division (Frazer 1997, 6). Kayuken continued nonetheless and as many landowners considered the Bina-based logging operation too slow, they made their land available to the competing company, which they expected to generate money more quickly. After 24 years of operation, the Rafea & Kwaleuna Sawmilling Company closed down in 1998, forced out of business by log-exporting companies.

Lau Lagoon: Manaoba Island

Two operations have taken place on Manaoba Island. The first of these, which is only remembered by some informants from the villages of Hatodea and Fumamato'o (situated on the eastern and western sides of the island), is said to have lasted a few months in 1995. It involved the selective cutting of a specific species, by an unknown foreign operation. The second operation happened during the tensions and is widely remembered as fast and intense: in less than a year, a Malaysian company, in collaboration with the licensee, a local politician and businessman, clear-cut large parts of the island to harvest an unrestricted variety of locally and internationally valuable species. This operation echoes the situation on Ndai Island, 40 km to the north. In the early 1990s, Ndai Island Sawmill Limited obtained a license to cut and ship 12,000 m^3 of round logs. It took a year (1992–1993) and two shiploads to log the island, which has a surface area of 17 km^2 (Frazer 1997, 12).

West Are'Are: Waisisi to Uhu

West Are'Are had a strong anti-logging movement in the late 1980s and early 1990s (Naitoro 1993 *In* Frazer 1997, 65), but over the past 15 years it has been among the most intensively logged areas in Malaita Province. For this study, we focused mostly on the Waisisi Harbour area, which is situated just north of the West Are'Are Lagoon and consists of a bay that is connected with the open sea through a relatively narrow passage. Interviews were held with people in the four main villages surrounding the bay: Surairo, Kopo, Nahu and Country Side.

Over the past 15 years, two Malaysian-run logging operations have taken place in Waisisi Bay. The first of these started in 2003 and was operated by the Oceana Trading Company (OTC), which constructed a wharf and log pond in the bay adjacent to the village of Nahu. The operation was meant to last three years but ended prematurely as conflicts over benefit sharing agreements arose between landowners and the company as well as among landowners. A second, still ongoing operation started in late 2014 and is being implemented by Rite Trade Pacific. Given the dissonance over the earlier operation by the OTC, the start of the Rite Trade Pacific operation met with strong resistance from a portion of the landowners who lined up along the edge of the log pond to prevent access. Although the logging proponents were eventually successful in facilitating the landing of logging machinery, the operation remains controversial. Presently, the Rite Trade logging road extends to the village of Haukona.

In addition to Waisisi, interviews with logging personnel and licensees at the log ponds and logging camps of Wairokai and Uhu (respectively situated at the northern and southern tips of the West Are'Are lagoon) have also informed this study. Again, the companies implementing these operations were

Malaysian-owned. The operation at Wairokai (by Glen Gro) was in the process of preparing for its final shipment and was pulling out prematurely after operating for less than a year, as a result of landowners' dissatisfaction with benefit sharing practices. This operation was the third in Wairokai and had been preceded by another one by the same company (2010–2012), and by Sam Lim San (2007–2009). The Uhu operation (by Sunway) started in late 2015 and was ongoing during the time of study.

East Are'Are: Mararo to Muki

As the relatively accessible forests of the western side of the Are'Are region have been intensively logged over the past 15 years, logging companies increasingly seek access to the region's steeper, rougher and remoter east side. Interviews in six villages in East Are'Are showed that at least eight different operations have taken place so far, all of which were implemented by Malaysian companies.

The first of these dates back to 1998 and lasted very briefly. The company wished to transport the logs through the sacred site (locally referred to as *tambu* areas) of Su'u Pauru at Mararo but failed to negotiate access with the village leadership. After this unsuccessful attempt, the next operation only started over a decade later, farther to the north in Amota'a, and was implemented by Sam Lim San from 2009 to 2012. In 2015, Sunway landed logging machinery for an operation in the nearby village of Honoa for which a log pond was constructed adjacent to the village. The company withdrew unexpectedly in late 2016 following disputes with landowners over benefit sharing and, allegedly, financial problems. A year later (November 2017), a new company, Galeko, landed machines in Honoa for an operation that is ongoing.

In March 2017, Mega started an operation near Mararo, which met with resistance from part of the local population. A formal complaint was filed to the MECDM in April 2017 on the grounds that the machines landed before the PER was publicly presented and that it contained erroneous information on the affected area. Despite the complaint, as well as media coverage on the damage that Mega causes to mangroves and reefs in Mararo (see Saeni 2017a), the ministry has not yet formally responded and the operation continues as this report went to press.

Farther north, several logging operations have taken place in the past, while Malaysian companies Rite Trade Pacific and Sam Lim San presently operate from two log ponds that are situated closely together in

Plate 8. Woman at Ruarata log pond, East Are'Are 2017.

Muki and Waima'aka. The larger of the two, Rite Trade Pacific, has recently extended the main logging road heading west as far as the villages of Tariuna and Orea (Map 2).

This chapter has shown that a logging-based development strategy has been promoted for decades but that its real contribution to the national and provincial economies is arguably much lower than is often suggested. It was also discussed how longstanding and repeated predictions of the imminent collapse of the logging industry are inconsistent with the reality of log production, which has grown tremendously over the past decade, at a high environmental and social price. The characteristics of operations in Malaita that serve as case studies for this report reflect the short-term and uncontrolled nature of logging.

Plate 9. Log pond Uhu, West Are'Are 2016.

Plate 10. Logging camp Waisisi, West Are'Are 2017.

3. Local impacts

The previous chapter has described several key characteristics of the logging industry at the national and provincial levels. We will now discuss the local impacts of logging, namely the expected and actual benefits that it brings, as well the social costs felt in different spheres of village life.

3.1 Benefits

At the village level, people welcome logging for different reasons, all of which have to do with the promise of a better life. This includes money, jobs, roads and services. Although people's strong desire for these things is to be taken seriously, logging companies generally fail to live up to their promises, which leads to overall frustration and conflict.

Royalties and access fees

As mentioned in Chapter 2 landowners receive 5%–10% of the export value of each shipment of logs, depending on their agreement with the licensee. In some cases, additional, ad hoc arrangements are negotiated for the payment of access and anchorage fees and log pond rental. Reported amounts for such fees range from SBD 10,000 to 25,000, but it is always unclear who receives them and on what basis. These royalty payments and other fees are promoted as the number one benefit to landowners by proponents of logging. However, large as the amounts may sound, the actual money received per capita is small. In each operation visited, some informants claim not to have received any royalties, while most report having received amounts below SBD 100 per head per shipment, with many operations resulting in only one or two shipments.

This is so for several reasons. First, in their negotiations with the licensee on whether their share consists of 5% or 10%, the landowners are at the mercy of the licensee's goodwill. Second, the fairness of the calculations behind royalty payments is questionable because they are based on reported international market values, which are known to show a downward distortion as a consequence of transfer pricing (see Chapter 2). Third, the uneven distribution of royalty payments between landowners is a grievance in all sites visited. The consistent picture emerging is that a handful of influential men receives a disproportionate share while the majority receives nothing or very little. Finally, even if the amounts are shared equally between landowners, the large number of people who can claim clan membership implies that individual people's share of the pie is inevitably small.[11]

Thus, the much-anticipated royalty payments generally fail to generate structural benefits at the village level. Looking back on the logging operation on Manaoba Island (Lau Lagoon), one male respondent remembers, *"There were royalties but they had to be divided between all [. . .] tribes that come under the main tribe. They [the royalties] were immediately spent on food, clothes, and things like radios. There were no long-term investments. The money was not used for roofing, not for boats, not even for school fees. The company did not give any education on how to spend money well: the money did just come in and we did not know how to use it wisely"* (pers. comm. respondent 70, February 24 2017).

Jobs

Given the very limited job opportunities countrywide, and notably in the remote rural areas where logging takes place, the promise of job generation is another major reason to welcome logging. However, the local workforce is limited in size relative to the total village populations affected by logging operations. Moreover, as logging companies show little commitment to train their local workers, most jobs on offer are unskilled, low paid and short term. We will here first discuss the general logging labor recruitment situation and then turn to the characteristics of local logging employment.

Logging labor recruitment

Logging concessions in Malaita operate on labor recruited from three main sources. First, being foreign-owned, companies import a workforce of skilled laborers and management personnel. These employees, who predominantly originate from Malaysia, the Philippines and Indonesia, are the concession managers, human resource personnel and machine operators. Second, a crew of skilled Solomon Islanders, who mainly work as chainsaw operators, trimmers and scalers, is hired directly by the company in Honiara. These "Solomon Boys," as they are locally referred to, are usually young and single, though some bring their families. Third, local labor is recruited from among the resource owners whose land is being logged as well as from neighboring villages.

Based on interviews with foreign logging operation managers and local employees, we assessed the number of employees per category for eight recent logging operations in West and East Are'Are (Table 2). On average, each operation recruited 16 foreign, 24 national and 36 local workers. It must be noted, however, that the size and composition of the workforce frequently changes, and especially the local workforce is highly unstable, with the number of employees fluctuating on a daily basis.

Location	Period	Company	Number of employees		
			Foreign	"Solomon Boys"	Local
West Are'Are					
Uhu	2015–present	Sunway	15	10	30–40
Wairokai	2016	Glen Gro	9	10	20–30
Pipisu	2016–2017	Pacific Ventures	12	15	40–50
Waisisi	December 2014–present	Rite Trade Pacific	25	15	40–50
East Are'Are					
Honoa	2015–2016	Sunway	15	6	30–40
Raroasi	April 2017–present	Mega	9	2	20–30
Muki	2016–present	Rite Trade Pacific	31	111	65–75
	2011–present	Sam Lim San	12	20	5–10
Average			**16**	**24**	**36**

Table 2. Foreign, national and local employment in logging operations in Malaita.

Plate 11. Indonesian machine operators at log pond at Waisisi, West Are'Are 2017.

Local logging employment

Information on local logging employment was collected for 67 individuals from 45 different households. For each of these households, information on employment in logging was listed by asking if the respondent or any other member of the household was currently or ever employed in logging operations. If individuals had various jobs in logging over time, only the most recent one was included in the analysis. Table 3 summarizes the main types of logging employment that emerged from these interviews.

Local logging employment is predominantly unskilled and therefore low paid. Of the jobs held by the 67 individuals, almost 63% fell in this category, with security guard (of logging machines in the forest and on the log pond) being the most frequently held position, followed by surveyor (both for road construction and tree felling purposes). Less than 20% of the individuals held jobs involving skilled labor, the most important one of which is chainsaw operator. Finally, a few people are in some way involved in operation management, which is usually rewarded with a certain amount per m^3 of shipped logs. Employment is usually short term, ranging from 3 months to 3 years, but typically lasting less than a year. Wages slightly vary per job and company, but for unskilled labor roughly follow minimum wages (which stood at SBD 4/hour at the time of fieldwork) and a 6-day workweek, with overtime fees for night and weekend shifts. While a few permanent workers become members of the National Provident Fund (NPF), thus building up a pension, most are hired on a casual basis and do not receive such benefits.

A key characteristic of logging employment is its sharp gender division: with the exception of care work (cooking, washing, cleaning), which is exclusively done by women, all jobs are held by men. Depending on its size, three to six women are hired per operation. Female employees report longer working days than their male colleagues, of up to 13 hours a day. It is common for female workers to work 6 to 7 days a week. The laundry and kitchen girls are locally hired, and mostly are very young and single, living with their parents. The chief cooks are often pre-hired and arrive together with the foreign workers and the machinery. They live in the logging camp beside the kitchen, with little privacy and sometimes without a lockable door. Some of them have traveled the country with logging

Type of employment	Total % (n=67)
Unskilled labor	
Security, surveyor, guide, crew (excavator, bulldozer, chainsaw), S-hook, cleaner, cook	62.7
Skilled labor	
Chainsaw operator, welder, trimmer, scaler, timber control officer, personnel officer, excavator driver, timekeeper, skipper	19.4
Management	
Trustee, secretary of the licensee, land coordinator, committee member	17.9
Total	**100**

Table 3. Local logging employment.

Plate 12. Employee of Rite Trade operation at Waisisi, West Are'Are 2017.

Plate 13. Employee of Rite Trade operation at Waisisi, West Are'Are 2017.

Plates 14a–b. Logging employees' housing in logging camps West and East Are'Are 2017–2018.

companies for years, serving the foreign workers in different logging operations.

A further characteristic of labor recruitment is that it favors coastal over highland communities. As log ponds are constructed along the coast and roads are built from there, most vacancies have already been filled once operations reach the highlands, often despite earlier promises that highland people would be hired.

Both male and female workers frequently experience delays in payment, and some informants have reported underpayment. The harsh circumstances, low wages and long working hours, which inhibit undertaking any other significant economic activity, make logging employment not so attractive after all. Several informants pointed out that a day spent fishing, marketing garden products, copra making, carpentry or timber milling generates more money than a job at the logging company.

Development aspirations

Despite being aware of the low benefits from royalties or jobs, people in the remote rural areas of Malaita have other aspirations that they hope logging companies can help them achieve. Generally, these are things that government fails to provide: roads, clinics, schools, water systems and housing projects. Through mediation of the licensee, landowners can negotiate with the company about these and other benefits. In theory, the outcome is laid out in the technical agreement (TA), but in practice they often remain verbal, nonformalized and therefore prone to nonfulfillment. Table 4 summarizes the benefits as promised and fulfilled by logging companies based on people's recollections of the agreements made.

Road construction is the most important of these promises. Accessibility is a major issue in all research sites, and most of all in the Are'Are highlands. In villages that were very recently connected to a logging road constructed by Rite Trade Pacific, enthusiasm over the newly gained access is great:

"The road is very important, because before, if someone was sick, we had to make a bed of sticks to carry the person down to Manawae" (pers. comm. respondent 148, November 24 2017, old man in Tariuna).

"Before the road came, life was hard. […] We women, when we were pregnant we had to walk down to the clinic in Manawae. Now we can just ride on the truck" (pers. comm. respondent 150, November 24 2017, young mother in Tariuna).

"Our sisters have died from problems in childbirth. […] But now it is easier to get [to the clinic] because of the road" (pers. comm. respondent 147, November 23 2017, young father in Tariuna).

In addition to access to medical services, an often-mentioned advantage of roads is that goods can be transported from the coast to highland villages by truck, rather than on foot, which relieves people from the burden of one or two days hiking with heavy loads. Moreover, landowners anticipate that once operations are over, the government will maintain the roads. These are then hoped to literally pave the way for key services like clinics and schools and facilitate agricultural development by creating farm to market access. These high expectations as well as the direct way in which they are fueled by logging licensees, trustees and foreign operation managers can be sensed from the following reflections:

"We accept logging for our lives. Access is very important. The road and the trucks will ensure that the people on top can use gravel and cement for making toilets there. And the roads that will be constructed can help for marketing cash crops, like coffee or cocoa" (pers. comm. respondent 90, April 4 2017, trustee from East Are'Are).

"There are no long-term benefits from logging yet, but we want to make plans for the future. Road access is really our main aim for the future, but at this stage it's just a dream. We are […] in a position to link the highlands to the coastal areas and the towns. We also want the government to assist us in help building a school and a hospital. It is only big thoughts right now; the real work must still happen" (pers. comm. respondent 124, May 10 2017, man from Waisisi).

"We must plan for what comes after logging. The people focus too much on the immediate volume [of logs]. There is some money coming in, but it is only small money, these are not the real benefits. In the short term the bush is spoiled. The real benefit comes only after logging; logging is only the beginning of development. At Waisisi we are now working on this: it is now in the government system and budget as EGC [Economic Growth Centre]. Just three weeks ago a delegation went to Honiara to finalize the contract for a hospital that will be built here. When the people in East Are'Are heard about this they consented the last areas needed for another logging operation. That operation will also allow for the construction of the connecting road [from East to West]. [However] [t]he road that is to be constructed by the company follows a different route than the connecting road. I asked the Commissioner of Lands about this too; he is from here. He

Location	Period	Company	Expectations based on verbal agreements (other than royalties)	Benefits in practice as reported by informants [a]
Lau Lagoon				
Manaoba Island	~ 2000–2001	Unknown	1. A good road 2. Clinic 3. Housing project 4. Church 5. School	1. Road was not properly built and is now only a bush track 2. Clinic was not built 3. Housing project was not implemented 4. Church was not built 5. School was not built: company did bulldoze an area where the community later built the school
West Are'Are				
Waisisi Bay	December 2014–present	Rite Trade Pacific	1. Free transport of landowners' logs 2. Build schools in Nahu, Surairo and Kopo 3. Contribute to future plans for road construction 4. Contribute to future hospital construction	1. Landowners have to pay machine operators 2. Nahu supported, Surairo and Kopo not 3. Still to materialize 4. Still to materialize
Uhu	November 2015–present	Sunway	1. Assistance in wharf construction 2. Free transport of landowners' logs	1. Logging barge transported gravel for wharf, but licensee and landowners paid the gravel 2. Transport facilitated
Wairokai	2016	Glen Gro	1. Build wharf 2. Help build a school 3. Construct a water system	1. Wharf has not been built 2. School was not built 3. Water system was not constructed
East Are'Are				
Mararo/ Raroasi	March 2017–present	Mega	Landowners have asked the company to 1. upgrade their water system; 2. support the school; 3. support the Church; 4. prepare the log pond for settlement after termination and build an office for the Namoaraha Council of Chiefs; 5. provide a portable sawmill; 6. provide a road connecting to West Are'Are; 7. provide free transport of landowners' logs.	The company has not yet formally committed to landowners' demands and will follow up after the first shipment.
Honoa	2015–2016	Sunway	1. Road connection to West Are'Are 2. School building 3. Playground for youths 4. Free transport of landowners' logs to log pond and Honiara 5. Housing project	1. Road was not connected 2. Company contributed nails, tin roof and some labor but school building is unfinished 3. Company bulldozed soccer field 4. Company facilitated transport of landowners' logs during operations, but left behind an estimated 400 logs in the forest as it pulled out suddenly 5. Company provided unspecified number of tin sheets 6. Company has left behind office building for community
	November 2017–present	Galeko	Same requests as for Sunway above as these were not implemented.	No information: operation has just started
Waima'aka/ Muki	2016–present	Rite Trade Pacific	1. Construction of sea wall at Waima'aka 2. Clearing of land for settlement 3. Support school in Muki 4. Contribute for future plan for road	1. To be implemented 2. Land is being cleared 3. Under discussion 4. Still to materialize

Location	Period	Company	Expectations based on verbal agreements (other than royalties)	Benefits in practice as reported by informants [a]
Are'Are highlands				
Haukona	2015–2016	Rite Trade Pacific	1. Free transport of landowners' logs 2. Tin roofing 3. Clearing new area for settlement 4. Church building 5. Rest house for Chief 6. Soccer field 7. Logging road to be extended to Haukona village	1. Landowners have to pay machine operators 2. Tin was not provided 3. Area was not cleared 4. Church was not built 5. Rest house was not built 6. Soccer field was cleared by machines 7. Road was extended but not properly constructed. As a consequence, it is now degraded and the water supply that reached each house was destroyed in the process.
Waipara	2010–2011	Sam Lim San	1. Preparing area for new settlement 2. Housing 3. School building 4. Church building	1. No proper area was prepared 2. Housing project was not implemented 3. School was not built 4. Church was not built
	2015–2016	Sunway	Same requests were made as for Sam Lim San above as these were not implemented	Not implemented
Tariuna	2016–present	Sam Lim San	1. Build new classroom for primary school 2. 35 tin roof houses 3. Clinic 4. Water supply	All promised to be delivered after the second shipment
Jordan	2016–present	Rite Trade Pacific	1. Lucas mill (portable sawmill) and chainsaw 2. 25 tin roofed houses 3. Road construction to cross to West Are'Are	1. Lucas mill and chainsaw have been provided 2. Construction is ongoing 3. Road reached Jordan/Tariuna in 2017; plans for crossing to West Are'Are still unconfirmed

[a] This table is based mostly on interviews with landowners. In addition, interviews with licensees, company officers and the researchers' own observations have informed the table.

Table 4. Benefits as promised and fulfilled by logging companies in Lau, West Are'Are and East Are'Are 2016–2017.

said he will look into it" (pers. comm. respondent 119, May 9 2017, man from Waisisi).

"Some people do not favor logging because there are negatives, but we come because the government cannot fulfil some of its duties […] in terms of infrastructure and economic development. So we look at ways to bring about development by using our resources. […] The company can provide road construction. We are also partnering with the government [for] a proposed […] high school [and] a hospital. We can assist by providing machine labor. If this will happen depends on the negotiations. It says in the TA that the company and licensee will provide assistance to landowners in a way they see fit. As licensee(s) our responsibility is to coordinate the operation and to supervise that [the company] fulfils the promises made in the TA, and at the same time we must make sure that the landowners don't overuse the company" (pers. comm. respondent 126, May 10 2017, licensee Waisisi).

"Logging can help this country because, look around you, this country is not developed. If you come to Malaysia you will see that people can get healthcare for only one dollar. Education? Is free! Malaysia is now a good country because of logging" (pers. comm. respondent Malaysian operations manager, April 16 2017, West Are'Are).

Two things stand out here. First, a permanent connecting road, and all the services associated with it, is always a hope for the future, a dream to accomplish but yet unachieved. Second, whether or not companies will indeed provide assistance ultimately depends on their goodwill. As a result, in this study we have not been able to identify any lasting road infrastructure from past logging operations. The roads that logging companies build serve one purpose: getting the trees down to the log pond from the cutting area as efficiently as possible. Moreover, for reasons of poor construction and lack of maintenance, after companies pull out, roads quickly erode and become impassable. For instance, on Manaoba Island, the logging road that briefly connected the island's eastern and western tips had soon degraded to a mere walking track. Similarly, in 2015 the remote village of Haukona in the Are'Are highlands was connected to a logging road built from Waisisi by Rite Trade Pacific. Since logging ended around Haukona in early 2017, trucks only come to the village on request and a payment is needed. Potholes have emerged and bridges have begun to collapse. *"We are back to walking. It takes us a full day [to walk to Waisisi] so we don't go down much anymore"* (pers. comm. respondent 168, November 28 2017, young man, Haukona).

Another key aspiration of many rural women and men in Malaita is to have a "permanent" house. Housing schemes are therefore often included in the negotiations between landowners and companies. But as Table 4 shows, they usually remain unfulfilled. Only one potentially successful example was witnessed in Jordan (Are'Are highlands), where in November 2017 a total of 25 permanent houses were being constructed for landowners living next to the licensee of a Rite Trade Pacific concession.

In addition, several timber species are reserved for use or sale by landowners, and some landholding groups have successfully negotiated the provision of portable sawmills by companies. Logging companies are also required to facilitate the hauling of logs to the log pond as well as their transportation to Honiara if so desired. However, the generosity with which such help is given varies between operations. Many landowners complain that they still have to pay machine operators in return for their services and that they are being charged freighting fees to ship their timber on logging barges.

While some of the other benefits received might be highly valued by landowners, from a wider perspective they constitute tokens at best. For instance, a man in Honoa pointed out that Sunway (which had pulled out early without notice, leaving an unfinished school and an estimated 400 logs in the forest) had at least bulldozed the soccer field and left their office building on the log pond for the landowners to use: *"This may seem something small, but for us it is a big thing"* (pers. comm. respondent 8, November 27 2016, man from Honoa).

The great majority of informants, however, feel deceived by companies and licensees for not living up to their promises and letting their own interests take precedence over local needs. A man from Manaoba Island reflects on the situation as follows: *"In logging, they take all the trees and all we get in return are some leaves from the tree [handful of royalties]. It is like we are hunting dogs: the dogs do the work, but all they get are some bones to eat, while the hunter eats the meat"* (pers. comm. respondent 59, February 24 2017).

3.2 Costs

Whether logging was ongoing or had taken place in the past, in all research sites the majority of informants voiced strong sentiments against it. Local criticism of logging relates to its failure to structurally benefit the local economy, despite the high expectations that it raises, as well as to its short- and long-term negative environmental and social impacts. The impacts on

Plate 15. End of Rite Trade logging road at Orea, Central Are'Are 2017.

Plate 16. Women catching a ride on a logging truck at Uhu, West Are'Are 2016.

land and water often have direct implications for livelihoods and are discussed in Chapter 4. We will here focus on the negative social impacts, which include heightened levels of conflict at multiple levels, the sexual exploitation of girls and women and increased alcohol abuse. In all of these issues, gender inequity is a major concern.

We are certainly not the first to raise these issues. An extensive qualitative study on the sources of conflict and grievances conducted in 86 rural communities in five provinces, including Malaita, found, "[t]he presence of natural resource development […] particularly in the form of logging, is the most significant determinant of community cohesion and harmony. Those areas that were in the midst of, or had recently experienced, logging activities were generally the most fractious and dysfunctional, with substantial social order problems and crime" (Allen et al. 2013 xi, 21–23).

Conflict

The occurrence of conflict indeed appears to be the norm wherever logging takes place and it happens at every level: within households, villages and clans, between clans and between clans and the company. *"I do not know of a single case where logging has not lead to conflict. […] Logging pollutes the sea, the land, the bush, the river and at the same time it pollutes the relationship between people. Everything touched by logging gets polluted"* (pers. comm. respondent 4, November 26 2016, man from East Are'Are).

Both men and women report that when men work for a logging company this often increases tensions in the

family. These tensions relate to how the money earned in logging is spent: a common grievance of women is that only a relatively small share is left for household needs, while the husband spends most of his wages in the company store and/or on alcohol. Increased alcohol use in itself also increases conflict in the house (see also below). Some men use logging money to maintain mistresses, leading to deep family problems and breakups. The same informant summarizes his observations as follows: *"Many men take additional girlfriends because suddenly they have money to spend. But as soon as the money is finished, the girlfriends disappear, and by that time he has already lost his wife too. So when the money is gone, he doesn't have anything left in life."*

Within and between villages and clans, conflict typically arises over two main issues. First, there usually is disagreement over whether or not logging should have been allowed to take place on specific lands at all. This often goes back to arguments over who is allowed to speak on behalf of the clan and how procedures for obtaining consent were implemented. Second, logging is everywhere associated with accusations of unfair benefit sharing between clans and among clan members. The deep and lasting rifts they give rise to can be sensed from the following reflection by a young single man from East Are'Are: *"Logging makes life not much good. Before the logging operations the community was at peace, we were united, we worked together, religion was strong. After logging came, these values and others, like caring for each other and supporting each other, disappeared and turned the opposite"* (pers. comm. respondent 21, November 29 2016).

This can considerably disrupt village life. A man from Manaoba Island remembers his dad's position as a negotiator between a logging company and the landowners. He was an 18-year-old boy at the time: *"It was not smooth. The company pulled, the landowners pulled; there was a lot of tension."* These tensions sometimes turn violent, as was the case at Afio in late 2015. *"It was a very unsafe time. Everyone suffered. The police came to control the situation, but they were always at the log pond and were drunk most of the time"* (pers. comm. respondent 0, November 26 2016, woman from Afio).

Logging companies tend to put the blame for these conflicts on the landowners, accusing them of making unreasonable demands or being unable to solve their land disputes. A Malaysian operation manager comments, *"[…] operations often stop because of disputes. Landowners […] don't know how to compromise. But the company, we don't have time to wait until they have resolved their disputes"* (pers. comm. respondent, April 16 2017).

Improper decision-making

As mentioned above, many conflicts have their origin in decision-making processes. A first common complaint is the lack of adequate information provisioning on logging, which could facilitate balanced decision-making. In as far as any awareness raising prior to proposed logging operations takes place, the information is presented by logging proponents, usually the licensee, and therefore positively biased.

It is also common knowledge that decision-making procedures favor logging proponents both on paper and in practice, and landowners experience this reality as highly frustrating. The two main decision-making procedures disussed in Chapter 2, namely the TRH and the Development Consent, are both skewed toward a favorable decision, even if there is explicit resistance to logging. Procedures for objecting are complicated, costly and have to happen within a short period of time (30 days).

For instance, various informants have described how the operation at Mararo (East Are'Are) got approved by only inviting proponents of logging to the TRH, by changing trustees on the spot and manipulating the votes. There is also resentment about the fact that the foremost political authority in the region, the Namoaraha Council of Chiefs, was not formally consulted. Procedures for obtaining Development Consent from the MECDM (Chapter 2) were shortcut by both the logging applicants and the MECDM itself. The ministry only requested a PER instead of an EIS, and the objection period was shortened by a delay in delivering the PER to the affected communities. Moreover, the PER contained incorrect information on the scope of the operation, which started before the PER was publicly presented. A similar situation described by Baines (2015, 3) for Kolombangara Island shows the Mararo case is far from isolated.

In this and other cases, the procedural inconsistencies and the feeling of injustice that these give rise to often become a reason in itself for landowners to be highly critical of logging. However, opponents of logging feel structurally unsupported by government authorities, including the police, in seeking justice. This problem has been documented in detail by Allen et al. (2013, 54–5), who describe the despair felt by villagers who feel that the foremost government service that ought to protect them lets them down or even uses disproportianate force to end nonviolent protest against exploitative logging companies. Some authors have suggested that the occasional acts of violence

against logging personnel or their equipment must be seen in the light of this failing justice system (e.g. Baines 2015, 14).

A further problem is that certain groups of people are systematically excluded from decision-making processes, because these are based on primary landownership rights (see also Baines 2015, 13; Allen et al. 2013, 21). This means there is no decision-making power for communities that may experience downstream effects from logging operations that take place in areas to which they hold no primary rights.

For the same reason, women are structurally excluded from decision-making and negotiation processes, as well as from royalty payments. Moreover, they often have specific concerns, many of which relate to the safety of children, such as the dangers of logging roads being constructed near villages and schools, and machines driving back and forth on log ponds. As their concerns are not heard, many women are critical of logging.

"One thing that I do not like about logging is this: Is it taboo for letting us women be part of the committees or the agreements? Logging comes to everyone, no matter man, woman, so why can we not be part of it?" (pers. comm. respondent 94, April 5 2017, woman from East Are'Are).

"We women are not part of the meetings where logging is discussed […]. But we have good ideas too, sometimes even better than the men's ideas. We want more women to be part of the committees in logging." (pers. comm. respondent 95, April 5 2017, woman from East Are'Are).

A woman from West Are'Are wanted her views on these matters explicitly mentioned: *"We women don't receive any royalties. The men forget us. We are also not part of any of the log pond committees. [Men] look at us as if we are not big, they look at themselves as big only. Also, the loggers only talked about the positive side. The licensee […] called a meeting […], but they only invited the people who are pro-logging. I went there too because I wanted to know what's going on. I spoke out during that meeting and said that they should also include women in the logging committees, but they did not respond. Some men are open to it, but they did not put it into action"* (pers. comm. Irene Patanikeni, respondent 125, May 10 2017, Waisisi).

Poor negotiations and mismanagement

"Now that the company is here, we should make the best of it" (pers. comm. respondent 5, April 6 2017). This statement by a man from East Are'Are reflects the stance of many landowners. However, in the period that follows, their pragmatism often turns to frustration.

Negotiating fair agreements is complicated by the uneven knowledge and power basis between the logging companies, who are well informed and well connected, and landowners, who have little or no experience with formal negotiations and do not avail over all necessary information to claim their rights. As is clear from the situation in Mararo, many people are well aware of their weak negotiation position.

"The machines landed on Friday (March 10). On Saturday they [the logging proponents] came [here] and we [logging opponents] told them, 'You'd better make sure that you negotiate well with the company, because if not, everything fails for us.'" On the same situation, another informant comments, *"[We said], 'If you fail to follow up on our interests, we all stand naked'"* (pers. comm. respondents 5 and 6, April 6 2017).

While committees are formed for each consented land area to oversee the implementation of royalty and other benefit sharing agreements, these often do not function well and suffer from mismanagement and internal strife. A woman from Waisisi comments, *"When the machines work, corruption comes in. Only the committee members benefit from the logging. When our committee chairman received the money, he opened an account for us landowners in Honiara, but when he came back all the money was finished to the last coin. It went to motels, drinking and women"* (pers. comm. respondent 118, May 9 2017). However, revealing mismanagement is often reason for complainants' removal, as happened to a timber control officer who reported the lack of progress with the implementation of the development plan to the licensee, who fired him.

In addition, while damage compensation is often part of the agreements, in practice it is always problematic. The compensation mechanisms are not specified and therefore lack transparency. Moreover, there is an inherent problem with damage compensation, especially when it involves spiritual or cultural damage. For example, damage to sacred sites is highly controversial and cannot be compensated with money. In anticipation of damage to sacred sites, landowners sometimes demand the licensee to fund offering ceremonies to ask forgiveness from the ancestors for the upcoming disruption. However, landowners are often in disagreement on whether or not this is acceptable.

Sexual exploitation of girls and women

Sexual exploitation of local girls and women by logging personnel is a major concern voiced by men and women alike. Thirty-eight informants from all areas visited spontaneously mentioned this issue.[12]

Many informants brought up the growing number of children born from sexual encounters between local (underage) girls and foreign (predominantly Malaysian) logging staff.[13] One woman from West Are'Are comments, *"[…] Here in […] we have around five 'baby Waku's,'[14] but the fathers are already gone. One of [my] cousins […] is currently six months pregnant from a Waku too. She is only around 15 years old. She was in class four when she got pregnant"* (pers. comm. respondent 118, May 9 2017).

Informants consider this highly problematic for several reasons. First, in almost all cases the logging staff leave the girl with the child after the logging operation is finished and do not take responsibility for either the girl or the child(ren). Thus, she and her family are left with the burden of looking after the child afterward. This also means that these children grow up without a father, and therefore they do not inherit primary land rights. This is especially problematic for boys, while girls can gain access to land (albeit with secondary rights only) through their future husband.

Second, as in the above cited case, the girls concerned are often underage. Some have been reported to be as young as 12. Schoolteachers in both West and East Are'Are have reported seeing some of their female students dropping out from school as a result of these pregnancies. One teacher had lost three female students to "log pond marriages" in a short period of time.

Third, these relationships run very strongly against cultural norms. No proper bride price is paid, and thus compensation payments are requested for violating rules surrounding marriage and courtship. The nature of the sexual encounters is considered exploitative, even if the girl has consented to the sex. Girls are said to be having sexual relationships in exchange for relatively small favors to her and/or her family. Such favors may constitute money, a few iron sheets for the roof, a bag of rice, a carton of noodles or operating a logging machine to bring the family's logs down to the log pond for milling. While some parents are allegedly stimulating these arrangements, the general sentiment is that the short-term character of it all and the fact that no proper bride price is paid affects the girl's dignity.

Thus, many mothers do not allow their daughters to visit logging camps and log ponds, and in some operations women are discouraged from riding on logging trucks. Parents say, however, that they have a hard time ensuring their daughters' safety, as they may have to pass by logging camps and log ponds to go to the gardens or even to school. Moreover, *"[…] there is security on the log pond, but they don't pay attention to the girls who are roaming around or walking up to the logging camp. They are paid to protect the machines, so*

Plate 17. Discarded logging machine with girls from East Are'Are 2017.

that's what they do, but nobody protects our girls" (pers. comm. respondent 118, May 11 2017, mother from West Are'Are).

Many communities have included in their agreements with the logging companies a prohibition for logging staff to maintain relationships with local girls. Breaking such agreements in theory results in the sending off of this staff member as well as the payment of compensation, but *"[…] nobody thinks heavily about it. […] We have chiefs here, but they don't play their role. They should keep an eye on these things, but they don't. We parents are weak and the chiefs are weak too"* (pers. comm. Diana Simarore, respondent 133, May 11 2017, West Are'Are).

Alcohol abuse

The social problems related to increased alcohol consumption came up spontaneously in 40 interviews. Alcohol is generally not available in the company shops and its consumption is prohibited on log ponds, but enforcement of such prohibitions is poor. Moreover, logging companies facilitate the local sale of alcohol by allowing landowners to transport liquor on logging barges to start local bottleshops, which often involves a shortcut on the rules: *"To get a license to sell alcohol you should first get permission from the chiefs and the church leaders. […] But what the people are now doing is that they only request the permit [in] Auki and they easily get it"* (pers. comm. respondent 139, May 12 2017, man from West Are'Are). The increased alcohol consumption increases family problems. Men are said to spend their logging wages on *"[…] drinking and women. So many families break up"* (pers. comm. respondent 93, April 4 2017, woman from East Are'Are). *"In the places where logging takes place, some daddys are always getting drunk"* (pers. comm. respondent 33, December 1 2016, woman from West Are'Are). Thus, *"The people who work for the company, they don't take care of their families well. They don't help them with the money they earn. Money makes people crazy. They just drink beer month after month"* (pers. comm. respondent 140, May 12 2017, man from West Are'Are).

A teacher from West Are'Are expressed concerns about the vulnernability of young people to alcohol abuse, saying that whenever the logging barge has arrived she witnesses drunkenness among schoolchildren. An adolescent boy from East Are'Are recalls how during a past logging operation, *"[…] especially young village boys went drinking on the log pond […] then they did not do good things. […] they made a lot of noise and demolished things, causing disturbances in the village"* (pers. comm. respondent 23, November 29 2016). In short, *"Alcohol is disturbing the whole community now. Before logging, drinking would only happen when it was time to celebrate, but now it happens Monday to Sunday. The young and the old, everyone drinks and it happens everywhere too. Before, drinking would happen at the edge of the village. Now it happens in the middle of it, within the view and hearing of children, who see and hear all the swearing and the fighting. […] Women get frustrated too when their husbands spend all the money they earn on beer. So to get it balanced, they also start drinking. And then a lot of fighting happens inside the house, and the children don't know where to run to anymore"* (pers. comm. Irene Patanikeni, respondent 125, May 10 2017, Waisisi).

This chapter has shown that at the outset of logging, expectations of the anticipated benefits are skyhigh. Rural Malaitans view logging companies as potential providers of cash, jobs, key services and infrastructure. However, few of these expectations are met as the cash rewards are mostly disappointing and badly managed, jobs are short term and low paid, and benefit sharing agreements are poorly formalized and rarely implemented. Meanwhile, logging is invariably associated with heightened levels of conflict, increased sexual exploitation of girls and women and widespread alcohol abuse, which leave communities fractioned and bitter.

Plate 18. Sign board in Waisisi, West Are'Are 2018.

4. Food security

How does logging impact local food security? We explore this question from two angles: First, we look at the money that landowners might earn from logging, which may increase people's access to food. Second, we look at the way in which logging changes pre-existing livelihoods and what implications this has for food security. The focus is mainly on fishing, but we also discuss other major livelihood components, such as gardening and hunting, and basic needs, like water and construction materials.

4.1 Money and food

There are two main ways in which people can directly earn money from logging operations: through wages and royalties. In addition, there are several indirect ways to earn money from logging, notably marketing, storekeeping and the sale of sawn timber, locally known as "cubic." This logging money is indeed partly spent on food, particularly store items. Both men and women consistently report an increase of store food consumption as a result of logging presence. Rice, tin taiyo, noodles, sugar, tea and biscuits are the most frequently mentioned food items that logging money helps buy.

Storable food items are highly appreciated for the variation they bring in daily diets. A mother of three children comments, *"We are getting tired of eating the same food all the time"* (pers. comm. respondent 26, November 30 2016). A teenage boy from East Are'Are summarizes the situation as follows: *"Before the company came, we ate food from the sea and the gardens, like kumara, taro, cassava, fish, cabbage, sea shells and other things. When the company stayed here, we ate more rice than before and also other things: noodles, luncheon meat, corn beef, chicken, tin taiyo, cake. […] The food that is brought in is much tastier than local food"* (pers. comm. respondent 22, November 29 2016). The popularity of imported food is such that some teenagers set out fishing specifically for the purpose of exchanging fresh fish for tin taiyo or other store goods with foreign logging workers.

Another major attraction of store food is its practical value. Women often mention how they make life easier, since cooking rice and noodles saves them time and energy because it is much less labor intensive than cooking *home kaikai* (local food), the preparation of which takes two to three hours per meal (Pollard 1997, 1). Moreover, when seas are rough and fishing is difficult, tin taiyo helps relieve the scarcity. On a more abstract level, imported foods appear to be associated with "progress" and "modern" life, the taste of which is thoroughly enjoyed. Sometimes, the fact that these products come from abroad is also mistakenly thought to mean that they must be healthy, while in reality store food generally has low nutritional value and high contents of salt, sugar, fat and additives (Andersen et al. 2013, 12).

Incidentally, logging changes diets in an extreme way, because store food is then almost completely replacing local food. This is especially so when not only the husband but also male (and occasionally female) teenagers work for the company. In that scenario, no household members are available for fishing and garden work, and the household becomes largely reliant on logging wages. A woman from East Are'Are reflects on the time that she used to work as a *hausgele* (maid) for Sam Lim San, while her father and brother also worked for the company: *"That time, we did not work in the garden much because my mum's body was not very strong. So it all depended on me and my dad, but we were busy with our work for the company. My brother used to fish a lot, but he also worked for the company so he did not go fishing anymore. If we wanted to eat fresh fish, we had to buy it from fishermen, but we did not do that often. Before logging, we ate fresh fish almost every day, but when logging came it changed to maybe once a month only. During logging, we were usually eating rice, potato, cabbage, noodles and taiyo. We ate noodles and taiyo in the morning, in the afternoon and in the evening. We changed from* home kaikai *to store food"* (pers. comm. respondent 115, April 7 2017).

In most cases, however, store food bought with logging money merely causes a shift, rather than a complete transformation of local diets. Noodles and tin taiyo are often mixed with cabbage and other greens, and rice is eaten together with sweet potatoes, cassava and taro. This can be illustrated with two diet records from Mararo (East Are'Are) that were kept by one household with logging wages and one household without.[15] The records confirm the general trend that logging money increases rice consumption, since the household with logging employment ate rice almost twice as often as the nonlogging household. However, this did not come at the expense of tuber consumption, as potatoes, cassava or taro were eaten almost every day by both the logging and nonlogging households. Furthermore, the logging household reported eating vegetables as well as fruits from the

garden on fewer days compared to the nonlogging household: 50% versus 67% of days for vegetables and 17% versus 30% of days for fruits. This is also in line with our respondents' general qualitative comments.

Kaikai selen

Men are often said to literally *kaikai selen* (eat money) (see also Dyer 2017) from logging. Since men are usually the sole recipients of royalties, they consider this money to be theirs to spend. While these payments are indeed often partly and immediately spent on (store) food, they never structurally feed the family. Only one respondent mentioned using royalty payments for stocking up supplies to use "in case of emergency."

The same is largely true for logging wages. Chapter 3 showed that local logging jobs typically are low paid, short term and performed by men. This all has implications for how income from logging contributes to daily diets. While there certainly are men who do make sure that at least part of their earnings flow back to family needs (notably school fees and food), the general situation voiced by both women and men is that logging money does not translate into increased food security.

Moreover, local workers are allowed to buy goods on credit from the company store. Thus, a common complaint by both logging workers themselves and their wives is that most of the wages remain on the log pond and that only little of what is earned makes it back to the home.

A final explanation for the limited structural contribution of logging wages to household food security is the short-term nature of logging employment. In as far as logging brings a situation of increased access to and availability of food, this lasts only for a few years at best. *"During logging, people can eat noodles all the time. When logging goes out, their hands are heavy, their legs are heavy. They don't know how to work anymore"* (pers. comm. respondent 6, April 8 2017, man from East Are'Are).

Women

It is widely acknowledged that logging is men's business and that Malaitan women rarely share in its monetary benefits through employment or royalties. The exclusionary character of logging is something that deeply bothers many women as well as some men in all research areas. Despite these structural barriers, women do attempt to create benefits from logging for themselves and their children.

Wages

It is important to take into account the women who do work for logging companies as cleaners and cooks, even though their numbers are very small (see Chapter 3). The majority of the cleaners are single girls, and they generally hand over their wages to their families, who have often also encouraged their daughter to take the job. Married female logging workers say they spend their wages on two main things: school fees and food. This suggests that logging wages earned by women make a more structural contribution to family needs, including food, than those earned by men.

Marketing

Logging operations tend to increase marketing activities. This is especially so in remote areas where markets are not normally organized on a regular basis. Log ponds and logging camps function as new market sites, and at the start of the operation a fixed market day is usually set to take place weekly or fortnightly. Although foreign logging personnel occasionally visit local markets, the main customers are fellow villagers working for the company and externally hired Solomon Boys. Not having gardens of their own, the Solomon Boys are dependent on marketed garden products. In addition, the company cooks also regularly buy vegetables from local women.

Many women in coastal areas market garden produce, shells, fish or home-baked cakes whenever they have something to sell. On average they do this once every 2 weeks, with earnings ranging from SBD 20 to 300 per day. Earnings are reportedly best after workers' payday. Women spend their market earnings mainly on store

Plate 19. Market at Ruarata log pond, East Are'Are 2017.

food, laundry and bathing soap, clothes and school fees. In West Are'Are, some women put part of their market earnings in saving clubs. However, the extent to which marketing is a significant income earning opportunity for local women varies depending on village-to-market distance, since women from highland communities without road access do not consider log pond marketing a viable activity.

Shopkeeping

Female shopkeepers see a favorable impact on their businesses during logging. They benefit mainly from purchases by locally hired logging personnel, notably around payday. An elderly lady from West Are'Are explains, "Logging is helping me because I can sell things in my canteen. My eyes are not good, so it is the only thing I can do. When the worker men have some money at the end of the month, they come to me." (pers. comm. respondent 120, May 10 2017).

However, local shopkeepers also face competition from company shops, which are situated on log ponds and in logging camps and are supplied directly from Honiara. Moreover, the economic advantages are short-lived, as explained by a logging employee from West Are'Are: *"I have seen some changes with respect to economic activity and food, but no big changes: when the logging barge arrives then it is all 'rice, rice, rice.' That time, some canteens run good, but there is no major increase in economic activity because the supplies run out quickly. So it is on and off"* (pers. comm. respondent 119, May 9 2017). According to another female shopkeeper, for this reason, it is best not to lean too much on logging: *"Whether or not logging is here, it is all the same for me. I just use my creativity"* (pers. comm. respondent 134, May 11 2017).

"Cubic"

A number of women from Waisisi, West Are'Are, are taking charge of their own monetary benefits from logging through what is locally called "cubic," or the sale of timber that has been milled with a portable sawmill. In doing so, they make use both of their resource rights and of the infrastructure that the logging companies have brought: roads, trucks and barges. These women proudly call themselves "cubic women" (Saeni 2017b). They are often outspoken logging opponents, who also show logging proponents that they will not sit by passively but will make sure that they gain from the operation now that it is here.

The process of taking cubic is time consuming and costly, but also comes with considerable rewards. The average net earnings of four women amounted to SBD 9000 for their latest cubic shipments. Often the timber produced is partly sold and partly used for building one's own house. Cubic women spend their earnings on a number of things including food, school fees and household needs.

4.2 Impacts on fisheries

Fishing forms a major component of rural Malaitans' livelihoods, and the majority of animal protein is derived from fish. Fishing in Malaita is predominantly artisanal: small-scale, nonmotorized and technology extensive. The main techniques used are manual collection of shells and crabs, spearfishing, and hook and line fishing from dugout canoes. Fishing happens in mangroves, on reefs, in and around passages and in rivers and creeks, both during the day and at night. In coastal areas, mangroves are predominantly the domain of female fishers, while the outer reefs and passages are usually fished by men. Both women and men fish on inshore reefs (Schwarz et al. 2013; van der Ploeg et al. 2016; Roeger et al. 2016). In the highlands, women and children are mostly involved in collecting shells and prawns, as well as spearfishing in shallow waters. Spearfishing for eel and a variety of other freshwater species in deeper, rougher waters is done by men.

Of 81 respondents (41 men and 40 women) that were interviewed on changes they observed in their fisheries in relation to logging, only two male respondents did not observe logging-related changes. All other respondents (98%) reported one or multiple negative impacts of logging on marine and freshwater resources, and consequently on fishing catches. Figures 2 and 3 summarize the findings and together show several trends.

First, there are marked gender differences in the reported impacts of logging on local fisheries (Figure 2). While the most frequently reported impact by men is the decline of reef resources, for women it is the decline of mangrove resources. The decline of freshwater resources is also especially important for women, 50% of whom have reported this as an impact of logging. This is striking given that most respondents come from coastal areas.

Second, the causes of the decline of both reef and mangrove resources are mostly reported to rest in the direct destruction of reefs and mangroves as a consequence of log pond and wharf construction. The

smothering of corals and mangrove roots by increased sedimentation is a further important reported cause of resource decline (Figure 3). Finally, a striking outcome is the frequency in which oil spills are reported, especially by women, as a cause of both marine and freshwater resource decline. We will elaborate on each of these issues below.

Destruction of reefs and mangroves

The destruction of reefs and mangroves as a direct consequence of logging is an issue in all coastal research sites. Reefs get heavily damaged by the construction of log ponds and wharfs, the digging up of corals for producing gravel for logging road construction, the repeated anchoring of logging barges and the loading of logs by logging machinery at the shoreline. This means that reefs either become less productive or completely unsuitable for fishing or shell collection. This is the case for instance in Hatodea (Manaoba island), Honoa (East Are'Are) and in Waisisi Bay (West Are'Are), where people consistently say they have had to abandon the reefs next to which the log pond is situated and focus on fishing grounds farther afield. This has great everyday implications. For instance, a respondent from Hatodea at the eastern tip of Manaoba island, where the last logging operation took place over 15 years ago, explains, *"We feel the effect of logging on our fisheries every day up till now. We already used to fish in the deep sea even before logging, but we have increased deep sea fishing after logging, because our corals were damaged when the log pond and wharf were built"* (pers. comm. respondent 70, February 24 2017).

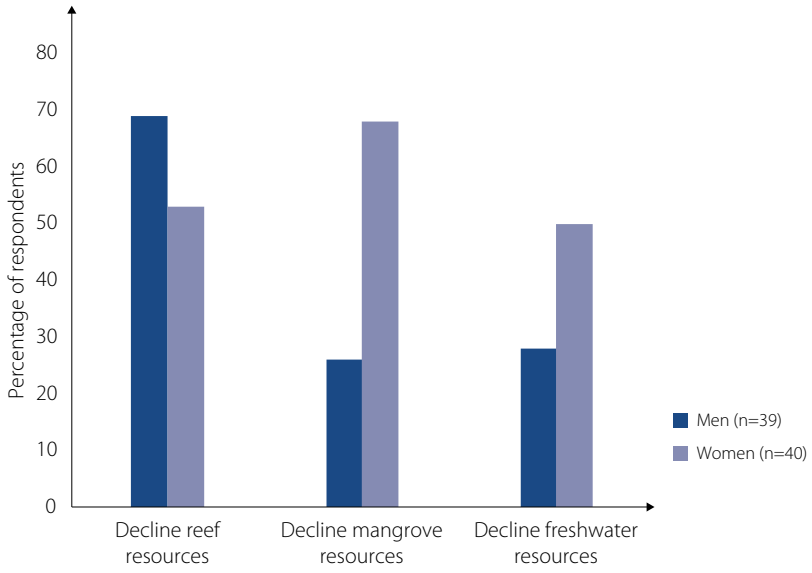


Figure 2. Reported impacts of logging on marine and freshwater resources.

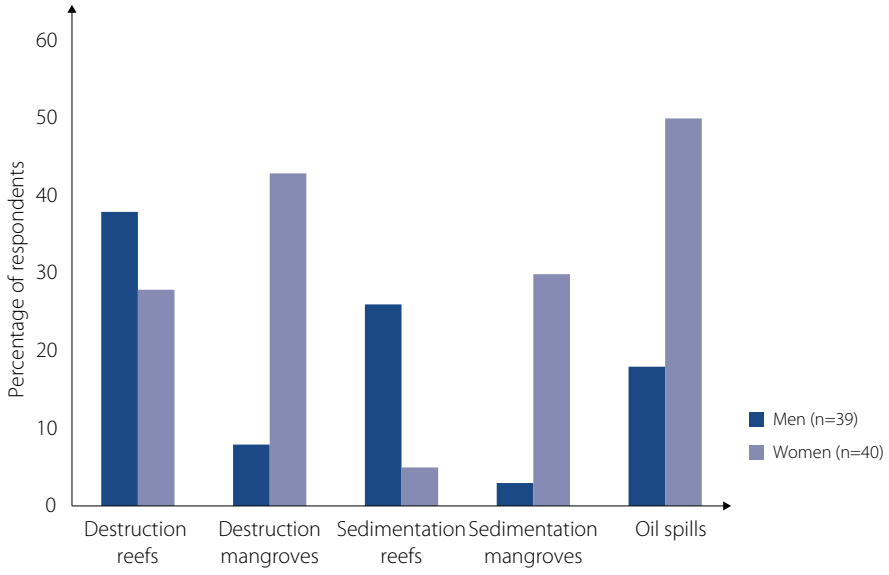


Figure 3. Reported causes of marine and freshwater resource decline.

Mangrove forests, which are of great importance for local fishing livelihoods, especially for women, are often cleared for the construction of log ponds. This is despite the prescription that a 50 m buffer zone from the coast is compulsory for log pond construction under the Code of Logging Practice (SIG 2002: 3). The local impacts of such clear-cutting are high, particularly because each logging operation tends to have its own log pond, even if they are situated closely together (see also Hamilton et al. 2017, 279).

The situation in Mararo illustrates this well. Plates 23–26 show how the logging company Mega constructed a log pond in April 2017. The women from Mararo, Aiparuru and Raroasi used to have a productive fishing ground within close reach, but now they have to paddle for 20 to 30 minutes to collect shells and mud crabs. This involves increased effort and risk. *"We used to always collect our shells from the mangrove area that has now changed into the log pond. Even if the sea was rough, we could always go to this area [because it is close by and sheltered]. But now we cannot use it anymore. Even if logging goes out, we will not be able to use that area anymore. Our fishing ground here is destroyed. This is a big problem for us mothers"* (pers. comm. respondent 112, April 7 2017).

An elderly woman who has raised 11 children in Mararo explains the nutritional and emotional importance of the lost mangroves: *"It is a big concern for me that the mangroves have gone because it is the place where I found food. When my children were small, I would go there to find food for all of them. It was close by, so when I heard them cry I could just go back quickly. It [the mangroves] also gave the last food to my husband when he was dying. When he was crying for* roropio[16] *[…], I just went there to collect it for him. It was the last thing he ate before he died. So when I saw the machines landing, I felt as if I saw my mother dying. I cried. The happiness, the food and the help that the place gave me, is now gone. I want this to be told, because it makes me cry"* (pers. comm. Sicolastica Okapisi, respondent 114, April 7 2017–see Plate 20).

Sedimentation

Another frequently reported cause of resource decline is increased sedimentation of rivers, reefs and mangroves. This is the combined result of runoff from upstream cutting areas and the above-mentioned log pond and wharf construction. Riverbanks erode as the prescribed buffer zones (25 m for streams and 50 m for rivers) (SIG 2002, 3) are often disrespected, and riverbeds are damaged by logging machinery as bridges are not consistently and properly constructed. The effects are felt both in the highlands and in downstream areas.

For instance, in the Are'Are highlands fishers report that as rivers turn murky and brown, especially when it rains, visibility has gone down in the past few years, making diving and spearfishing increasingly hard, and in some places impossible. Thus, for highland communities the presence of logging often means that they avoid rivers within and downstream of cutting areas and focus instead on areas where the impact of logging is not felt. As can be sensed from the experiences of a respondent from Langalanga, rivers can take a very long time to recover from the impacts of logging. This respondent reports how the logging operation that took place in the late 1990s is still affecting Bina and Kwaleuna Rivers: *"The two rivers that were inside the logging area have suffered a lot from the machines running through them and hauling logs inside. As a bulldozer crew [member] I saw that the buffer zones were not respected, and the machines just went right through the rivers. After logging, it became very hard to fish. I used to go diving in the rivers all the time. […] [I]t is only now that it starts to recover slowly"* (pers. comm. respondent 141, May 26 2017).

In downstream areas, and notably in narrow bays, runoff is also causing visibility problems, as is clear from the following quotes from fishers in Waisisi Bay:

"We cannot see the corals anymore, they are covered in mud. The drainage from this bay [Waisisi] is not good; it is like a pool. If this continues I don't know what will happen" (pers. comm. respondent 129, May 11 2017).

"Just yesterday I wanted to dive, but the sea is cloudy and dark so I cannot see anything. The corals underneath start to die. The clamshells now like to keep their mouths shut" (pers. comm. respondent 137, May 12 2017).

"Fishing inside the bay is a problem now because the mud is covering the corals and some corals die. But the people who like logging, they don't like to listen to us women. They say they don't worry about these things. They like logging, they like development. But what kind of development is this when it damages everything? Is that development? Or is it damage?" (pers. comm. respondent 131, May 11 2017).

Mangroves situated near river mouths are also impacted by runoff from upstream areas, as their roots get covered by an impenetrable mud crust, which suffocates the shells. This problem has been mentioned by 30% of all women in our sample, all of whom come

Plate 20. Sicolastika Okapisi in Mararo, East Are'Are 2017.

Plate 21. Excavator making wharf at Ruarata, East Are'Are 2017.

Plate 22. Removal of mangroves for log pond construction at Ruarata, East Are'Are 2017.

from Waisisi (West Are'Are), Honoa and Mararo (East Are'Are). One of them explains, *"I used to collect* ke'u, maruri, u'u *and* iro[17] *from the mangroves […]. But now I cannot find them anymore because there is a thick layer of hard mud that is washed down from the rivers. The mud is too hard to cut through. Also, the shells underneath have died"* (pers. comm. respondent 138, May 12 2017).

Oil spills

Oil leaks, especially around log ponds, form another major concern. Half of the women in our sample have raised this problem and 18% of the men (Figure 3). Oil is reported to leak from logging machines, logging barges and fueling stations, which are positioned at the edge of the log pond near the shore. Oil also gets dumped in the sea when logging machines and chainsaws are receiving their routine oil change.

Respondents from Manaoba remember how oil leaking from logging barges resulted in dead fish floating on the sea surface at the island's west coast. Women and men from Mararo report that their children can no longer swim in the bay adjacent to the village because of oil spills. And in villages along tidal rivers near log ponds, people experience oil pollution during high tide. A woman reports, *"Last week when we were eating our cabbage, we suddenly noticed a bad taste. We went to check the part of the river from where we always take water for cooking and we saw oil in it. We had to throw away our meal"* (pers. comm. respondent 105, April 6 2017).

Impacts on fish consumption

A key question is whether damage to fishing grounds negatively affects consumption of fresh fish. Local resource decline does not necessarily imply this, because resource loss in one fishing ground may be compensated by shifting to other fishing grounds, by fishing longer or by using different fishing techniques. Nevertheless, 25% of all respondents in our sample (33% of the women and 17% of the men) explicitly said that damage to fishing grounds meant that their families ate less fresh fish, shells or crabs during and after logging operations as compared to before.

For example, after oil leaks from a logging barge had occurred off the west coast of Manaoba island in the late 1990s, the people from Fumamato'o *"[…] just ate less fish and waited for it to become better"* (pers. comm. respondent 63, February 23 2017). In Honoa (East Are'Are), female respondents said that the food contribution from fishing decreased during and after the Sunway operation in 2015 and 2016.

In Mararo (East Are'Are), people remember that following the OTC operation in 1998 they had a *"[…] hard time finding food. Especially shells were almost wiped out"* (pers. comm. respondent 6, November 27 2016). With the start of the Mega operation that began in April 2017, the situation has aggravated, as a woman from nearby Raoroasi explains: *"The mangrove area is gone for good. So where should we now find our* supo, u'a,[18] ke'u *and mangrove fruits? We used to just collect shells in the mangroves for our late afternoon snacks, but our happy hour became a hungry hour!"* (pers. comm. respondent 81, April 4 2017).

Impacts on resource management

In most research sites, logging and natural resource management activities take place simultaneously. Most of these have their origins in customary resource management practices, revolving around the temporary closing of fishing, hunting and gathering grounds. The aim is to increase resource

stocks for later harvesting purposes. Logging has various implications for these resource management activities. There are indications that logging increases unsustainable fishing practices. Certainly, the change of fishing practices is part of a more general erosion of customary values and practices that cannot be solely attributed to logging. However, it does intensify under its influence. This is because products like torches and magnet nets (trammel nets) from Honiara come in greater quantities. Also, expatriate loggers themselves fish with nets and poison. A man from Hatodea (Manaoba) reflects, *"We used to have very strict rules about fishing, but these days fishing is open to everyone and every method. Before, fishing areas were temporarily closed in preparation of the ngalinut, pana and yam*[19] *seasons of the people from the bush: we would then have big fish harvests after the closed season and use it to barter with the people from the bush. This all started to change during the time of logging"* (pers. comm. respondent 70, February 24 2017).

At least as important, however, are the deep rifts within communities and families that were discussed in Chapter 3. The social disruption that logging brings inhibits the collective action necessary to maintain preexisting fisheries management systems and/or initiate new ones that could contribute to resource recovery in the aftermath of logging. Also, the disillusionment caused by the breach of logging agreements makes people wary of "agreements" in general. This is clear from one respondent's explanation of how the negative atmosphere in which logging came about on Manaoba Island in the 1990s still affects present day talks about fisheries management: *"Sometimes during meetings our old people mention that in signing any agreements on [our management area] we should be very careful. The logging agreement is then mentioned as an example of how things can go wrong"* (pers. comm. respondent 65, February 23 2017).

In some cases, a management area itself becomes part of the conflict. In Apuapu (Are'Are highlands), for instance, some landowners have decided that they will not allow logging on their land because it includes a preexisting conservation area and/or sacred sites. Their determination, however, comes at a high social price as it goes against the wish of relatives who are in favor of logging.

Plate 23. Boy at log pond at Ruarata, East Are'Are 2017.

Paradoxically, the presence of logging often implies the retreat of other outside actors that previously played a supportive role in resource management. For example, the community-based resource management (CBRM) unit of the MFRM tends to withdraw from sites where logging takes place, implicitly reasoning that logging and CBRM are mutually exclusive. However, continued support of communities' resource management practice is important, especially during and after logging operations.

4.3 Impacts on other livelihoods

How does logging affect rural Malaitans' other core livelihoods? In general, the emerging picture is bleak, which is summarized well in the following reflections from areas where logging is presently ongoing:

"It is only short-term gain, all the rest is lost" (pers. comm. respondent 10, November 28 2017, young man from East Are'Are). *"We will be very poor after logging. Where will we find anything to earn money from? Because those things where we can earn from will be gone"* (pers. comm. respondent 140, May 12 2017, man from West Are'Are).

These worries appear to be confirmed by observations from two men from Manaoba Island on what happened in the aftermath of logging 15 years ago:

"During the operations some people benefit but afterwards the community suffers" (pers. comm. respondent 58, February 22 2017). *"The activities that [people from Manaoba] did before logging got damaged, or they did not take interest in them anymore. […] [D]uring logging […] people had an increase in income but only temporarily. Just after logging pulled out everything went down"* (pers. comm. respondent 59, February 22 2017).

Plate 24. Expatriate company workers fishing with nets at Ruarata, East Are'Are 2017.

We will now discuss in more detail how logging relates to gardening, hunting, gathering and the availability of drinking water.

Gardening

The relationship between logging and gardening points in different directions. In the short run, logging can facilitate gardening by opening up new areas and facilitating transport to and from gardens. A woman from Honao (East Are'Are) explains, *"Logging helped us a lot in gardening because for one and a half years we could just hop onto the logging trucks and the trucks would bring us to our gardens. Now [that logging has stopped it] takes us again the whole day to walk back and forth. Sometimes we come back only in the evening"* (pers. comm. respondent 13, November 29 2017). Consequently, after logging pulls out, most of the newly established gardens in the remoter forest areas are being abandoned.

More often, however, respondents mention the negative short- and long-term impacts of logging on gardening. The construction of log ponds and roads, as well as the timber felling process itself, causes damage to existing gardens, copra, betel nut and sago plantations. Farmers are often chronically involved in the frustrating process of requesting damage compensation, the outcome of which tends to be negative. That is, while company personnel or licensees sometimes acknowledge the damage, no proper compensation is provided. An elderly woman from Raroasi (East Are'Are) comments, *"Logging came, but to me it is a big problem. The [logging] road goes right through some of my gardens. I told the chairman [of the log pond committee] about it and the company said that they will pay [for the damage] but they did not say how much and when. I will have to open up new garden areas because even though we can now buy some store foods, I am still not sure that we can eat in the future"* (pers. comm. respondent 86, April 4 2017).

Alarmingly, respondents also consistently report a number of long-term issues in relation to gardening that they quite plausibly attribute to logging. In all research sites, people report a rapid growth of weeds, especially various types of grasses, that are hard to remove and that they had not seen prior to logging. These problems persist even long after the termination of logging. On Manaoba Island, for instance, gardens continue to suffer from these pests, as well as from snails that people say they did not see prior to logging. Respondents suspect that both the weeds and the snails were brought in and dispersed by logging machines. The spread of invasive species, including the giant African snail, is indeed

known to be facilitated by logging machines (Stronge 2016; Kiddle et al. 2017; Saeni 2017c).

Aside from its ecological impacts on gardens, logging also appears to affect time investment in gardening, as is reflected in the following remarks by a respondent from West Are'Are, where logging is ongoing: *"Before logging started, we ate good food, but since logging came we […] are not interested anymore in going to the garden, we eat rice all the time and forget about our garden foods. After logging, the people will struggle hard because they have gotten used to just going to the store to buy rice whenever they are hungry. Then they must go back to the ways of before, and they are not used to it anymore"* (pers. comm. respondent 140, May 12 2017).

Hunting and gathering

For communities in the Are'Are highlands, hunting forms another important livelihood component. Wild pig is the main game animal, but opossum, various species of lizard, wild cat and a range of birds and bats are all regularly hunted. Hunters use trained hunting dogs, and spears or bow and arrow and operate either on their own or in small teams. Hunters in logging concessions say they have observed a strong decline in pig abundance in their former hunting grounds and blame this mostly on the disturbance caused by logging machinery, as well as the felling of fruit trees on which wild pigs feed. Possibly the pig population also suffers from increased hunting pressure caused by higher demand for wild meat. This can have far reaching consequences: respondents from Manaoba Island have observed how their entire wild pig population was eliminated as a result of a logging operation that lasted only about a year (2000–2001). Not only did it dramatically alter forest composition, the Filipino workers who were employed by the company were allegedly intensively hunting for wild pig themselves.

In addition, the collection of forest products for food and construction is important. Different types of wild yam, fruits, mushrooms, plants, flying insects and worms are all gathered for consumption. Moreover, as most construction materials are obtained from the forest, respondents mentioned how in the long run logging negatively affects people's ability to obtain these in all research areas. That is, while it generally becomes easier to cut down and transport timber for local use during logging, after logging it usually turns out that certain species have been overharvested, that sago groves have been damaged and that other essential construction materials like lawyer cane (*Calamus* sp.) have become hard to find. Being a relatively small island, Manaoba provides an extreme, but insightful example of what logging might mean for the availability of forest resources for local use on Malaita as a whole. The island's residents mention that they now rely on the mainland for the gathering of construction materials for housing. *"Before, we used to invite people to our island to come find housing materials, but ever since logging took place, it is the opposite"* (pers. comm. respondent 63, February 23 2017).

Water

The effects of increased sedimentation and oil pollution on rivers and streams were already discussed in relation to fisheries. However, it also impacts water quality. In several communities, we have come across cases of damage to preexisting water systems by logging companies. The residents of Manaoba Island relied on several natural freshwater basins before logging took place. When the log pond was constructed and the logging camp erected, at least two of these wells were damaged by logging machines and could no longer be used. Allegedly, the residents who depended on these water sources were too overwhelmed by the situation to protest. *"People were not prepared for dealing with the company. Also, the power was in the hands of a few leaders at that time, there was a lot of fear"* (pers. comm. respondent 72, February 24 2017).

Fifteen years on, communities still appear fearful to stand up against such infringements on their rights. In the Are'Are highlands, the village of Haukona lost its piped water system when Rite Trade company constructed a logging road in 2015. Villagers have received no response to their request to the company to repair the system. In East Are'Are, the logging company Mega damaged the piped water system that supplied the village of Mararo when it constructed a log pond and logging road around May 2017. Again, the community's requests to the company to have the damage repaired have remained unanswered. Since Mararo is situated on a steep rocky outcrop, cooking becomes more burdensome, as does fetching water for drinking and bathing. Thus, the loss of this water source is a major burden for women in particular.

Finally, throughout the Are'Are region respondents report that gravel pits left behind fill up with stagnant water, creating a breeding ground for mosquitos. Logging companies are required to refill these pits to prevent an increase in vector-born disease (see for example the PER of East Side Forestry and Development Company Limited 2017: 22). However, as this requirement is not fulfilled, people are rightly concerned about the health risk this poses.

5. From happy hour to hungry hour

Logging may be temporarily increasing cashflow, but it undermines the rural subsistence economy. Both during and after logging, fishing, gardening and hunting continue to be vital for sustenance, so the ecological effects of logging are directly felt. Moreover, the impacts of logging cannot be seen in isolation from the social context. Living in remote, small villages characterized by tight kin-connections, Malaitans depend heavily on each other for their well-being. Therefore, the social impacts of logging must be taken into account if we are to understand its full implications. We will first discuss our findings in relation to the literature and present our conclusions, before suggesting a number of recommendations, which are meant to support the Provincial Government of Malaita and the SIG in safeguarding food security and well-being in the context of a logging-dominated development strategy.

5.1 Discussion

We will now consider how logging relates to three of the four pillars of food security: availability (the supply of food), access (the affordability and allocation of food) and stability (the ability to obtain food over time) (FAO 2017, 11).[20] It is useful to distinguish between store food (purchased from village or company stores) and *home kaikai* (food that is locally grown or procured from fishing, hunting and gathering) (Table 5).

Store food

The availability of store food (notably rice, noodles and tin taiyo) increases during logging operations. Logging companies organize supply lines to stock their company store and kitchen. In addition, they facilitate the transport of store goods by landowners on logging barges, making it easier to supply local stores.

Access to store food is uneven, however, varying greatly depending on a number of factors. First, distance to the log pond determines whether people enjoy increased access to store food from the company stores and local stores in surrounding villages. Communities not connected by logging roads have the least access to store food, even if their land is being logged, though they can obtain some through barter. Second, employment in logging is decisive for whether or not people have money to spend on store food and access to "food on credit" from the company store. Third, within households that do receive logging money, access to store food is uneven: as logging wages and royalties are almost exclusively received and spent by men, they are the main consumers of store food.

Store food is also characterized by low stability, because its increased availability lasts only for as long as the logging operation is in full swing, which ranges anywhere between a few months to several years.

Overall, while logging does increase both availability of and access to store food, it mostly complements rather than replaces *home kaikai*. Thus, while the commonly heard phrase *kaikai selen* (Dyer 2017) captures very well how logging wages and royalties are used, both literally and metaphorically, logging money makes no structural contribution to local diets.

Home kaikai

The availability of and access to food obtained from fishing and hunting decrease as logging operations proceed. Fishing and hunting grounds become less productive or are entirely lost. We have to be cautious to attribute all degradation of fishing grounds to logging because many factors are at play here. These include a general shift to more intensive fishing methods, like night fishing with torches, and the use of trammel nets and chemicals, which can result in overharvesting (see also Albert et al. 2014). While these changes are partly catalyzed by logging, they reflect wider social-environmental transformations, among which the erosion of preexisting natural resource management mechanisms (Govan et al. 2015).

	Store food	*Home kaikai* from various sources				
		Reef fishing	Mangrove fishing	Freshwater fishing	Gardening	Hunting
Availability	+	-	-	-	+/-	-
Access	+/-	-	-	-	+/-	-
Stability	-	-	-	-	-	-

Table 5. Impact of logging in Malaita on three pillars of food security: availability, access and stability.

However, there is increasing scientific evidence from other parts of Solomon Islands of the negative impact of logging on the integrity of freshwater and marine ecosystems. For instance, on Kolombangara Island, logging results in unsustainable soil erosion rates, which has multiple ecological and hydrological effects, including direct negative effects of sediment on freshwater species (Wenger et al. 2018). In Marovo Lagoon (Western Province), high sediment loads in the heavily logged Gevala River catchment area have had considerable downstream impacts on the Merusu reef, causing it to have relatively low biomass of herbivorous fish, poor water quality and poor reef conditions (Albert et al. 2014). In western Isabel, Hamilton et al. (2017) found severe impacts of logging on the habitat of juvenile bumphead parrotfish, which (like many juvenile coral fish) depend on highly branching corals that occur in shallow inshore areas. These corals are very vulnerable to logging, because increased sedimentation results in smothering of coral, and the low light conditions hinder photosynthesis. Much of this sedimentation increase is caused by log pond construction (Hamilton et al. 2017, 275).

Availability of and access to garden products follows a variable pattern. In the short-term, the productivity of gardens close to the village often suffers from direct damage by logging activity (road construction in particular) and changes in time expenditure. At the same time, logging clears previously inaccessible forestland and provides transportation between the garden and the village. However, as these new and remote gardens can only be reached by logging truck, they are usually abandoned after the logging operation. In the long term, logging has a predominantly negative impact on gardening. There is increasing evidence that the transportation of logging machinery between islands spreads weeds and pests, which cause persisting productivity problems to Malaitan farmers (Kiddle et al. 2017; Stronge 2016).

Implications

The post-logging situation is consistently described as a period of hardship. For their sustenance, rural Malaitans depend on the same resources negatively impacted by logging. By undermining the core means of food provisioning (fishing, gardening and hunting) (Schwarz et al. 2013; Albert 2014), logging is further increasing the risk of malnutrition (SIG 2017, 180). Alarmingly, the negative impacts of logging on drinking water compound these problems (Wenger et al. 2018). Logging companies frequently destroy piped water systems, on which nearly 46% of the rural population depend (SIG 2017, 17 and 169), and rarely take responsibility for repairing the damage. Therefore, logging effectively increases the share of the rural population depending on unsafe sources of drinking water.

Simultaneously, logging results in a (temporary) increase in the consumption of imported products, notably rice and noodles. These ready-to-cook products certainly have value. Importantly, they relieve women from the burden of acquiring, processing and preparing *home kaikai*. Also, the long shelf life of packaged food makes it suitable as high-calorie emergency food. Moreover, the taste of store food is much appreciated, particularly by young people.

However, store foods generally have low nutritional value and high fat, sugar and salt content. Therefore, the above-described trends can potentially aggravate the depth and spread of the so-called "double-burden" of nutrition: a situation wherein families have both overweight adults and stunted children. Indeed, some of the worst nutrition situations reported by nurses came from logging areas on Choiseul, where people only subsisted on rice, noodles and canned fish and meat (Unicef 2005, 12).

5.2 Conclusions

"From happy hour to hungry hour" is a phrase used by one of our informants to summarize how logging has changed food provisioning as the mangroves from which women used to collect their "happy hour food" (shells, mud crabs, mangrove worms and small fish) were clear-cut to create a log pond near the village of Mararo (East Are'Are). Her words capture our overall findings well.

We conclude that logging leads to an overall decrease of food security as a result of two simultaneous trends. On the one hand, logging leads to increased availability of store food, but access to this food is uneven between and within villages, families and households. Because of the temporary nature of logging operations, it is also characterized by low stability. On the other hand, logging negatively affects food derived from fishing, gardening and hunting in terms of availability, access and stability because it undermines the resource base on which these activities depend.

Our respondents consistently report negative impacts of logging on freshwater and marine ecosystems. Men and women also directly feel this in their fishing activities, albeit with different emphases: 69% of men (n=39) and 53% of women (n=40) see negative impacts of logging on inshore reef resources. A crucial impact

of logging is its negative effect on mangrove resources. This is especially important for women, 68% of whom reported this problem (and 26% of men). Women also more frequently report impacts on freshwater resources than men (50% and 28% respectively), even in coastal communities. This suggests that the importance of both mangrove and freshwater fisheries is underacknowledged and undervalued.

Strikingly, a major cause of resource decline is the direct destruction of coral reefs (reported by 38% of men and 28% of women) and mangroves (8% of men and 43% of women) for log pond and wharf construction. Another important reported cause is the smothering effect of increased sedimentation on corals (26% of men and 5% of women) and mangrove roots (3% of men and 30% of women). Finally, the pollution of rivers and coastal waters from oil spills is reported by 18% of men and 50% of women. Many of these impacts, oil spills in particular, are easy to avoid and thus suggest highly careless logging practices.

While the negative environmental effects of logging in Solomon Islands have raised alarm since long ago and have been highlighted in numerous reports (e.g. Katovai et al. 2015; Sinclair Knight Merz 2012; Pauku 2009), there has been much less consistent attention on its social impacts. The logging industry itself denies having any responsibility (Tuni 2017). However, the social impacts are a major source of concern for rural Malaitans because they are deeply disrupting and last much longer than the logging operations themselves (see Allen et al. 2013 xi and 21–23).

Post-logging resource recovery is a challenge that requires persistent and concerted resource management. However, the social cohesion and collective action needed to successfully meet that challenge are often undermined by the rifts that logging brings within landholding groups, villages and households. Among the many unresolved structural issues is the question of who is entitled to decision-making about logging. Currently, formal decision-making is the privilege of those holding primary resource rights, which excludes those who do not hold such rights in the cutting areas but do suffer downstream impacts (see also Baines 2015).

We further conclude that the often-cited importance of logging to the local economy is grossly overestimated. Local employment in logging is unstable, low paid, male-dominated and limited relative to the total population affected by logging operations. Moreover, we found that actually received royalty payments are negligible (SBD 50–500 per capita per shipment) and therefore never structurally contribute to local development. Crucially, women rarely receive royalties.

The logging industry is highly exploitative of communities. Licensees and logging companies capitalize on the lack of government presence in the remote areas where they operate and suggest that they can fill this vacuum by promising "development": infrastructure, schools, clinics, water and sanitation projects. While these promises are made in return for landowners' acceptance of logging, they are rarely formalized and remain largely unfulfilled. In the absence of transparent benefit sharing agreements and enforcement regimes, landowners have very little control over the outcomes.

Meanwhile, the same lack of government presence that explains the appeal of logging companies, means that they can operate without checks and balances since police, forestry, environment and

Plate 25. End of Rite Trade logging road at Aieke, Central Are'Are 2017.

Plate 26. Abandoned log pond at Honoa, East Are'Are 2016.

fisheries officers are either absent or do not take action. Therefore, the widespread damage to gardens, fishing grounds, forest resources and water systems remains unaccounted for, and communities are often chronically immersed in frustrating complaint and damage compensation procedures.

Although the direct monetary and development benefits of logging are practically insignificant, logging does indirectly stimulate other, more gender-inclusive economic activities that make a greater contribution to household needs, albeit only for the duration of the operation. Marketing activity around log ponds intensifies, and local stores situated in villages close to the wharf and along logging roads run better when logging companies are around. Most importantly, landowners make use of the available infrastructure (roads, trucks and barges) to run their own small-scale logging and sawmilling activities. This allows for the construction of timber houses and for the sale of cubic, which generates far better earnings than logging royalties and wages. Moreover, in contrast to "logging money," these earnings appear to get invested in longer-term projects like supplying a store or purchasing tin roofs, a chainsaw, a portable sawmill or outboard motor. In all of these activities, women play an important role and also have more control over the generated earnings.

In all other respects, however, logging reinforces gender inequity in rural Solomon Islands. First, women are disproportionately affected by the environmental damage logging causes, notably by the impacts on mangroves, gardens and water quality. The stark gender differences in the reported impacts of logging can be explained by the relative importance of mangroves for women's fisheries, and of rivers for other predominantly female tasks, like washing, fetching water and bathing children. The high importance of oil spills that women report can be seen in the same light, since women are probably more often confronted with this problem than men. While unsurprising, these findings underscore the importance of paying specific attention to how logging is affecting women's well-being.

The male-dominated character of the logging industry itself and the way land rights and decision-making processes regarding land and resources are locally organized both work together toward the systematic exclusion of women from the management and potential benefits of logging. Also, while women with husbands employed in logging see little of the logging wages flowing back to the household, their workload at home and in the garden intensifies. Coupled with increased alcohol consumption, this gives rise to tensions in the household, sometimes with violent outcomes. Finally, logging is associated with the sexual exploitation of women and girls, which harms their dignity, puts their health at risk and compromises their future and the future of the children born from these encounters.

In conclusion, the unregulated and socially and environmentally damaging nature of logging operations has highly undesirable outcomes in terms of food security and social justice. It has the potential to seriously deteriorate the nutrition status of rural households and is fractioning communities. Given that the forestry industry itself does not take responsibility for these issues, fails to meet its financial obligations and is operating in environmentally unsustainable ways, logging presently is a burden rather than an asset to Solomon Islands.

Plate 27. Log for the school, Ruarata, East Are'Are.

Plate 28. Landowners milling their timber at Uhu, West Are'Are 2016.

5.3 Recommendations

Turning this situation around to one in which logging could make a real contribution to local well-being requires concerted action from actors at the national, provincial and local levels. As a modest start to addressing that challenge, we are presenting a number of recommendations that can be provincially achieved, focusing on the following four fields: (1) empowering communities for inclusive decision-making, (2) increasing the benefits of logging, (3) preventing social harm and (4) minimizing environmental damage. These recommendations are meant to start a constructive dialogue on how an environmentally and socially sustainable logging industry can be developed that will help fulfill the present and future needs and aspirations of rural women and men.

Empowering communities for inclusive decision-making

The provincial government supports landowners to make prior informed decisions that have broad support from the community.

- Prior to the TRH, community awareness meetings are held by a multisectoral team led by provincial government officials with support from national line agencies, police, church groups and NGOs, and are paid for by the license applicant.[21]
- These meetings discuss the potential benefits and risks of logging, people's legal rights and responsibilities, and actively involve women and youth.
- Women's concerns and demands receive specific attention in EIS/PER procedures and the TRH.
- Women's direct representation in local decision-making procedures is formalized.
- The TRH and the presentation of EIS/PER results are timely and effectively announced to men and women in affected communities.
- The provincial government develops a mechanism to receive and address objections and complaints regarding logging applications and operations.

Increasing the benefits of logging

The provincial government ensures equitable and effective benefit sharing.

- Provincial tax collection from logging companies and licensees is strictly enforced.
- Additional legal possibilities for maximizing provincial revenues are determined and institutionalized.
- Benefit and royalty sharing agreements are transparent and accessible.
- Implementation of benefit sharing agreements must start prior to the logging operation (not after export) and is monitored by the provincial government.
- The provincial government ensures that mismanagement of royalties by licensees and logging committees is investigated.

The provincial government stimulates a shift from labor extensive round-log exports to labor intensive timber milling:

- The provincial government requires logging companies to have timber milled locally.
- The provincial government promotes and supports the development of a locally owned, sustainable timber industry.

Preventing social harm

The provincial government ensures that the social impacts of logging are minimized.

- The provincial government requires logging companies to pay for community support programs that address alcohol abuse, domestic violence, health (including sexual health), household economics and nutrition. This includes training of teachers, women's groups, church and village leaders to detect and report sexual abuse.
- The police immediately respond to sexual offenses against women and girls.
- No new licenses for local bottle-shops in logging areas are issued.

Minimizing environmental damage

The provincial government develops mechanisms to monitor and respond to environmental damage.

- Provincial multisectoral teams are trained to monitor and enforce logging companies' compliance with environmental regulations (i.e. Logging Code of Practice, the FRTUA and the Environment Act). Specific attention is needed for oil pollution.
- The construction of new log ponds is prohibited.

Notes

[1] An encouraging exception is the Ridges to Reefs Conservation Plan for Isabel Province, which acknowledges the threat that logging poses to ecosystems on which the provincial population depends (Peterson 2012, 11) and identifies priorities for resource conservation planning.

[2] "Tribe" is a central notion in Malaitan local organization and refers to patrilineal land holding groups that trace their descent to a common ancestor. In this report, the term "tribe" is only used in quotes, while we will otherwise use the term "clan" (see also Moore 2017).

[3] Sinafolo, Bina and Arabala (Langalanga Lagoon), Fumamato'o, Hatodea and Uru'uru (Lau Lagoon), Haukona, Surairo, Nahu, Kopo, Countryside, Wairokai, Uhu and Afio (West Are'Are), Mararo, Raroasi, Pio, Aiparuru, Honoa, Muki, Jordan/Tariuna, Orea/Taripiri and Manu (East Are'Are).

[4] The estimated log export volume stood at 2,743,845 m^3 in 2016 (MOFR 2017).

[5] Frazer (1997, 65) has documented in detail how the only government that was critical of logging (the National Coalition Partnership 1993–1994) was brought down mainly because of its attempts to reform the forestry sector.

[6] Allen (2008, 277) reports a 15% contribution of logging to government revenues, and so does the ADB (ADB 2012, 2).

[7] The export values are based on the "customs and excise export duty rates for round logs," which are determined quarterly based on international market prices by the Ministry of Finance and Treasury.

[8] The distribution of the remaining 15% between the licensee and the landowners depends on their agreement, but commonly favors the licensee (see Chapter 3).

[9] The civil conflict resulted in the eviction of 35,000 migrant settlers (mostly Malaitans) from Guadalcanal, and the breakdown of business and infrastructure following attacks by Guadalcanal youths and counterattacks by Malaitan youth militia. It is increasingly acknowledged that the destabilizing effect of the close ties between the logging industry and the political elite is among the root causes of the conflict (Bennett 2002, 10–14; Allen et al. 2013, 11). Given that these ties still exist and have arguably further intensified, that the SIG continues to capture very little of the logging rents, and that the group of unemployed youths is growing quickly, the safeguarding of peace and stability remains a serious concern (see Allen and Porter 2016).

[10] Personal communication with several provincial officials in 2017 and 2018.

[11] While one way of overcoming this problem would be to invest royalty payments into collective projects, we have come across only few such initiatives, and these were associated with conflict over financial management and project implementation.

[12] See also Allen et al. (2013: 23) for Malaita, and Raomae (2010), Herbert (2007), John (2017), Toito'ona (2018), Sanga (2017), Buchanan (2017) and Runa (2018) for other provinces.

[13] Some of the expatriate men employed by logging companies have worked in logging operations across the tropics (Southeast Asia, Central Africa and South America). If they have had similar encounters with local women in these other countries, the risk of them bringing sexual transmittable diseases, including HIV/AIDS is significant (see also World Bank 2017, 56).

[14] Local (derogatory) term for people of Chinese or generally "Asian" origin.

[15] The first family consists of the parents and three daughters 2–12 years old; the second household has seven children ranging from 9 months to 17 years old, including four teenage boys, with the male household head earning a daily logging wage of SBD 32 based on an eight-hour workday. Both households kept records of the food they consumed as part of meals and as snacks over a 30-day period in April/May 2017.

[16] *Roropio* (mangrove worm, *Teredo navalis*).

[17] *Ke'u* (mud shell, *Polymesoda* sp.); *maruri* (unknown), *u'u* (mangrove whelk, *Terebralia palustris*), *iro* (mangrove oyster, *Saccostrea cucullata*).

[18] *Supo* (marine snail, *Melanoides* sp.), *u'a* (mud crab, *Scylla serrata*).

[19] Ngalinut (*Canarium* sp.), pana (*Dioscorea* sp.), yam (*Dioscorea* sp.).

[20] The fourth pillar, utilization, which is the metabolism of food by individuals, falls outside the scope of this study.

[21] Information sharing by communities that have previous experience with logging is stimulated (a promising ongoing initiative is the Maasina Greenbelt in Are'are).

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