TOTAL E&P PNG LIMITED

PAPUA LNG

Upstream Environmental Impact Statement

Volume 2: Environmental and Social Baseline

Part 15
Upstream Governance and Economics Baseline Report

TOTAL
TOTAL E&P PNG LIMITED

Papua LNG Project

Total E&P PNG Limited

Upstream Governance and Economics Baseline Report

Report: 01215B_25_6-3_ v6

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August 2017

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Document Summary

Company:	SIA & Development
Project Manager:	Mike Finlayson
Title:	Upstream Governance and Economics Baseline Report
Author/s:	Mike Finlayson
Client:	ERIAS Group and Total E&P PNG Limited
Client Contact:	Danielle Martin
Date of Issue:	August 2017
Version	V6 final
Document Reference	01215B_25-6-3_v6
Delivery Format:	word
Contact:	Mike Finlayson: mp.finlayson@gmail.com

Revision History

No.	Title	Date	Author	Details or change
6	01215B_25-6-3_v6.docx	23/8/17	M Finlayson	Final

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Executive Summary

This Upstream Governance and Economics Baseline Report is one of several stand-alone reports that will be used to compile a social baseline for the Papua LNG Project. This report is limited to the upstream component of the Project.

Project Description

Joint venture partners, Total E&P PNG Limited (TEP PNG) (40.13%), ExxonMobil (XOM) (37.03%) and Oil Search Limited (Oil Search) (22.84%), are currently planning the development of the Elk-Antelope gas field, which is located in Gulf Province, Papua New Guinea. The gas fields are located within Petroleum Retention License 15 (PRL-15). The Project will include infrastructure development inside PRL-15, and the construction of gas and condensate pipelines (export pipeline) to an LNG Plant site at Caution Bay, 20 km northwest of Port Moresby. TEP PNG, a wholly owned subsidiary of TOTAL S.A (TOTAL) has the largest interest in the Elk-Antelope gas field and is the operator of the Papua LNG Project (the Project) on behalf of the other joint venture partners.

Legislative and Regulative Framework

Petroleum projects are regulated by the *Oil and Gas Act 1998*. Among other matters, Section 49(c) of the Act requires that petroleum license applicants submit to the Minister [for petroleum] and Minister responsible for environmental matters "a socio-economic impact study as part of the environmental plan required under the Environmental Planning Act 1978". However, there is little guidance on what constitutes or is required for a social baseline, or socio-economic impact assessment, in Papua New Guinea. Guidance in terms of the socio-economic impact statement is provided in the *Environment Act 2000* (refer Independent State of Papua New Guinea, 2004). Section 51 of the Environment Act stipulates the need for an Environmental Impact Statement for Level 3 activities. Level 3 activities include petroleum activities for which a Petroleum Development License (PDL) or Pipeline License (PL) is required, or activities in which a Petroleum Processing Facility License (PPFL) is required (with the exception of processing activities classified as Level 2, Category B).

An information guideline prepared by the Department of Environment and Conservation (now Conservation and Environmental Protection Agency (CEPA)), states that the EIS should include, among other things, characteristics of the receiving environment, including the social structure and socio-economic data on the resource/land owners, LLG, the Province and Papua New Guinea.

A working draft: Social Impact Assessment Guideline was published by the former Department of Environment and Conservation in 2001 however has never been formally incorporated into the Environment Act.

TOTAL the parent company of TEP PNG, has a Social Baseline Study (SBS) general specification (GS_EP_SDV_101) that describes the objectives, roles and responsibilities, process and reporting requirements for social baseline studies (TOTAL, 2014). As stated in the general specification, the overarching objective of a SBS is to describe the societal and human rights context of the potential project sites.

This report has been prepared in accordance with the social baseline standards or requirements of the PNG's Environment Act and related guidelines, the International Finance Corporation (IFC) and International Petroleum Industry Environment and Conservation Agency (IPIECA), both of which are referenced in TOTAL's SBS general specification.

Study Area and Project Area of Influence

The Upstream Governance and Economics Baseline Report presents information, when available, for (i) Papua New Guinea, (ii) Gulf Province, (iii) Kikori District, (iv) Baimuru and Ihu Rural LLGs, (all of which are considered to be within the Project Area of Influence) (PAOI). The

PAOI includes 39 villages and one government station with a combined population in mid-2016 of 12,763. This area was the study area for the SBS from which primary data for this baseline report was obtained.

Information presented at national and sub-national levels provides context and allows comparisons with information presented for the PAOI.

Methodology

The key objective of the SBS is to identify, describe and, where possible, quantify and map social values in the study area that require consideration in the development of the Project. The Upstream Governance and Economics Baseline report provides information on the following:

- Social structures and governance arrangements; and
- Economic activity.

Social baseline data requirements were identified by assessing (i) national legislation and international best practice and (ii) the social impacts of other large-scale resource projects in Papua New Guinea. This resulted in a 'data map' that articulated all social baseline data requirements, and differentiated between secondary and primary data sources. Following a detailed literature review, secondary data was collected from various agencies, and survey instruments prepared for the collection of primary data, which included both community level and household surveys.

Governance

PNG society, and the PAOI in particular, is influenced by the following social structures and governance arrangements:

- Traditional social structures;
- Religion;
- Government administration;
- Donors and civil society;
- Logging projects; and
- Petroleum projects.

Traditional Social Structures. Village life revolves around subsistence, social relationships and social obligations, all of which are tied to land, which provides for the majority of subsistence, provides social identity and provides meaning to social obligations. Although traditional leadership and social organization varies across Papua New Guinea, rights over land access and use are of fundamental concern to the entire population. Some 97% of land in Papua New Guinea is owned on a communal basis and referred to as customary owned land. The Constitution of the Independent State of Papua New Guinea (Amendment 22) and national laws expressly recognizes customary law and robustly protects their customary institutions, laws and rights to land.

In the PAOI, land ownership is vested in clans. A clan is a group of families with a common ancestor or common lineage. A clan will identify themselves and their customary-owned land through oral histories, including genealogies, stories, beliefs, customs and practices. In the PAOI, members of one clan may reside in several villages, although these villages will be affiliated to only one tribe or language group.

The clan provides a safety net for the community and for the welfare of its members. The '*wantok*' system reinforces the primary allegiance to one's clan, placing the obligation of kinship, along with the expectation of reciprocity, on its members.

Traditional leaders are recognized in the PAOI and are often elderly statesmen, identified from within the village as a result of their experience, wisdom and character. Although their role is changing over time, they generally provide leadership in matters impacting on resource access, relationships with other groups or communities, and maintaining peace and law and order.

Religion. The progressive introduction of Christianity in Papua New Guinea from the 1800s had a marked effect in the country; it introduced western concepts of right and wrong, it introduced new beliefs, and it introduced a new layer of village leadership. In many locations, these concepts were introduced simultaneously with government administration, both leading to substantial social change. The churches also played a major role in the expansion of coconuts and copra production in Gulf Province, and the expansion of schools and health services.

The main denominations in the PAOI are the Catholic, United Church, Seventh Day Adventists, Lutherans and Gulf Christian Services. All villages in the PAOI, with the exception of Poroi 1, indicated that they had church leaders.

Government Administration. PNG's public sector includes:

- Three tiers of government (national, provincial and local); and
- The national Public Service, which includes staff based at national, provincial, district and local-government levels.

Service delivery responsibility is vested in the hands of the Provincial Governor, who chairs (or appoints the chair of) the Joint Provincial Planning and Budget Priorities Committee (JPPBPC), and the Open Members of Parliament, who chairs the District Development Authority (which replaced the District Administration and Joint District Planning and Budget Priorities Committee in 2014).

A review of provincial service delivery by the Constitutional and Law Reform Commission in 2009 concluded that in Gulf Province rural communities continue to be denied the basic human right to essential services. While a 10-year development plan was prepared in 2011 (Gulf 2020), neither district nor any of the Local Level Governments (LLGs) have the required five-year development plans, nor does the province have a corporate plan. The Constitutional and Law Reform Commission concluded that neither the Provincial Tenders Board nor Provincial Building Board were functioning properly. The conclusions made by the Commission in 2009 remain valid in 2016.

Around three quarters of all villages in the PAOI are represented by a ward councilor, a position elected by residents of the ward which represents the ward in local level government. Almost 28% of all villages have a ward development committee, comprising residents appointed by the ward councilor, responsible for identifying development projects for submission by the ward councilor to the LLG. For those three quarters of all villages in the PAOI, with a ward councilor and Ward Development Committee, little or no money has been received to implement projects at village level.

Around three quarters of all villages are served by a village court system. The village courts have been substantially strengthened since responsibility for them was transferred to the Department of Justice in 2012.

However, within the PAOI, there is an overwhelming feeling among all communities that government at all levels has neglected them.

Donors and Civil Society. In 2015, the aid contribution to Papua New Guinea was PGK819 million (USD262 million), which represented 8% of total government revenue. In Gulf Province, donors provide substantial contributions to education, health and law and order. The donor contributions are largely delivered through national programs where the Provincial Government or District Authorities are aid recipients rather than being actively involved in planning and management of aid programs.

All but five villages in the PAOI identified some external assistance over the past decade. Assistance has been provided by various donors, Members of Parliament (MPs) and companies, with most assistance provided for water supplies, health facilities and schools. Not all assistance has been effectively implemented.

In Papua New Guinea, the churches are the largest and most prominent components of civil society, fulfilling primary service-delivery roles including health and education. Various civil society organizations (CSOs) exist at national level, and while the National Government has articulated development strategies that involve CSOs, it has not articulated a role for civil society in governance.

Very few CSOs, other than the churches, operate in Gulf Province. However, 84% of villages in the PAOI had a youth group, 87% of villages had a women's group, and 97% of villages had a church group.

Although the groups have different membership, all are generally involved in fellowship, fundraising and community services. Some women's groups are involved in business activities, and many of the youth groups are involved in sporting activities.

Logging Projects. Landowners within the PAOI have or are participating in large-scale logging activities. Timber permits cover the majority of Gulf Province. However, there is little transparency in logging payments or project expenditure at local level, and no recent data available for Gulf Province. The Gulf Provincial Government notes that royalty and equity benefits from logging are not visible on the ground. A report by the Overseas Development Institute (ODI) noted that governance failings have been a noticeable characteristic of the PNG forest sector for the last twenty years, and a succession of Independent Reviews commissioned by government has continued to question the way that timber licenses are issued and subsequently operated.

In the PAOI, the majority of villages have Incorporated Land Groups (ILGs), generally for each clan, and around half of the villages are involved in a Landowner Association and Landowner Company, more commonly on a tribal or project basis. The majority of these organizations have been established to participate in logging projects, although landowners have generally not benefited as expected, and the majority of ILGs struggle to meet the requirements outlined in the Land Groups Incorporation (Amendment) Act 2009.

Petroleum Projects. Petroleum projects impose a new level of governance on local communities. Because the potential benefits are so great, it is of paramount importance to be recognized as project landowners. Not surprisingly, in a land tenure system where land boundaries are neither documented nor necessarily permanent, results of the social mapping and landowner identification (SMLI) study commonly leads to disputes between tribes, clans and families.

Project landowners typically receive benefits via an Incorporated Land Group (ILG) and are members of a Landowner Company. The project benefits are determined in a meeting, called the development forum, which is chaired by the Minister for Petroleum and Energy. Landowner benefits typically include a share of royalties, equity, business development grants, lease and compensation payments, and landowners will expect preferential employment and business opportunities. The provincial and/or LLGs may typically receive a share of royalties and equity and development levies. They may also buy additional equity in the project. Additional funds can be allocated to infrastructure in the project area under Infrastructure Development Grants, or subsequently, under the Tax Credit Scheme. There is thus a range of potential benefits for landowners and other communities in the project area and host province. However, PNG's record has been poor in both mining and petroleum projects, with many common shortcomings, including cash payments being inequitably distributed among landowners, cash payments replacing traditional methods of cash income, thereby placing a dependency on a non-renewable resource, failure to improve public infrastructure and services, limited involvement of landowners in how money is spent or invested on their behalf, limited provincial and LLG capacity, and a lack of transparency.

In the PAOI, some Pawaians are involved in the Elk-Antelope Resource Gas Project Area Landowner's Association and a local business company called Sakura Osura Resources Limited. Both were established with assistance of InterOil, the previous operator of PRL-15.

Economic Activity

Economic Infrastructure. Papua New Guinea has difficulty maintaining its economic infrastructure, or extending its coverage to the wider population:

- 47% of the population live five or more kilometers from the nearest national road;
- Only 12% of households in Papua New Guinea have access to electricity); and
- While mobile phone coverage has been expanded dramatically over the past decade, internet coverage was around 10% in 2014).

Economic infrastructure in Gulf Province has stagnated since Independence: regular shipping services ended in the 1980s, many airstrips have been closed or are not serviced by regular flights, and electricity is limited to Kerema and Malalaua. Kerema has postal services and a bank, other services are limited to Chinese trade stores, a hotel and several guesthouses.

People living within the PAOI rely predominantly on dinghies and canoes for transport. The only roads in the PAOI are temporary logging roads. The only operational airstrips in the PAOI are those at Wabo and Herd Base. Neither is serviced by regular commercial flights. Coastal shipping services ended in the 1980s, although TEP PNG and the logging companies contract barges to deliver equipment, materials and other goods to the Project area.

Around two thirds of the villages in the PAOI have mobile phone coverage, and solar has replaced generators as the main source of electricity: 28% of households in the PAOI have access to generators while 53% have access to solar panels (40% of households stated solar provided the main source of lighting and 10% stated it provided a secondary source of lighting. Some households had access to solar power but it didn't provide the main source of lighting).

Economic Activities. Papua New Guinea has experienced strong growth in Gross Domestic Product (GDP) over the past decade, with much of the growth in 2014 and 2015 attributed to the PNG LNG Project. The formal economy is dominated by mining and petroleum, commercial agriculture, tuna processing and logging, of which the majority are foreign owned or foreign controlled, and a small manufacturing sector. The informal economy, which supports 85% of the population, is primarily dependent on subsistence agriculture.

The main industries in Gulf Province are oil, prawns and logging. Oil has been extracted from the Gobe Main and South East Gobe oil fields since 1998. Although the majority of PNG's prawns are captured in the Papuan Gulf, they are all processed in Port Moresby. Although the province contains five large-scale logging operations, benefits from logging are not visible on the ground and the provincial government does not benefit financially.

In the PAOI the main industries are logging and petroleum (the latter in a development phase). The only logging occurring within the PAOI is Vailala Block 3, operated by Frontier Holdings. However, Turama Forest Industries has a permit to log in Baimuru Block 3, which covers PRL-15 in its entirety. Both Frontier Holdings and Turama Holdings are affiliates of the Rimbunan Hijau (PNG) Group, the Malaysian logging company.

For the majority of people living in the PAOI, the main sources of income are from the sale of betel nut, fish, crabs, garden produce and sago. Outside the logging and petroleum operations, the only business activities in the PAOI are restricted to small trade stores and fuel retailers, many of which operate on an intermittent basis, and few are formally registered.

Labor. Analysis of 2011 census data indicate that Papua New Guinea had 61% labor force participation and 3% unemployment, and of those economically active, 16% had formal wage employment. Most economically active people, particularly females, are employed in subsistence activities.

Within the PAOI the labor force participation rate is very high (males 86%, females 88%), noting that this includes both subsistence activities and formal labor activities. The proportion of people stating they were unemployed is also very high for Papua New Guinea, and particularly a rural area (males 9%, females 6%). As expected, most people are occupied with

subsistence activities, however, 17% of males and 8% of females have formal employment or business activities. The main sources of formal employment are government, church agencies and TEP PNG. The most common jobs included teachers, village court officials, pastors, carpenters, cooks and laborers.

In the PAOI there is a clear division of labor. However, making sago, making and tending to gardens, fishing, collecting seafood, collecting edible plants and community work are all important tasks performed by both men and women. Hunting, making canoes and building houses are tasks that are primarily the responsibility of men, while women spend more time making sago and performing duties around the house, including caring for children, collecting water, cleaning and cooking.

Income Levels. The World Bank estimated GDP per capita in 2014 at USD2,268, or roughly PGK5,600. However, an estimate of the median household income level, based on analysis of the 2009-2010 Household Income and Expenditure Survey, is estimated at below PGK1,000 (USD320), implying substantial inequality between formal and informal sectors of the economy.

Results of the Household Survey indicate that 43% of households had three or more income sources in the previous two-week period and the median household income level in the PAOI was PGK80 (USD26) per fortnight. This equates to PGK2,080 (USD666) per annum or PGK312 (USD100) per annum per capita.

The median level of household expenditure in the PAOI was PGK76 (USD24) per fortnight, which equates to PGK1,976 (USD632) per annum or PGK286 (USD92) per annum per capita. The majority of household expenditure was allocated to food, transportation and basic household necessities. Due to high transportation costs, the price of fuel and store goods in the PAOI is high relative to Kerema or Port Moresby.

Women's Participation in the Economy. Women play a key role in the subsistence economy. However, women occupy only 27% of jobs in the formal economy (across Papua New Guinea), and their wage levels are around half that of males. Women are particularly disadvantaged in rural areas, including much of Gulf Province, where literacy levels are low, access to markets can be expensive and time consuming, and training and business support services are limited.

Results of the Women's Focus Group Discussions indicated that most women from approximately 70% of villages earn income for the household, have their own money to spend, and contribute to family spending decisions. However, access to credit in the PAOI is limited, there are few markets in the PAOI, and income-earning opportunities for women are limited.

Women's Assessment of Disadvantaged People in the PAOI. Women from 61% of villages considered that the village contained people that were disadvantaged. The main types of disadvantaged people in the PAOI included women headed households, single mothers and widows. Based on results of the Household Survey, 7% of households in the PAOI are headed by women. Several villages also identified elderly headed households, people with a disability and orphans as disadvantaged. Again, based on results of the Household Survey, approximately 8% of people had a disability of some kind. It is unlikely that people with a serious disability, or orphans, will attend school, and will therefore remain illiterate. However, people that are disadvantaged are cared for by their families. While some civil society organizations (particularly women's and youth groups) appear to play an important role in supporting disadvantaged people, there are no government services or facilities in the PAOI to provide assistance.

In other respects, it could be argued that the entire PAOI is socially and economically disadvantaged:

- Few people have access to anything but the most basic medical services;
- Few children have access to anything but the most basic elementary and primary schools; and

- There are very few income-earning opportunities due to limited markets within the PAOI and a lack of buyers or market infrastructure to enable sales to other areas.

1. Introduction

This Upstream Governance and Economics Baseline Report is one of several stand-alone reports that will be used to compile an Environmental and Social Baseline Report for the upstream component of the Papua LNG Project. The report has been prepared following research and consultation conducted in Gulf Province in 2016.

This section of the report describes the Papua LNG Project and the objectives of the Governance and Economic baseline study.

1.1 Project Overview

Joint venture partners, Total E&P PNG Limited (TEP PNG) (40.13%), ExxonMobil (XOM) (37.03%) and Oil Search Limited (Oil Search) (22.84%), are currently planning the development of the Elk-Antelope gas field, which is located in the Gulf Province, Papua New Guinea. TEP PNG, a wholly owned subsidiary of TOTAL S.A. has the largest interest in the Elk-Antelope gas field and is the operator of the Papua LNG Project (the Project) on behalf of the other joint venture partners.

The Elk-Antelope field, located within Petroleum Retention License 15 (PRL-15), is a significant gas discovery in Papua New Guinea consisting of a gas reservoir with several trillion cubic feet of gas reserves located approximately 120 km inland from the township of Kerema, and 340 km northwest of Port Moresby.

The Project will comprise upstream production well development and associated infrastructure at the gas field within PRL-15, construction of an upstream central processing facility (CPF) and delivery of gas and condensate via onshore and offshore export pipelines to a LNG Plant site at Caution Bay, Central Province, 20 km northwest of Port Moresby. The design life for the Project will be 25 years.

The Project area comprises the physical footprint of the various Project components and associated infrastructure as detailed below.

- Production, processing and related facilities (within PRL-15):
  - Wellpads and the associated gathering system (including flowlines and trunkline);
  - Central processing facility (CPF) incorporating an acid gas removal unit (AGRU);
  - Logistics base and offloading facilities, accommodation camps, airstrip, roads and bridges;
  - Quarries, communications infrastructure;
  - Initial section of the onshore export pipeline.
- Onshore pipeline (outside PRL-15):
  - Remainder of the onshore export pipeline to landfall on the Gulf coast including valve stations;
  - Laydown areas, camps;
  - Quarries, communications infrastructure;
- Transport (river) corridors:
  - River transport routes— the Purari, Urika-Ivo and Wame-Varoi rivers;
- Offshore pipeline:
  - Offshore section of the export pipeline to a LNG Plant site.

Initially, the Project will focus on exploiting the Elk-Antelope reservoirs via one to three production wellpads on Antelope and one production wellpad on Elk. Gas and condensate will also be transported from the CPF and delivered to a LNG Plant site.

1.2 Objectives

The key objective of the SBS is to identify, describe and, where possible, quantify and map social values in the study area that require consideration in the development of the Project. The upstream governance and economics baseline study aims to:

- Characterize the socio-economic context of the study area, with a focus on the project area of influence (Section 3);
- Obtain socio-economic data that will help inform the prediction of potential impacts and development of management and mitigation measures;
- Contribute to the establishment of a social and economic baseline against which the impacts of the Project will be monitored; and
- Meet the requirements of national legislation and other requirements as outlined in Section 2.

The Upstream Governance and Economics Baseline Report contains a description of (i) social structures and other governance arrangements, and (ii) the economy of the study area.

2. Regulatory Framework and Standards

This section of the report provides background on the requirement for social baseline studies (and more broadly social impact assessment) for large-scale petroleum projects in Papua New Guinea.

2.1 National Legislation

Petroleum projects are regulated by the *Oil and Gas Act 1998* (refer Independent State of Papua New Guinea, 2001). Section 49 of the Act states that a socio-economic impact statement must be submitted by the proponent to the Minister [for petroleum] and Minister responsible for environmental matters, before a development forum shall be convened.

Part IX of the Act regulates the participation and benefits provided to provincial and local-level governments and customary landowners in petroleum developments. Along with Section 47, which stipulates the need for preliminary and full-scale social mapping and landowner identification studies for petroleum license areas, this influences who and to what degree various provincial and local-level governments and other people may be affected by the project.

Guidance in terms of the socio-economic impact statement is provided in the *Environment Act 2000* (refer Independent State of Papua New Guinea, 2004). Section 51 of the Environment Act stipulates the need for an Environmental Impact Statement for Level 3 activities. Level 3 activities include petroleum activities for which a Petroleum Development License (PDL) or Pipeline License (PL) is required, or activities in which a Petroleum Processing Facility License (PPFL) is required (with the exception of processing activities classified as Level 2, Category B).

Section 2 of the Environment Act states that the environment includes:

a) Ecosystems and their constituent parts including people and communities and including human-made or modified structures and areas;
b) All natural and physical resources;
c) Amenity values;
d) The qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and
e) The social, economic, aesthetic and cultural conditions which affect the matters stated in Paragraphs (a) to (d) of this definition or which are affected by those matters.

An information guideline prepared by the Department of Environment and Conservation (now Conservation and Environmental Protection Agency (CEPA)), states that the EIS should include:

- A description of the proposed development activity;
- The development timetable;
- Characteristics of the receiving environment, including the social structure and socio-economic data on the resource/land owners, LLG, the Province and Papua New Guinea, and which may include:
  - Demographic information;
  - Information on existing infrastructure;
  - Information on public health issues (if applicable);
  - Information on present economic status of the project area;
  - Description of existing social services;
  - Details of archaeological, historical, cultural or religious features of the project area under consideration; and

- Environmental management, monitoring and reporting, including information on a socio-economic management and monitoring strategy (Department of Environment and Conservation 2004, pp. 3-4).

A working draft: Social Impact Assessment Guideline was published by the Department of Environment and Conservation in 2001 however has never been formally incorporated into the Environment Act.

No other official guidance has been provided on what constitutes or is required for a social baseline or socio-economic impact assessment in Papua New Guinea.

2.2 National Development Objectives

Papua New Guinea's development aspirations are enshrined in the Constitution, which has five national goals and directive principles:

1. Integral human development: every person to be dynamically involved in the process of freeing himself or herself from every form of domination or oppression so that each man or woman will have the opportunity to develop as a whole person in relationship with others;
2. Equality and participation: all citizens to have an equal opportunity to participate in, and benefit from, the development of our country;
3. National sovereignty and self-reliance: to be politically and economically independent, and our economy basically self-reliant;
4. Natural resources and environment: to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations; and
5. Papua New Guinean ways: to achieve development primarily through the use of Papua New Guinean forms of social, political and economic organization.

Papua New Guinea's development approach has been outlined in the following plans and strategies:

- Vision 2050;
- PNG Development Strategic Plan, 2010-30;
- Medium Term Development Plan (MTDP), 2011-15; and
- National Strategy for Responsible Sustainable Development.

Vision 2050, the Development Strategic Plan and MTDP were prepared between 2008 and 2010 and acknowledged that much of the rural population is not actively participating in the cash economy, and basic service provision remains low. The vision and plans acknowledge the need to effectively use the benefits of large-scale resource projects to grow and diversify the economy, leading to better service delivery and improved education and health services (National Strategic Plan Taskforce, 2010, pp. 24, 28). While the Development Strategic Plan and MTDP emphasize economic growth, the National Strategy for Responsible Sustainable Development, prepared in 2014, reiterates the national goals and directive principles outlined in the Constitution and emphasizes socially inclusive and environmentally friendly growth.

2.2.1 Vision 2050

Vision 2050 maps out PNG's development initiatives from 2010 to 2050 and identifies seven strategic pillars underpinning economic growth and development:

- Human Capital Development, Gender, Youth and People Empowerment;
- Wealth Creation;
- Institutional Development and Service Delivery;
- Security and International Relations;
- Environmental Sustainability and Climate Change;

- Spiritual, Cultural and Community Development; and
- Strategic Planning, Integration and Control.

Vision 2050 includes the aim to lift Papua New Guinea into the top 50 countries in the United Nation's Human Development Index (National Strategic Plan Taskforce, 2010, p. xiv). This represents a substantial improvement over its ranking in 2014, which was 157th out of 187 countries (UNDP, 2014, p. xii).

2.2.2 PNG Development Strategic Plan

The PNG Development Strategic Plan translates the focus areas of Vision 2050 into concise directions for economic policies, public policies and sector interventions with clear objectives, quantitative targets, and baseline indicators. The Development Strategic Plan is based on a series of strategies and targets that will contribute to economic growth (Independent State of Papua New Guinea 2010, p.15). These include:

- Effective land reform;
- A 55% reduction in crime;
- Quality basic education;
- 265,000 higher education graduates;
- Tripling the road network;
- Tripling the capacity of water transportation;
- 70% access to electricity;
- Internationally competitive agricultural sector;
- Doubling tuna revenues;
- 80% of timber exports processed;
- Maintaining 2009 oil production levels;
- Establishing two large gas projects;
- Doubling mining exports;
- Tripling manufacturing production; and
- 1.5 million tourists.

The PNG Development Strategic Plan has a strong economic focus and aims for a five-fold increase in national income levels by 2030, lifting Papua New Guinea to middle income status (Independent State of Papua New Guinea, 2010, p. 12).

2.2.3 Medium Term Development Plan

The MTDP is guided by the PNG Development Strategic Plan on how development will be undertaken under the Public Investment Program, outlining resource utilization by focusing development efforts on key policy areas. The MTDP, prepared by the Department of National Planning and Monitoring (DNPM), describes the resource envelope in which the National Government will operate over the five-year period (2011-2015), and guides sector, provincial, district and LLG plans (DNPM, 2010, pp. 5, 7).

2.2.4 National Strategy for Responsible Sustainable Development

The national planning framework described above outlines clear, albeit ambitious objectives. The O'Neil Government confirmed its support to Vision 2050, the Development Strategic Plan and MTDP in successive National Budget papers, most recently for the 2016 Budget (Government of Papua New Guinea, 2015, pp. i, 2, 26). The O'Neil Government has also instructed all government departments and agencies, including provincial governments, to align their strategies and plans with Vision 2050, the Development Strategic Plan and the MTDP. However, as part of the Alotau Accord, the O'Neil Government committed to reviewing the

Development Strategic Plan. This review resulted in the National Strategy for Responsible Sustainable Development (NSRSD).

DNPM prepared the NSRSD in 2013. In the Strategy, the Development Strategic Plan is described as a consumption driven, natural resources intensive, high carbon producing 'brown' economic growth path, that the industrialized world follows (DNPM, 2014, p. 19). The NSRSD is described as a transition towards a green and clean economy that is low carbon, resource efficient and socially inclusive (DNPM 2014, p. 20). The Strategy acknowledges that the medium-term development challenges require some reliance on the exploitation of primary resources to fund the investment needed for inclusive and innovative green economic growth as well as [improvements] in education, health and law and order (DNPM, 2014, pp. 21, 22). In essence, the Strategy challenges all Papua New Guineans and all organizations in Papua New Guinea to pursue development approaches that achieve greater social and environmental outcomes.

The NSRSD includes 21 guiding principles for inclusive and innovative green economic growth that emphasizes equality and inclusiveness, social protection, basic human rights, access to essential services, education, the protection of biodiversity and ecosystem services, energy efficiency, accountability and transparency (DNPM, 2014, pp. 60-64).

2.3 TOTAL Corporate Standards

Within its Sustainable Development framework, TOTAL has a SBS general specification (GS_EP_SDV_101) that describes the objectives, roles and responsibilities, process and reporting requirements for social baseline studies (TOTAL, 2014).

As stated in the GS_EP_SDV_101 general specification, the overarching objective of a SBS is to describe the societal and human rights context of the potential project sites. More specifically, the aim of the SBS is to:

- Gain a thorough understanding of the socio-economic and human rights context of the license area and future site(s) before any operational activity begins;
- To the extent possible, carry out a mapping of potential external stakeholders, compile a stakeholder database, and (know enough about them to) begin engagement;
- Identify information relevant to past, present, and potential human rights issues and exposures;
- Identify Project Affected Communities and Project Affected Peoples and, if possible, vulnerable Project Affected Peoples;
- Provide a body of information that is useful later when the local development support plan is developed; and
- Evaluate - at the end of operations - the differences between the baseline social context and the final social context (TOTAL, 2014, p. 7).

The SBS forms part of the social impact assessment, and highlights the importance of adequate and appropriate stakeholder engagement. While acknowledging the need to tailor studies to local conditions, it is expected that the following themes will be covered in the SBS reports:

- Country context;
- Legislative, regulatory and policy context;
- Community profile;
- Land and natural resource use;
- Government and local authorities;
- Civil society;
- Culture and cultural heritage;
- Public safety;

- Human rights context;
- Community health;
- Community education;
- Community services; and
- Economy (TOTAL 2014, pp. 9-17).

Human rights are incorporated in TOTAL's definitions for SBS. TOTAL has acknowledged various international organizations and principles and the approach to integrating human rights into environmental, social and health impact assessments prepared by the International Petroleum Industry Environment and Conservation Agency (IPIECA). It commissioned a dedicated Human Rights Impact Assessment, conducted by the Danish Institute for Human Rights, in early 2017.

Vulnerability is given particular attention by TOTAL in the SBS general specification, and is defined as an individual or group's diminished or lack of capacity to understand, anticipate, cope with, resist or recover from the consequences of a potential impact or other threat (TOTAL, 2014, p. 7). In this context, vulnerability is an assessment of project impact, and accordingly, will be addressed in the Social Impact Assessment. Vulnerability is differentiated from disadvantage, which refers more generally to people with a low level of wellbeing. The concept of disadvantage is easier to explain and more readily understood in Papua New Guinea, and was discussed with participants involved in consultations for the SBS. Results relating to disadvantage are presented as part of this Upstream Governance and Economics Baseline Report.

TOTAL's Charter of Principles and Guidelines Regarding Indigenous and Tribal Peoples reflects the principles of the International Labor Organization's Indigenous and Tribal Peoples Convention (C169). The Charter states that TOTAL affiliates will:

- Dialogue with communities in order to understand their goals, needs, values and constraints;
- Communicate plans to indigenous groups through presentations and local meetings;
- Inform indigenous groups about the development of the project; and
- Work with all stakeholders to ensure the overall impact of the project is considered positive.

The SBS general specification references publications prepared by the International Finance Corporation (IFC) and IPIECA, which are described below.

2.4 Industry Standards and International Good Practice

A review of information, relating specifically to social baseline standards or requirements of the IFC, IPIECA and International Association for Impact Assessment (IAIA) is presented below.

2.4.1 IFC

Over the past two decades the IFC has applied environmental and social standards to projects it has financed. The adoption of the IFC standards under the Equator Principles greatly expanded their application. The IFC currently has the following performance standards:

1. Social and Environmental Assessment and Management Systems;
2. Labor and Working Conditions;
3. Pollution Prevention and Abatement;
4. Community Health, Safety, and Security;
5. Land Acquisition and Involuntary Resettlement;
6. Biodiversity Conservation and Sustainable Natural Resource Management;
7. Indigenous Peoples; and

8. Cultural Heritage.

Performance Standard 1 establishes the importance of impact assessment, effective community engagement and the management of social and environmental performance throughout the life of the project. Performance Standards 2 through 8 establish requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. Although not prescribing specific methodologies, the IFC's performance standards strengthen the case for:

- Conducting a thorough social impact assessment;
- Preparing management programs to address social risks and impacts (generally in the form of detailed Action Plans);
- Actively involving impacted communities and other stakeholders in the social impact assessment process, the preparation of mitigation strategies and the monitoring of Action Plans; and
- Increased transparency and public reporting, including the preparation of reports for impacted communities in a form and method that is culturally appropriate.

The IFC's Performance Standards state that the risk and impact identification process should be based on environmental and social baseline data at an appropriate level of detail (IFC, 2012a, p.7). While the IFC Performance Standards do not specify social baseline requirements, they do highlight the need for baseline data to be commensurate with the level of risks and impacts and based on recent up-to-date information (IFC, 2012b, p .9). Furthermore, Performance Standard 7 (Indigenous Peoples) suggests baseline information [is presented which] clearly profiles the Affected Communities, their circumstances and livelihoods, with description and quantification of the natural resources upon which the Indigenous Peoples depend (IFC, 2012b, p. 254).

An earlier IFC Good Practice Note provides an indicative list of topics often explored as part of a SBS and specifies the methods best suited for attaining different types of information. However, it is also noted that topics covered will vary in light of the specifics of a given project and should be a targeted exercise based on the preliminary impacts identified in the scoping stage, focusing specifically on the directly affected population, and as much as possible utilizing local expertise (IFC, 2003, p. 9).

2.4.2 IPIECA

IPIECA was established in 1974 and aims to develop and promote socially and economically acceptable solutions to global environmental and social issues in the oil and gas industry. IPIECA has produced a range of good practice guidelines and describes various types of studies and data collection methods for compiling a social baseline (IPIECA, 2002, pp. 51-53; IPIECA, 2004, p. 10). Although not specifically identifying social baseline requirements, IPIECA highlights the need, particularly when a project may affect Indigenous Peoples, to gain a full and detailed understanding of:

- Land tenure and land access (including the legal context, traditional and cultural land governance, and the importance of land as it relates to cash incomes and livelihoods);
- Cultural heritage and traditional knowledge; and
- Natural resource use (IPIECA 2012, pp. 24-30).

IPIECA's approach to human rights is outlined in a guideline prepared by IPIECA and The Danish Institute for Human Rights. The guideline acknowledges the Universal Declaration on Human Rights and is consistent with the United Nations Guiding Principles on Business and Human Rights. The guideline also argues that human rights can be integrated with social impact assessment due to the overlap in the core principles and approaches, the latter including processes relating to data collection and stakeholder engagement (IPIECA and The Danish Institute for Human Rights, 2013, p. 4).

2.4.3 IAIA

The International Association for Impact Assessment (IAIA) was established in 1980 and advocates best practice on impact assessment of policies, programs, plans and projects. Social impacts are defined broadly as any of the following:

- People's way of life;
- Their culture;
- Their community;
- Their political systems;
- Their environment;
- Their health and wellbeing (including their physical, mental, social and spiritual wellbeing);
- Their personal property rights; and
- Their fears, aspirations and perceptions (IAIA, 2003, p. 4).

IAIA also highlighted the importance of local knowledge and participatory processes, the need to analyze the impacts that have occurred as a result of past activities in an attempt to understand and predict the impacts of a new activity, and the objective of not just minimizing potentially adverse impacts, but promoting positive outcomes as part of the development process (IAIA, 2003, p. 2).

A subsequent publication by IAIA articulates 26 tasks that comprise social impact assessment, including:

Task 3: Identify the preliminary 'social area of influence' of the project, likely impacted and beneficiary communities (nearby and distant), and stakeholders.

Task 4: Gain a good understanding of the communities likely to be affected by the project by preparing a Community Profile.

Task 8: Collate relevant baseline data for key social issues.

IAIA differentiates between the community profile and social baseline as follows: the community profile is a rich, qualitative description of the affected communities including a discussion of trends and issues, whereas the baseline is a carefully-selected set of social indicators with accompanying quantitative data for the specified communities. Furthermore, as the baseline data will be used as the reference point against which to measure the impacts of the project, considerable effort will be required to identify critical issues, determine appropriate variables, and collect the data (IAIA, 2015, p. 44).

3. Study Area

3.1 Project Area of Influence

The upstream PAOI (hereafter referred to PAOI) is the area that is likely to be affected by the Project, its activities and its facilities that are *directly owned, operated or managed by the upstream Project (including by Project contractors*). This definition includes predictable direct, indirect and some associated and cumulative impacts arising from the upstream Project, including indirect impacts on biodiversity and ecosystem services upon which affected communities' livelihoods are dependent.

The PAOI encompasses the areas associated with development of the upstream Project including:

- Facilities, infrastructure and related activities within Petroleum Retention License (PRL)–15 including wellpads and gathering system, trunkline, central processing facility (CPF), logistics base, airstrip, accommodation camps, wharf and access roads;
- Export Pipeline Corridor onshore and offshore between the CPF and LNG Plant site at Caution Bay;
- Riverways along which Project vessels will travel to and from PRL-15;
- Marine transport route between Caution Bay and the upstream riverways route to PRL-15; and
- Associated developments and activities such as quarries/borrow pits, logistical wharfs/terminals not operated by the Project.

It considers potential impacts resulting from activities such as:

- Induced in-migration (and associated implications such as increased pressure on resources, increased land clearance, the spread of communicable diseases, the development of existing infrastructure and services for increased populations (i.e., health, transport, waste));
- Wealth distribution (i.e., from the expenditure of wages and/or income generated from the Project on local procurement of goods and services); and
- Increased access to previously inaccessible land or resources including interactions with third parties leading to greater disturbance and access to primary resources, e.g., logging.

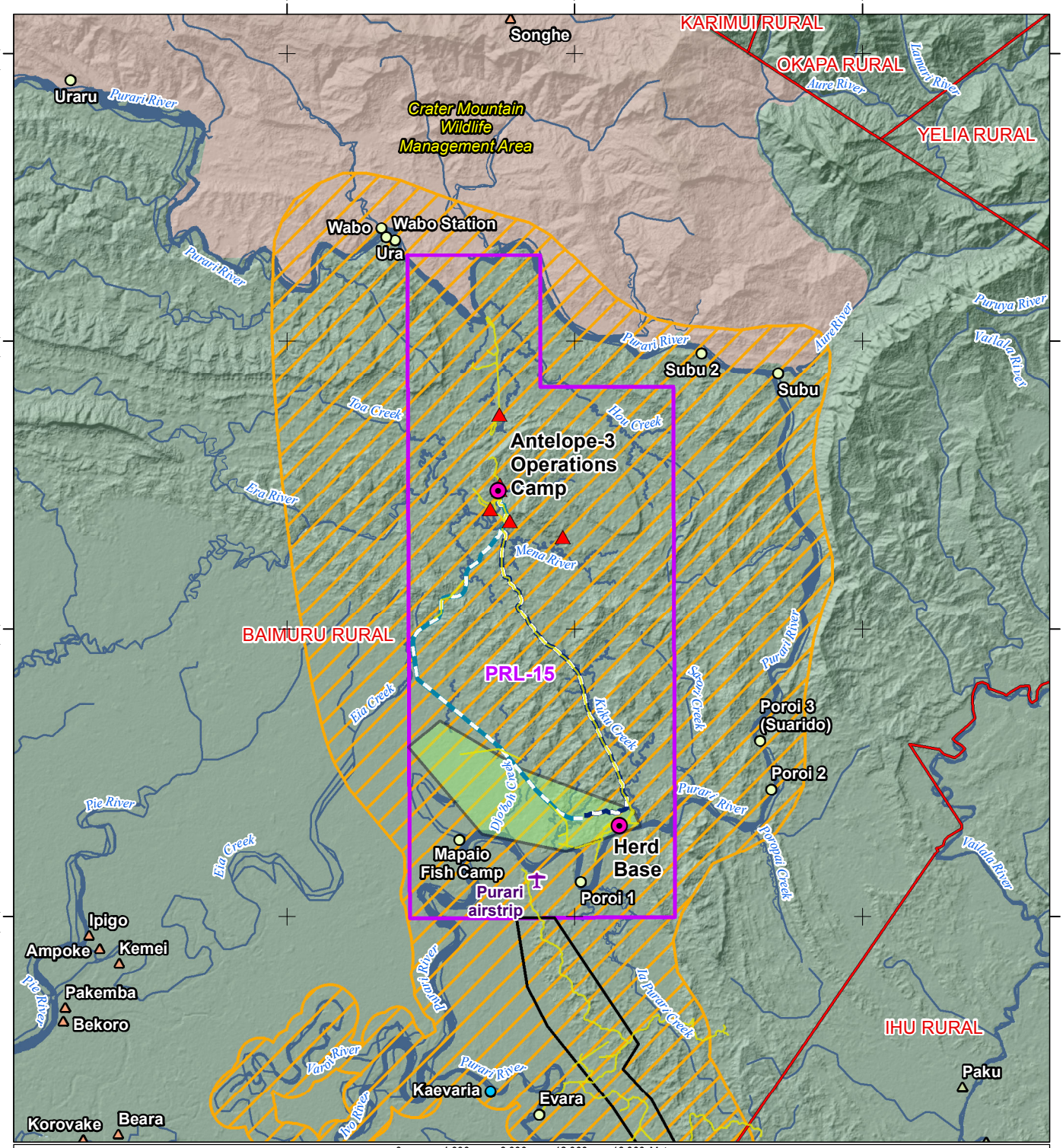
The communities and environment within the PAOI are shown in Map 1 and Map 2. Although not shown on Map 1 or Map 2 (due to scale) the provincial capital of Kerema is also considered to be within the PAOI, as it is likely that goods and services and workers will be sourced from or transit through this provincial center.

3.2 Study Area

The study area for the upstream governance and economics baseline study comprises local and regional areas.

The local study area corresponds with the PAOI described above. It includes land and communities anticipated to be directly affected by Project infrastructure, facilities and associated activities within PRL-15, the onshore export pipeline and the Purari tributary riverways as shown in Map 1 and Map 2.

The regional study area includes the relevant Provincial, District and Local Level Governments (LLGs). For the upstream study area this includes Gulf Province, Kikori District and Baimuru Rural and Ihu Rural LLGs (Map 3).



SCALE: 1:400,000 @ A4 — 0 4,000 8,000 12,000 16,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Towns and Villages

Project Affected Communities
- PRL-15
- Riverways

Host LLG Communities
- Baimuru Rural
- Ihu Rural

- Tracks
- Local level government boundaries
- Waterways
- Waterbodies
- Upstream project area of influence
- PRL-15
- Crater Mountain Wildlife Management Area

Existing Facilities
- Base camp
- Purari airstrip

Proposed Facilities
- Wellpad

Trunklines
- Field Purari West Route
- Field Purari Central Route
- Notional development area of CPF
- Export pipeline corridor

N

Note, not all Host LLG Communities have been verified in the field.

TITLE: Upstream Project Area of Influence - PRL-15

MAP: 1

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_102-81391 **REVISION:** Y

DATE: 14/07/2017

DATA SOURCES:
Facilities, CPF area, export pipeline corridor, towns and villages, waterways, wellpads, tracks, PRL-15, hillshade supplied by ERIAS Group and TOTAL (2015-2016). Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017). LLG Boundaries from HDX and then spatially adjusted to align with background and coastal boundaries removed.

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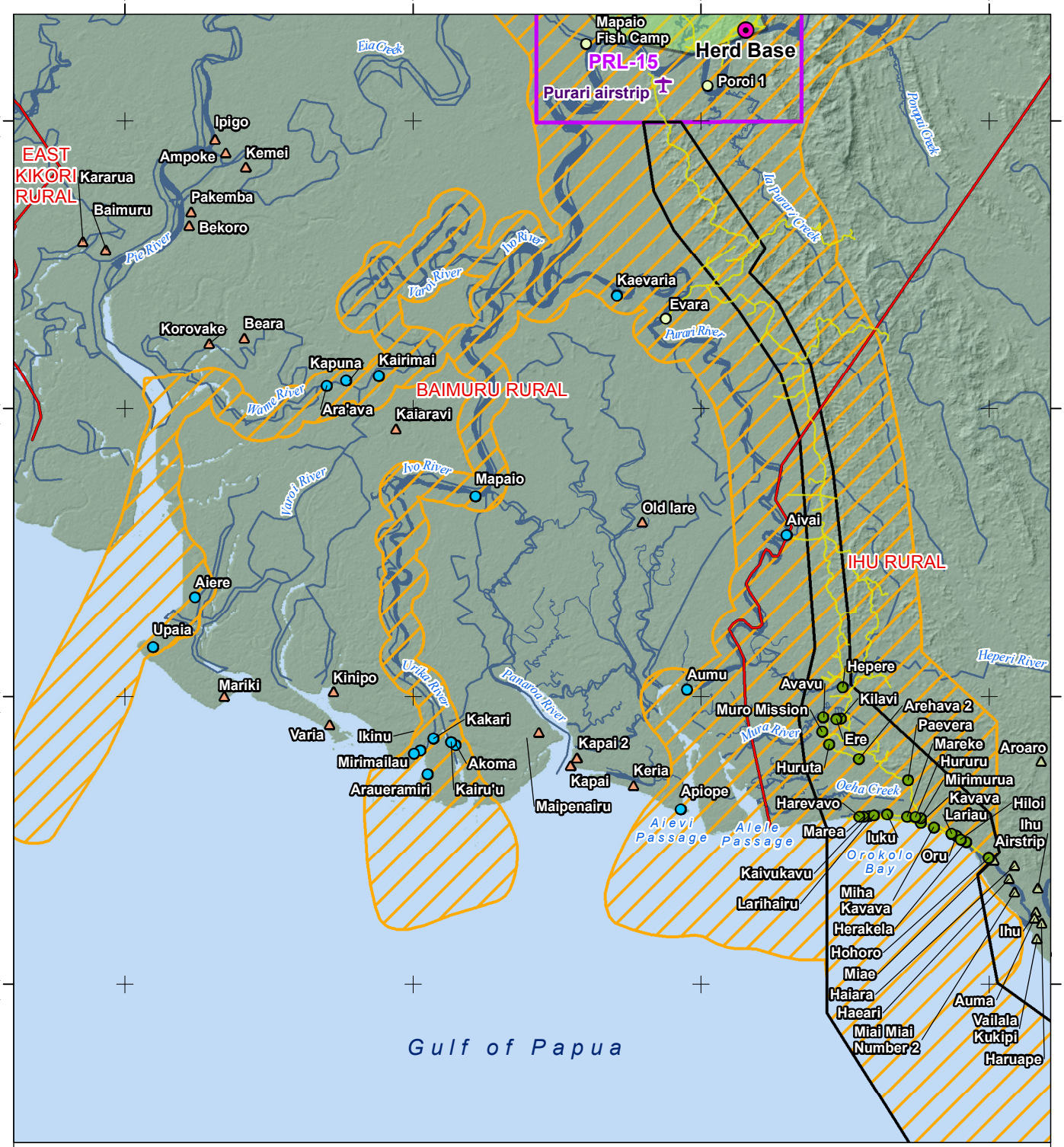

SCALE: 1:400,000 @ A4

0 4,000 8,000 12,000 16,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Towns and Villages

Project Affected Communities
- PRL-15
- Export pipeline corridor
- Riverways

Host LLG Communities
- Baimuru Rural
- Ihu Rural

- Tracks
- Local level government boundaries
- Waterways
- Waterbodies
- Upstream project area of influence
- PRL-15

Existing Facilities
- Base camp
- Purari airstrip

Proposed Facilities
- Notional development area of CPF
- Export pipeline corridor

N

Note, not all Host LLG Communities have been verified in the field.

TITLE: Upstream Project Area of Influence - Export Pipeline Corridor and Riverways

MAP: 2

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_102-81392 **REVISION:** Z

DATE: 14/07/2017

DATA SOURCES:
Facilities, CPF area, export pipeline corridor, towns and villages, waterways, tracks, PRL-15, hillshade supplied by ERIAS Group and TOTAL (2015-2016). LLG Boundaries from HDX and then spatially adjusted to align with background and coastal boundaries removed. Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017).

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SCALE: 1:1,750,000 @ A4

0 17,500 35,000 52,500 70,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Towns and Villages
- Waterways
- Local level government boundaries
- Province boundaries
- District boundaries
- PRL-15

Proposed Facilities

- LNG Plant site
- Export pipeline corridor

N

Note, not all Host LLG Communities have been verified in the field.

TITLE: Provincial, District and Local Level Government Areas

MAP: 3

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_077-81390 **REVISION:** J

DATE: 14/07/2017

DATA SOURCES:
Facilities, export pipeline corridor, towns and villages, waterways, PRL-15, hillshade supplied by ERIAS Group and TOTAL (2015-2016). LLG Boundaries from HDX and then spatially adjusted to align with background and coastal boundaries removed.

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4. Existing Information

Substantial social and economic data are available for Papua New Guinea, although data quality is variable. Generally, Papua New Guinea generates a range of population, health, education and economic statistics, including information from the 2009/10 National Income and Expenditure Survey (NSO, 2013). The Bank of Papua New Guinea publishes macroeconomic data each quarter.

Although the Department of Health coordinates a national health reporting system, and generates annual health statistics for all of Papua New Guinea, other national departments have less effective systems for monitoring and reporting.

Other information that may be available is usually provided by donors or research organizations, which generally conduct studies with a relatively narrow geographic or sectoral focus. However, one recent report includes Gulf Province and provides good information, this being an analysis of labor resources, based on data collected during the National Income and Expenditure Survey (2009/10).

Limited information is available for the PAOI. Population data from the 2011 census is not available for all villages in the PAOI, and the census information released to date is limited to aggregate population data. InterOil conducted social surveys that included villages in the vicinity of PRL-15 and in the Purari riverways between 2007 and 2010. These are considered too dated to reflect current living conditions.

Due to the lack of information specific to the PAOI, various village, household and key informant surveys have been conducted as part of the SBS, and are discussed in the following section.

5. Methods

This section of the report describes the methodology used for the governance and economics baseline study and compilation of this report. It elaborates on study methodology outlined in Papua LNG Project: Upstream Social Baseline Studies Scope and Methods (ERIAS Group, 2016c.).

5.1 General Approach

5.1.1 Identification of Data Requirements

Social baseline data requirements were identified by assessing (i) national legislation, TEP PNG's requirements, and international best practice (Section 0) and (ii) the social impacts of other large-scale resource projects in Papua New Guinea. This resulted in a 'data map' that articulated all social baseline data requirements, and differentiated between secondary and primary data sources. Relevant government agencies were identified for the collection of secondary data, and survey instruments prepared for the collection of primary data.

The survey instruments included both community and household level surveys that would generate both qualitative and quantitative data. The community level surveys were conducted first, in all PAOI villages. This provided good background information for each village, including up-to-date population data, and helped determine whether other villages should also be surveyed (either by identifying new villages, not shown in earlier maps, or by justifying the inclusion of other villages, through for example, strong trading links with villages from within the PAOI). The decision to conduct the community level surveys first, prior to the household surveys, also:

- Provided an opportunity to tailor the household surveys in response to information collected at community level;
- Provided information to facilitate an effective sampling procedure for the household surveys;
- Reduced the period of time field workers were required in the field at any one time, and therefore helped improve the accuracy of data collected; and
- Reduced the time demand on people from survey villages at any one point in time.

5.1.2 Identification of Villages in the PAOI

As discussed in Section 3, the upstream PAOI includes villages in close proximity to PRL-15, the export pipeline corridor and the three main navigable channels of the Purari River. Drawing on existing maps and census data, 36 villages were initially identified – prior to the conduct of community level surveys – as being within the PAOI (ERIAS Group, 2016c, pp. 9-10). As a result of the community level surveys, several corrections were made to village names and their location, and several additional villages were included in the PAOI.

For the purpose of identifying the population impacted by the Project, the missions at Kapuna and Muro were not included in the PAOI villages, as the missions contained a small number of people, generally from other parts of Papua New Guinea, who worked in schools, health facilities or the church. However, the residents of Wabo Station were included in the PAOI, as Wabo Station accommodates a substantial number of people who have relocated from other parts of Papua New Guinea, and who are not health, education or church workers, but have relocated in search of employment with the Project. It was therefore determined that the PAOI contained 39 villages and one government station (Wabo Station), which are shown in Map 1 and Map . Information collected during the SBS indicated that these villages and the government station had a combined population of 12,763.

5.1.3 Sampling Framework

The community level data provided the necessary information to (i) identify sampling criteria for the selection of villages in which household surveys would be conducted, and (ii) estimate the number of households to be surveyed in each village.

Results of the community level data indicated that people speaking a common language shared a similar history, and people residing in the same ecological zone practiced similar activities on a day-to-day basis. The language group and ecological zone were therefore identified as key determinants of current lifestyles and social behavior, and used as the key criteria on which village selection was based. Due to similarities within and between villages, it was deemed adequate, due to low variability in response to many social characteristics, for the household survey to be conducted in a sample of villages and to include a sample of households from each survey village.

The villages included in the household survey were therefore purposively selected to ensure a stratified sample of villages from (i) each language group and (ii) each ecological zone. Only two villages from the Kaimare language group are within the PAOI, so the nearby village of Mariki was included in the villages in which household surveys were conducted. Similarly, as Maipenairu and Kapai 2 were deemed to be culturally significant for the Iare language group, and are located near the PAOI, they were included in the Iare villages in which household surveys were conducted.

While the PAOI included 39 villages and one Government station, 27 villages (including Wabo Station and the villages of Mariki, Maipenairu and Kapai 2) were included in the household survey. The intention was to survey at least 30% of the households in each community, with the proportion of households surveyed increasing in villages with fewer households. The households selected from within each village were selected systematically from a village map and list of households prepared from information collected during the community level surveys.

5.1.4 Timeframe

A detailed data collection program was formulated, in consultation with TEP PNG and the Community Affairs (CA) officers, based on the assumption that:

- The community survey team would have sufficient team members to complete all surveys in a village within 3 or 4 hours; and
- The household survey team would have sufficient team members to complete between 20%-30% of households in the majority of villages in one day.

Data collection occurred between May and September 2016, as shown in Figure .

Activity	2015	2016											
		J	F	M	A	M	J	J	A	S	O	N	D
Scoping visit													
Assemble team													
Identify data needs													
Finalize work program													
Fieldwork training													
Upstream community surveys													
Upstream household surveys													
Secondary data collection													
Data entry and analysis													
Report preparation													

Figure 1: SBS Timeframe

5.1.5 Team

The team assembled for the community level surveys included five PNG and six expatriate consultants. The team assembled for the household surveys included one PNG and two expatriate consultants and eight PNG researchers. The PNG researchers were generally anthropology students (or recent graduates) from the University of Papua New Guinea.

Several team members have worked extensively in Gulf Province before. PNG consultants were involved in survey design to help ensure the survey instruments were appropriate in the cultural context. The inclusion of PNG consultants also ensured that many of the team were fluent in both Tok Pisin (Melanesian Pidgin) and Motu.

All team members participated in detailed pre-survey training programs that aimed to:

- Familiarize team members with the Project and the Project Area;
- Provide a detailed understanding on the reason for collecting social baseline data, and the importance of collecting accurate data;
- Ensure all team members understand all questions they may be required to ask, and how they should be asked;
- Ensure all team members understand the importance of respectful behavior and techniques to appropriately ask sensitive questions;
- Ensure all team members understand their responsibility to check each questionnaire to ensure it is complete and legible, before moving on to the next task;
- Ensure all team members are aware of the health and safety requirements of the Project and TEP PNG; and
- Ensure all team members are not only recording data but able to contribute to the knowledge base and provide insight to the potential social impacts of the Project.

As discussed further in Section 5.4.1, all team members were, to the extent possible, actively involved in the analysis and interpretation of results and report writing.

Photo 1: Household survey team during training, August 2016
Source: ERIAS Group, 2016a.

5.1.6 Implementation

Community Level Surveys

TEP PNG Community Affairs (CA) officers conducted survey awareness approximately two weeks prior to the community level surveys, and again, one or two days before the surveys were scheduled in each village. Awareness materials were prepared by ERIAS Group, in consultation with TEP PNG, to be used by CA officers when providing awareness in each survey village on the EIS process and the SBS.

Following arrival in each village, a meeting with village members was held and a *tok save* (explanation) provided by TEP PNG and the SBS team. As part of the *tok save*:

TEP PNG:

- Introduced ERIAS Group as an independent organization, engaged by TEP PNG to conduct the EIS;
- Indicated that the purpose of the visit was for the SBS.

The SBS team:

- Introduced individual team members;
- Outlined the need for TEP PNG to prepare an EIS;
- Outlined the contents of the Social Impact Assessment;
- Outlined why it was important to collect social data;
- Confirmed that participation in any survey was voluntary;
- Confirmed that the information collected would be presented in a public report but names of individuals would not be included in the report;
- Confirmed that a summary of the information collected would be returned to the village;
- Outlined the various surveys that the team would like to conduct; and
- Sought agreement from those present in the meeting that they were happy with the work and willing to cooperate.

Following the *tok save* the SBS team commenced the various focus group discussions (FGD) and key informant interviews (KII) and commenced mapping of houses, village infrastructure and other points of interest. The team generally completed the surveys in less than half a day, which allowed two villages to be completed on a single day when logistical arrangements allowed.

Photo 2: Conducting a women's FGD at Larihairu
Source: ERIAS Group, 2016a.

Household Surveys

TEP PNG's CA officers conducted awareness approximately two weeks prior to the household survey, and again, one or two days before the survey was scheduled for each village.

Following arrival in each village, a brief meeting was held with village members and a *tok save* provided by TEP PNG and the SBS team (reiterating the information presented on the previous occasion, as outlined above). The selected households were then identified (in the manner described in Section 5.1.3), and surveys commenced. Households were only surveyed if one or more adults from the house were present and willing to participate in the survey. If household members were absent or otherwise occupied, a replacement household was identified.

Generally, this was the nearest household to the one that needed to be replaced. One full day was generally required to complete the household surveys in each village.

5.1.7 Stakeholder Consultation

During the study consultation occurred with communities in the PAOI, elected officials, government officials, officers from TEP PNG and representatives from church groups, NGOs and the private sector.

The following agencies/organizations were consulted:

- Gulf Provincial Government and Provincial Administration, including representative from Kikori District and the Baimuru and Ihu Rural LLGs;
- Royal PNG Constabulary (Kerema);
- PNG Forest Authority (Kerema);
- Gulf Economic Development Authority;
- Gulf Investment Trust Fund;
- Elk-Antelope Landowner Association (representing selected Pawaian landowners[1]); and
- Sakura Osura Resources Limited (a Pawaian local business company).

A list of people consulted during the course of the SBS is presented as Attachment 1.

5.2 Limitations and Challenges

5.2.1 Study Challenges

The main study challenges included:

- Gaining political approval to undertake the work;
- Identifying villages within the PAOI;
- Differentiating between villages and hamlets;
- The logistics of travelling to each village; and
- Establishing rapport with villages in a short timeframe.

The first challenge faced during the study was to gain support from the Governor of Gulf Province, who had questioned the decision to process LNG at Caution Bay. The Governor provided his support for the EIS following discussions between the National Government, the Governor and TEP PNG, and reconfirmed his support specifically for the SBS at a meeting on 31 May 2016.

The second challenge involved the identification of villages within the PAOI. Existing maps have not been updated to reflect new villages, or new village locations, and often include incorrect village names. The maps presented in this report reflect current locations and names that have been verified by leaders in each village (with the exception of Iuku, which is consistent with census records but differs from the spelling used by local leaders, which is Iouku).

Determining village boundaries and differentiating between new villages or hamlets of an existing village was another challenge in some instances. While local residents know the boundaries between adjoining villages, it was more difficult to determine whether a group of people living in a new location was a hamlet of the main village or should be identified as a new village. It was decided to treat Poroi 1, Poroi 3 (alternatively known as Suarido), Mapaio Fish Camp (sometimes referred to as Nea Creek) and Subu 2 as separate villages because of (i) the considerable distance between their current location and the villages they relocated from, and importantly (ii) a preference within each new village to have their own identity. While

expressing a desire to have their own identify, they were also careful to confirm an alliance or link with the village they came from.

Several villages in the Orokolo Bay and Purari riverways areas have hamlets that have been included with the main village. These hamlets are generally in close proximity to the main village and were included in surveys of the main village at the request of village leaders. This includes:

- Ikinu and the hamlets of Mirimailau and Araueramiri;
- Herakela and the hamlet of Hiloi; and
- Kavava and the hamlets of Hururu, Mirimurua and Miha-Kavava.

Logistical issues were overcome through the use of helicopters and boats provided by TEP PNG.

Establishing rapport with villages in a short timeframe was only possible because of the SBS awareness work undertaken by the CA team in the lead up to, and during the surveys. The team was able to undertake the *tok save* and commence surveys without any undue delay.

5.2.2 Limitations

Information on petroleum and logging benefits should be treated with caution, as legislation or policy directions are often not followed, and limited transparency adds to the uncertainty on the allocation, management and use of benefits.

Provincial Government expenditure, although subject to review by the NEFC, is also clouded by relatively poor physical and financial reporting standards and limited transparency.

Information on ILGs and the SABL in Gulf Province must also be viewed carefully:

- Recent legislative changes could impact ILGs if enforced, but whether it will be enforced or not is unclear; and
- The recent Commission of Inquiry into SABLs provided clear recommendations, but there is no indication as to whether the recommendations will be implemented.

Some survey results also need to be treated carefully. Effort has been made to present reliable income and expenditure estimates, but low education and literacy levels make this task quite difficult. In addition, many questions are subjective and reflect the response provided by the person or people being interviewed. While some information has been collected from more than one source, or can be compared with previous information available, much of the baseline information presented in the report has only been collected from one source, and often collected in a relatively short timeframe. For the purpose of the SBS, most villages in the PAOI were only visited on one or two, relatively brief occasions. Due to the limited time spent in the villages in the PAOI, the accuracy of some data cannot be verified and must therefore be treated with caution. For example:

- Current and previous work experience has been documented, but no assessment of skill levels has been undertaken; and
- The village court and land mediation processes have been described, but their effectiveness has not been tested.

Furthermore, particularly caution needs to be given to information presented on customary land and clan land boundaries, as while clan boundaries are an important factor in determining resource access, it is clearly outside the scope of the SBS and requires far more detailed work for verification.

The information presented on the level of knowledge of, and attitudes towards the Project, reflects the views of a small number of people from each village. Detailed assessment of the extent of knowledge, or the views among the entire community, has not been undertaken.

5.3 Data Sources

An overview of the main sources of information is presented below. A report describing the approach to the social surveys for the upstream areas of the Project was prepared by ERIAS Group in advance of fieldwork. The report, titled 'Upstream Social Baseline Studies Scope and Methods' provides additional details on the SBS methodology (ERIAS Group, 2016c).

5.3.1 Literature Review

A review of existing literature was undertaken as part of the SBS. The literature review for the Economic and Governance SBS included:

- PNG legislation and international guidelines, policies and standards relevant to the Study;
- Project reports prepared for InterOil or TEP PNG;
- PNG development strategies, including Vision 2050, the PNG Development Strategic Plan, the Medium Term Development Plan and National Strategy for Responsible Sustainable Development;
- National Budget papers;
- Analyses of provincial government expenditure by the National Economic and Fiscal Commission (NEFC) and provincial government performance by the Constitutional and Law Reform Commission;
- PNG sectoral plans and strategies, including for example, the National Transport Strategy (2013);
- The Gulf Provincial Development Plan (Gulf Vision 2020);
- Statistical reports, including results from the 2009-10 Household Income and Expenditure Survey, prepared by the National Statistics Office (NSO);
- Other studies, including a labor assessment that included data for Gulf Province, by Jones and McGavin (2015) and various reports on the logging industry in Papua New Guinea; and
- An anthropology report, completed in 1924 by F.E. Williams, called 'The Natives of the Purari Delta'.

The work by F.E. Williams provides a description of village life in the Purari riverways area (otherwise known as a delta; the area of land in which a river divides into smaller rivers) more than 90 years ago and an insight to some of the social and cultural practices exhibited today.

5.3.2 Secondary Data

Official records, statistics, annual reports and development plans have been accessed from relevant government agencies and private sector organizations to help prepare the SBS. This includes:

- Information contained in Gulf Vision 2020;
- Economic statistics presented in National Budget papers; and
- Economic statistics presented in reports by the Asian Development Bank (ADB) and International Monetary Fund (IMF).

As discussed in the report, the extent of secondary data is limited, and its reliability often poor.

5.3.3 Primary Data

Primary data has been collected using community level and household-level survey instruments. The community level survey instruments included the following focus group discussions (FGD) and key informant interviews (KII):

- Village Leaders FGD;
- Social Organization FGD;

- Women's FGD;
- Youth FGD;
- Land and Natural Resource Use KII;
- Education KII;
- Health KII;
- Store KII; and
- Market KII.

In addition, GPS coordinates were recorded for houses, village infrastructure and other points of interest, to allow village maps to be compiled. A population census for each village was completed during the village mapping.

5.4 Field Surveys

The initial community level surveys were completed in May/June 2016. Some additional community level surveys, along with the household surveys, were completed in August/September 2016. A summary of the surveys completed in each village/station is presented in Table 1.

Table 1: Surveys Completed in the Upstream Area

Surveys	Villages/Station	Number
Community level surveys only	Kavava, Mapaio, Mareke, Ara'ava, Kaivukavu, Larihairu, Marea, Hepere, Avavu, Ikinu, Huruta, Aumu, Lariau, Oru, Arehava No. 2, Hohoro	16
Community level and household surveys	Iuku, Harevavo, Evara, Wabo, Maipenairu, Herakela, Kapai 2, Kairu'u, Apiope, Poroi 2, Upaia, Akoma, Ura, Mariki, Kilavi, Ere, Kaevaria, Wabo Station, Aivai, Subu 2, Subu, Poroi 3 (Suarido), Poroi 1, Paevera, Kairimai	25
Household surveys only	Aiere, Mapaio Fish Camp	2

It should be noted:

1. Several villages were combined for the community level surveys (after discussion with and approval by people from the respective villages), such as the adjoining villages of Ere and Kilavi or Akoma and Kairu'u;
2. A limited village leaders survey was conducted in Arehava No. 2 due to time and logistical constraints;
3. Logistical constraints prevented visiting Aiere, however, families from Aiere participated in the household survey when they paddled downstream to Upaia; and
4. Although a population count was completed, community level surveys were not completed at Mapaio Fish Camp as the village was mourning the death of a resident.

Once factoring in the villages that were surveyed together, up to 35 community level surveys were completed, covering 39 villages and one government station. The total number of household surveys completed was 354. This represented 33% of the households in the 27 communities included in the household survey.

5.4.1 Data Management

The survey enumerators were responsible for checking that each questionnaire was complete and answers legible before departing the survey respondent(s). The Social Lead would then check the questionnaire and if necessary, check with the enumerator to clarify any answers that were ambiguous, unusual or unintelligible. Any codes were added to the questionnaire, as required, and the questionnaire was then ready for data entry.

In addition to the surveys outlined in Section 5.3.3, members of the community survey team prepared brief written summaries describing key aspects of each village. These summaries were combined with maps and a photo catalogue of each village, into a Papua LNG Project Community Directory (ERIAS Group, 2016d). Statistical information from the surveys have been included in the Community Directory, and these now provide a project reference, that describes each village and provides baseline social data for each village.

5.4.2 Presentation of Results

Any information presented in this report that has been collected as part of the SBS has been referenced as either:

- Household Surveys;
- Village Leaders, Social Organization, Women's or Youth FGD;
- Land and Natural Resource Use, Education, Health, Store or Market KII; or
- Village Mapping (which includes the population census).

Focus Group Discussions were held in 29 villages. The number of KIIs varied: there were 35 Education KIIs, 22 Store KIIs and only one Market KII. A total of 354 household surveys were completed from 27 communities.

Not all survey information was collected for all villages or all households. In such cases, the sample size is lower than that described above. Information has not been presented when the number of responses is deemed inadequate to provide reliable information. In presenting community level data, Ere and Kilavi; Akoma and Kairu'u: Ikinu and Kakari; and Oru, Lariau and Herekela preferred to be surveyed together and thus data presented represents these groupings. Where no response was received from a community on a particular topic, the tables presenting that data omit communities, which did not provide a response.

6. Baseline Characterization

6.1 National, Provincial, District Context

6.1.1 Governance

This section contains a description of the factors that impact on social structures and governance in PNG communities, including:

- Traditional leadership;
- Religion;
- Government administration;
- Development support (donor programs);
- Civil society;
- Logging projects; and
- Petroleum projects.

6.1.1.1 Traditional Leadership

As noted by Jones & McGavin (2015, p. 12), village life revolves around subsistence, social relationships and social obligations, all of which are tied to land, which provides for: the majority of subsistence, social identity and meaning to social obligations. Rights over land access and use are, therefore, of fundamental concern to village societies, and while the majority of rural Papua New Guineans have property rights over land, which provides a sense of independence, land rights are, nonetheless, custodial rights and must be continually defended and reaffirmed.

Traditional leadership and social organization varies across Papua New Guinea. In some areas people recognize tribal affiliation, whereas in others, people are unified by language. Some tribal or language groups have a leadership hierarchy, while others may vest leadership at a clan level. Tribal or clan leaders are in most cases in Papua New Guinea, elderly men. Tribal leaders are often from one of the larger groups within the tribe, while clan leaders are often the first-born son of the previous clan leader.

A clan is a group of families with a common ancestor. A clan will identify themselves and their customary-owned land through oral histories, stories, beliefs, customs and practices. Most clan members live on their customary-owned land, although urban migration is changing this. Clan ownership of customary-owned land is recognized in the Constitution.

The clan provides a safety net for the community and for the welfare of its members. The '*wantok*' system reinforces the primary allegiance to one's clan, placing the obligation of kinship, along with the expectation of reciprocity, on its members (Mohanty, 2011, p. 38). At the same time, it can place pressure on people to provide money or favors to wantoks, including for example, giving contracts or employment to people that may not be suitably qualified. However, as the vast majority of rural Papua New Guineans have rights over land, they have the means to provide their basic needs and a sense of independence (Jones & McGavin, 2015, p. 12).

6.1.1.2 Religion

The progressive introduction of Christianity in Papua New Guinea from the 1800s had a marked effect: it introduced western concepts of right and wrong; it introduced new beliefs; and it introduced a new layer of village leadership. In many locations, these concepts were introduced simultaneously with government administration, and both led to substantial social change.

The churches also played a major role in the expansion of coconuts and copra production in Papua New Guinea, and the expansion of schools and health services in rural areas. Church agencies continue to play a key role in both the delivery of health and education services, and

church leaders often play a key role in the village in terms of community leadership and dispute resolution.

The main denominations in Gulf Province are the Catholic, United Church, Seventh Day Adventists, Lutherans and Gulf Christian Services (Gulf Provincial Government, 2010, p. 52). The churches have one representative in the Provincial Assembly. While remaining a central part of village life, the presence of the churches has contracted substantially in Gulf Province over the past 40 years (since the country gained independence).

Further details on the contribution of the churches to health and education are discussed in the Upstream Community Health Baseline Report (NewFields, 2017; Part 16 of ESBS Dossier) and the Upstream Community and Demographics Baseline Report (Finlayson, 2017; Part 14 of ESBS Dossier).

6.1.1.3 Government Administration

PNG's public sector includes:

- Three tiers of government (national, provincial and local); and
- The national public service, which includes staff based at national, provincial, district and local-government levels.

However, the reach of government occurred progressively in Papua New Guinea, not extending into more isolated areas until the 1960s, and has changed substantially in this time.

The introduction of government administration strengthened the western concept of right and wrong and imposed another layer of leadership in village areas. Prior to gaining independence, the government was represented by a kiap, the *tok pisin* term for a district officer or patrol officer. The function of the kiap varied according to other available personnel, but would include law enforcement (both policeman and magistrate), district administration, conducting the population census and any number of technical duties, such as engineering, surveying or agricultural advice.

Following the gaining of independence, the provinces were assigned responsibility for delivery of core basic services, although the provinces remained under National Government control. Due to a perceived decline in the provision of services since Independence, new legislation (*The Organic Law on Provincial Governments and Local-level Government, 1998*) was introduced to reform the provincial and LLG system. The new arrangements, with the stated objective to achieve further decentralization, replaced elected provincial governments with assemblies comprising the national MPs from each province, representatives of elected LLGs, and a small number of sectoral and community representatives. Although many teachers and health workers were based in rural areas, most other public servants were located in the provincial capitals. The reforms intended to relocate many public servants to outlying areas in an attempt to bring services to the people. However, even if public servants were relocated to rural areas, they often had few if any resources to implement any projects. The reforms also strengthened a bottom-up system of representation, where the people elected their ward representatives, and one of the ward representatives was elected as the LLG President (a position often referred to as the councilor). Although the LLGs have broad powers, including the ability to make local laws, they received very limited funding from the National Government and in most parts of Papua New Guinea they failed to deliver services due to capacity constraints and a lack of support from national or provincial government.

Due to continued concerns regarding the delivery of services, in 2006 the National Executive Council directed relevant agencies, including the Constitutional and Law Reform Commission, to review the current Organic Law and the current system of decentralization. The resulting report concluded that service delivery in the thirteen years since the introduction of the 1995 reforms had fallen to levels well below the pre-1995 levels and in some areas, the situation has deteriorated (Constitutional and Law Reform Commission, 2009, p. vi). In regard to specific

conclusions relating to Gulf Province: "regrettably the goals of reforms are far from being achieved and the rural communities continue to be denied the basic human right to essential services .... the politicians and the public servants in Gulf Province need to have a complete transformation of attitude, behavior and mind set towards empowering people by conforming to the political and administrative structures established by the Organic Law on Provincial and Local-level Government" (Constitutional and Law Reform Commission, 2009, p. 94).

The most recent assessment of the performance of the Gulf Provincial Government in allocating funds towards what has been defined as the 'minimum priority activities' (which includes specific funding for health, education, transport infrastructure, agriculture and village courts)[2] was undertaken by the National Economic & Fiscal Commission (NEFC) in 2013. The NEFC calculated the budget required to fund health, education, transport infrastructure, agriculture and village courts based on the population and other characteristics of each province. Results indicated that Gulf Province received approximately 80% of the budget required to meet the minimum level of funding in these priority activities. However, the NEFC also noted that while Gulf Province received 80% of the required budget, substantial funding was allocated to other activities, and the priority activities received only 52% of the required level of funding (NEFC, 2013, p. 30). This was a similar result to many other provinces. However, substantial improvement had been made in Gulf Province in terms of allocating a higher proportion of available funds to priority areas between 2008 and 2012.

Several key changes have been introduced by the O'Neil Government to improve service delivery. In 2013, the O'Neil Government increased funding for the Provincial Services Improvement Program (PGK5 million (USD1.6 million) /district), the District Services Improvement Program (PGK10 million (USD3.2 million) /district) and Local-level Government Services Improvement Program (PGK500,000 (USD160,000) / LLG). This increase replaced much of the National Government's development budget, which included funds for specific development activities in each province, with a mechanism that provided funds to the elected representatives at each level of government. Although the full budgets have reportedly not been paid each year, the budget amounted to PGK35 million (USD11 million) annually for Gulf Province between 2013 and 2015, and PGK31 (USD10 million) million in 2016 as budget to each LLG was reduced to PGK100,000 (USD32,000)). The government budget for Gulf Province is shown in Figure .

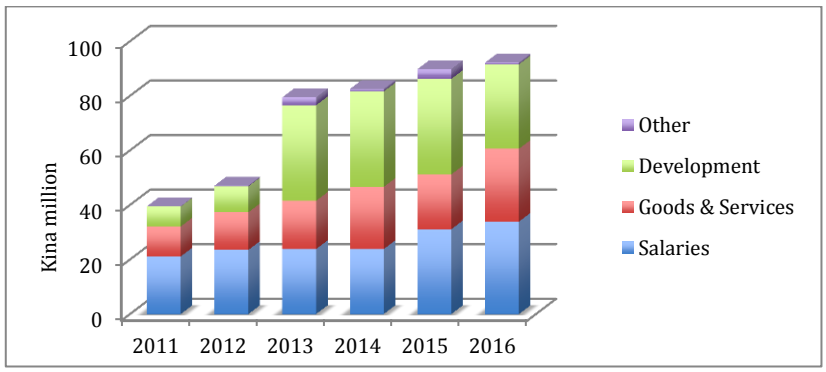


Figure 2: Gulf Provincial Budget, 2011-2016

Source: GoPNG, 2010, 2011, 2012, 2013a, 2014 & 2015.

As shown in Figure , the provincial budget has increased by 18% per annum, on average, between 2011 and 2016. Salaries have increased by an average of 10% per annum, compared to 19% per annum for goods and services, and 30% per annum for the development budget.

The District Services Improvement Program (DSIP) in particular, has been widely criticized for being open to misappropriation of funds. The DNPM attempted to enforce controls on the

[2] The responsibility for funding village courts was subsequently transferred from the provinces to the Department of Justice.

allocation and accountability of DSIP. However, the fixed sector allocation was removed in the 2015 National Budget to provide greater flexibility to address local development priorities (GoPNG, 2014, p. 72).

In 2014 the *District Development Authority Act 2014* was passed into legislation. As a result, the District Development Authority includes all public servants in the district, including police, teachers and health workers; each District Development Authority is chaired by the Open[3] MP; and the former District Administrator has become the CEO. This has placed substantially more financial authority in the hands of the Open MPs.

There are renewed concerns, as a result of the District Development Authority Act, that the majority of development funds may be preferentially allocated to high profile and/or capital projects used to consolidate political influence which may ultimately conflict with the goal of improving broad-based service delivery in the district (Wiltshire, 2014, p. 4). The Australian Government is more direct, stating in 2010 that the Government lacks capacity to track expenditure. The GoPNG Public Accounts Committee estimated in 2007 that between 25% and 50% of all public money had been misappropriated or misapplied in the previous five years; and the decentralized system of service delivery presents yet another challenge (Australian Government, 2010, p. 11).

While a 10-year development plan was prepared in 2011 (Gulf 2020), neither district nor any of the LLGs have the required five-year development plans (although some draft reports have apparently been prepared in recent years), nor does the province have a corporate plan. Neither the Provincial Tenders Board nor Provincial Building Board is functioning properly, and the conclusions made by the Constitutional and Law Reform Commission in 2009 (refer above), appears to remain valid in 2016.

6.1.1.4 Development Support

Papua New Guinea receives development funding through its own budgetary process (as described in Section 6.1.4.2), and from donors and the private sector.

Donors play a key role in service delivery in Papua New Guinea, with substantial support provided to the education, health and law and order sectors. In 2015, the aid contribution was K819 million, which represented 7.6% of total government revenue. The aid contribution included support from donor governments (95%) and international organizations (5%), with 98% of the aid in-kind and 2% in cash (Department of Treasury, 2016, p. 17).

In Gulf Province, donors provide substantial contributions to education, health and law and order. The donor contributions are largely delivered through national programs where the Provincial Government or District Authorities are aid recipients rather than being actively involved in planning and management of aid programs. The most notable aid programs in the province are the support provided to health and the police. Upgrading of the Hiritano Highway, including new bridges in Central Province, is receiving support from the Asian Development Bank.

6.1.1.5 Civil Society

In Papua New Guinea, the churches are the largest and most prominent components of civil society, fulfilling primary service-delivery roles including health and education. The church groups include the mainstream churches (Lutheran, Catholic, United and Anglican) and the Evangelicals, Pentecostals and Seventh Day Adventists.

[3] Members of Parliament represent 111 single-member electorates in Papua New Guinea. Those electorates comprise 20 provinces (represented by Governors) and 89 local electorates (referred to as "Open" electorates) representing administrative districts (National Capital District contains three electorates). The MPs who represent the Open electorates are referred to as Open MPs.

Papua New Guinea contains a range of international and local organizations, although the sector has been described as being in its infancy when compared to many Asian countries. Civil society organizations (CSOs) have a limited pool of candidates to choose from and many have difficulty retaining staff due to the higher wages and benefits offered by other organizations.

Attempts to coordinate civil society organizations in Papua New Guinea have fared poorly. However, the Papua New Guinea CSO Forum currently serves (in an interim capacity) as the country's National Liaison Unit for the Pacific Islands Association of Non-Government Organizations.

CSOs are active in a variety of areas, among them: community development, youth issues, gender equality, human rights, good governance and transparency, environmental protection, education and capacity building, health, family welfare and domestic violence, food security, and poverty alleviation. While civil society capacity in Papua New Guinea is strong on service delivery at the local level, it is weak on research and advocacy at the national level (ADB, 2015a, p. 6). The National Government has articulated development strategies that involve CSOs (along with development partners, the churches and the private sector) but does not articulate a role for civil society in governance, and the sector struggles to hold government accountable.

The PNG Chamber of Commerce and Industry represents businesses in Papua New Guinea and is affiliated to 19 provincial chambers. Gulf Province is one of the few provinces that is not represented. The PNG Chamber of Mines and Petroleum represents companies involved in the mining and petroleum sectors in Papua New Guinea and, similar to the role of the PNG Chamber of Commerce and Industry, provides services to the industry and a unified voice when representing its members in discussions with the National Government or other parties.

The trade union movement is relatively weak in Papua New Guinea. There are several industry-based unions, a national coordinating body and the PNG Trade Union Congress. However, the PNG Trade Union Congress was without a leader until early 2016 when a president was finally elected, and there are relatively weak links between the national body and the unions.

Very few CSOs, other than the churches, operate in Gulf Province. The Community Development Initiative (CDI) Foundation, established by Oil Search Limited in March 2012, had a base at Kikori for many years and provided a range of education and community development programs. However, the office in Kikori has since closed and any assistance provided by CDI is now provided from its base at Moro in the Southern Highlands. Medecins Sans Frontieres (MSF) has a base in Kerema and is implementing a tuberculosis (TB) program in Gulf Province. MSF is currently establishing an office in Ihu to extend the program in that area (including the villages along Orokolo Bay), and has plans to extend the program to Kapuna and Baimuru. The Digicel Foundation provides some assistance in Gulf Province, focusing on education and literacy. The World Wildlife Fund (WWF) and various other environmental groups have had activities in Gulf Province in the past, generally focusing on logging operations.

6.1.1.6 Logging Projects

A review of the governance of current logging projects is relevant to the Papua LNG Project because landowners within the PAOI have or are participating in large-scale logging activities. Many landowners may believe that petroleum development will have similarities with logging activities (which is largely perceived adversely) and this may challenge TEP PNG's relationships with landowners.

The logging industry is regulated by the *Forest Act 1991*; under the auspices of a multi-department National Forest Board; with a supervisory role played by the PNG Forest Authority (PNGFA) and a key role, in terms of forest resource planning and consultation, played by Provincial Forest Management Committees, which are often headed by the Provincial Administrator. Incorporated Land Groups (ILGs) are the mandated method of landowner representation and are responsible for the payment of royalties.

Between December 2010 and June 2015, a total of 287,824 m^3 of logs were exported from the province. Currently, timber permits cover the majority of Gulf Province. The logging operations are:

- Vailala Block 3;
- Turama Block 1;
- Turama Timber Rights Purchase;
- Turama Extension (which includes Kikori Blocks 1 and 2 and Baimuru Block 2); and
- East Kikori.

Further information on logging leases and operations is provided in the Upstream Land and Natural Resource Use Report (Booyong, 2017b; Part 18 of ESBS Dossier) Upstream Deforestation Baseline Report (Booyong, 2017a; Part 7 of ESBS Dossier). Map 4 shows logging leases in the PAOI.

These five logging operations employ approximately 1,000 workers. Other than the Turama Timber Rights Purchase project, all projects are under Forest Management Agreements (FMAs). The FMAs have the following benefits:

- Royalty, paid to the ILGs, varying between PGK10 (USD3.2 million) and PGK35/m^3 (USD3 - USD11/m^3);
- Agriculture, community development, business development and reforestation levies, each PGK1/m^3 (USD0.32/m^3);
- Project Development Benefits, which equate to approximately 7% of the value of log exports.

The Project Development Benefits (sometimes referred to as annual benefits, and previously referred to as premiums) is split into cash (40%) and project (60%) benefits. The cash benefits are distributed amongst the ILGs. The project benefits (along with the agriculture, community development and business development levies) are paid into a trust fund. A separate trust fund is established for each logging permit. A committee is established to administer the trust fund, deciding how the benefits are allocated. The committee is chaired by the Provincial Administrator and includes five landowner representatives, a women's representative and the developer.

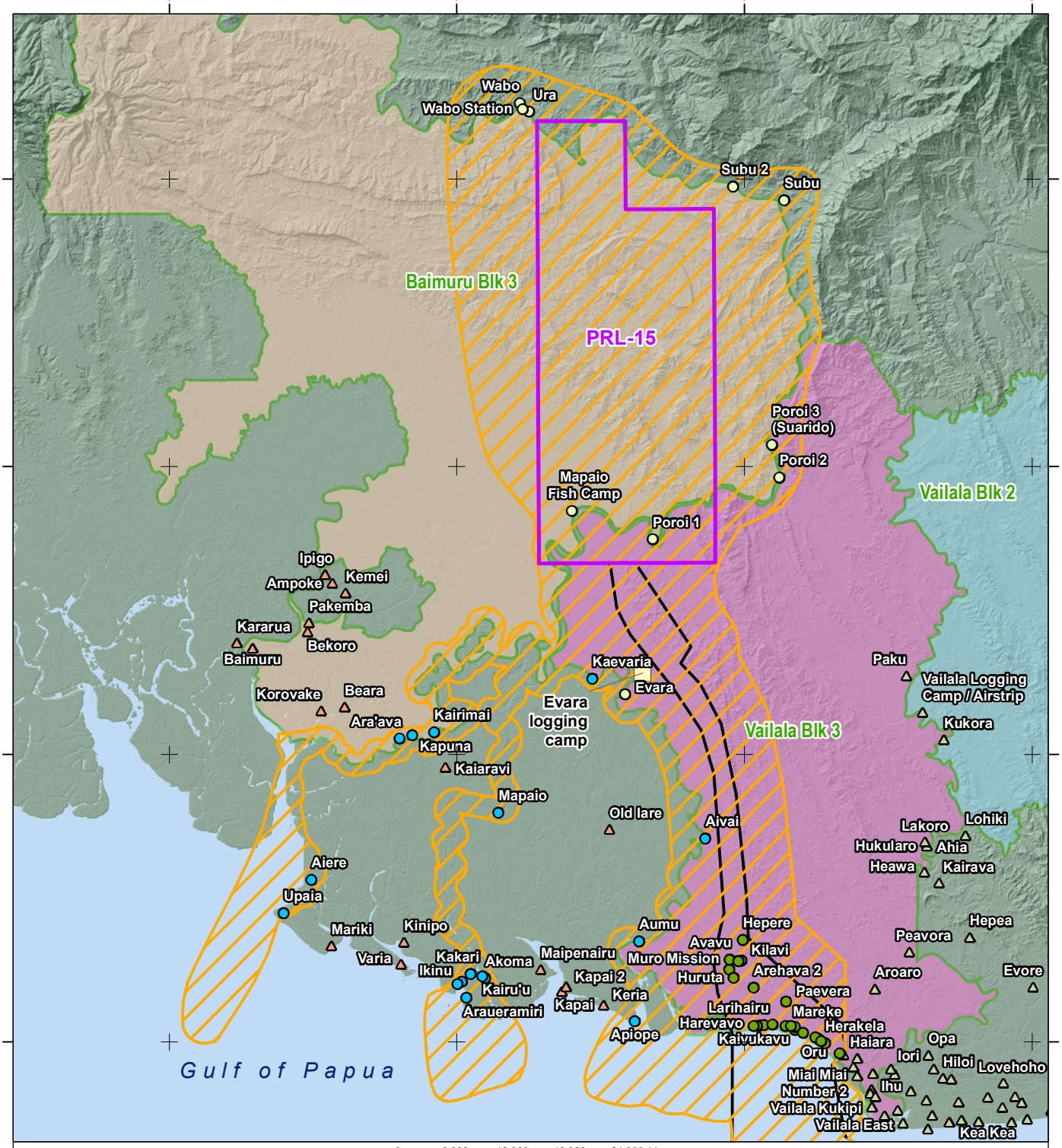
The reforestation levy is paid to the PNGFA for reforestation programs anywhere in the country.

Other than the local benefits, outlined above, the logging operations contribute income taxes and log-export taxes to the National Government. However, there are no direct benefits to the provincial or local-level governments.

There is little transparency in logging payments or project expenditure at local level, and no recent data available for Gulf Province. The Gulf Provincial Government notes that royalty and equity benefits from logging are not visible on the ground (Gulf Provincial Government, 2011, p. 32). Furthermore, there is a long history of complaints involving the logging industry, including:

- Limited consultation and awareness in the formation of ILGs and signing of logging agreements;
- Queries over the sustainability of logging operations;
- A lack of monitoring of logging practices, environmental impacts, and log exports;
- Inadequate employment conditions;
- Inequitable distribution of royalty payments; and
- Failure to deliver other benefits, particularly substandard infrastructure development.

A review of the logging industry in 2004 concluded that logging has little long-term beneficial impact on landowners, although they bear the environmental costs (The 2003/2004 Review Team, 2004b, p. viii).



SCALE: 1:600,000 @ A4

0 6,000 12,000 18,000 24,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Towns and Villages

Project Affected Communities

- PRL-15
- Export pipeline corridor
- Riverways

Host LLG Communities

- Baimuru Rural
- Ihu Rural

- Evara logging camp

Logging Concessions

- Baimuru Blk 3
- Vailala Blk 2
- Vailala Blk 3

- Upstream project area of influence

Proposed Facilities

- Pipeline export route corridor
- PRL-15 License

N

**Note, not all communities have been verified in the field*
***Note, language group does not represent land ownership*
****Note, no logging license for areas not covered by license*

TITLE: Logging Concessions

MAP: 4

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_126-81622 **REVISION:** A

DATE: 20/07/2017

DATA SOURCES:
Towns and villages, PRL-15, logging concessions, Evara logging camp, hillshade supplied by ERIAS and TOTAL (2015-2016). Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017).

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A report by the Overseas Development Institute (ODI) noted that governance failings have been a noticeable characteristic of the PNG forest sector for the last 20 years, and a succession of independent reviews commissioned by government has continued to question the way that timber licenses are issued and subsequently operated (ODI, 2007a, p. iv). Furthermore, and drawing on the results of a review of the logging industry in 2003, ODI highlighted that corruption and disregard for due process remained a problem not only in the forest sector, but more broadly, which contributed to PNG's ranking of 135 out of 159 on the Transparency International Corruption Perceptions Index in 2005 (ODI, 2007a, p. 19).

A subsequent report by ODI concluded that, unlike a Development or Benefit Sharing Agreement under the Oil and Gas Act, logging agreements, which are between the PNG Forest Authority and the developer, do not include enforceable promises for infrastructure, services, or spin-off businesses (ODI, 2007b, p. 9).

6.1.1.7 Petroleum Projects

This section of the report contains a review of the governance arrangements of petroleum projects in Papua New Guinea which are administered under the *Oil and Gas Act, 1998* and the precedence set from existing petroleum projects.

Section 50 of the Oil and Gas Act indicates that the State and the project area landowners, the affected local-level governments and affected provincial governments may enter into a coordinated development agreement. The development agreement specifies the allocation and management of benefits relating to a specific petroleum project, such as the Stanley Gas Project, in Western Province, which was finalized in 2014.

The PNG LNG Project was larger and presented more complex governance arrangements than any previous petroleum project in Papua New Guinea. It included landowners from 10 petroleum (petroleum production license (PPL)) and facility (petroleum production facility license (PPFL)) license areas, along with four provincial governments and 10 local-level governments. As a result, an Umbrella Benefit Sharing Agreement (UBSA) was prepared in 2009, outlining the broad benefit sharing arrangements for the project, with License Based Benefit Sharing Agreements (LBBSA) prepared later that year for each of the eight petroleum and two facility license areas.

It is unclear, at the time of writing, whether a development agreement or one or more benefit sharing agreements will be prepared for the Papua LNG Project, but their purpose and intent remains the same: the Agreement will articulate the allocation and management of benefits provided to project area landowners and affected provincial and local-level governments. It is also expected that the Agreement (or Agreements) will include the entire project, which will cover the area of resource extraction along with pipeline and processing areas.

Social Mapping and Landowner Identification

As stated in Section 47 of the Oil and Gas Act, the developer will undertake a Social Mapping and Landowner Identification (SMLI) study to identify the project area owners of all license areas, the area (on- or offshore) within 5 km of any project facility, and other areas affected by the petroleum project if developed. The SMLI report is the key document, used to identify which landowners participate in the development forum and receive project benefits. The SMLI study must therefore be completed and vetted by the State, prior to the development forum.

Development Forum

Prior to the first grant of a license or licenses in respect of a petroleum project, the *Oil and Gas Act* requires the Minister for Petroleum to convene a development forum that consists of the State, the relevant provincial and local-level governments and the project area landowners. The purpose of the development forum is to provide an opportunity for these participants to voice their views, and to preferably reach agreement on matters relating to the allocation of benefits.

As stated in Section 49 of the Act, a development forum cannot be held until:

- The SMLI studies have been completed and vetted;
- The Minister is satisfied, on the basis of the results of those studies, that the people who would be project area landowners of the petroleum project are truly represented by the persons who are to be invited to the development forum as their representatives;
- A socio-economic impact study, prepared by the developer, has been submitted to the Minister, and the Minister responsible for environmental matters; and
- The Director for Petroleum has prepared a development proposal (called a 'director proposal'), after giving due consideration to the results of the full-scale SMLI studies and the socio-economic impact study, for the equitable sharing of the equity benefit and the royalty benefit amongst project area landowners, and has provided that proposal to representatives of those future project area landowners.

The PNG LNG Project had a development forum in Kokopo that resulted in the UBSA. Separate development forums were subsequently held for each petroleum area resulting in the 10 LBBSAs. For the Stanley Gas Project, a single development forum was held in Kiunga, and resulted in the Development Agreement.

Project Benefits

As noted above, the deliberations of the development forum are documented in an agreement between the State, the relevant provincial and local-level governments and the customary landowners, in what is referred to as a Development Agreement or Benefit Sharing Agreement (BSA). In this agreement, the State also commits the developer to the National Content Plan. The Minister for Petroleum signs the Agreement on behalf of the State following the approval of the National Executive Council. The Agreement is likely to include mention of the benefits outlined in Table 2. At the time of writing, no landowners of the upstream components of the PNG LNG Project (e.g., excluding Caution Bay) had been paid royalties from the project.

For projects in a taxable position, the TCS can provide substantial amounts of funding for public infrastructure. For example, Ok Tedi Mining Limited managed PGK 200 million (USD 63 million) in TCS projects completed in Western Province, on behalf of the National Government, between 1997 and 2012. This included support for numerous schools, health facilities, roads, police stations, water supplies and electricity. If the developer does not want to utilize the TCS then this form of funding will not be available.

Subject to the outcome of negotiations during the development forum, the development agreement or BSA may also address matters such as:

- Preferential employment and training opportunities for local workers. This is addressed in an Employment and Training Plan that must be submitted by the developer to the National Government;
- Support for the establishment and capacity building of local landowner companies. This is addressed in a Business Development Plan that must be submitted by the developer to the National Government; and
- Support for local procurement. This is addressed in a Supply and Procurement Plan that must be submitted by the developer to the National Government.

In addition to the above, the development agreement or BSA may or may not refer to voluntary social contributions by the developer. The agreement or BSA not only describes obligations or assurances of the State but also obligations of the other parties including participating landowners (e.g., agreement to not impede process of construction).

The agreement will also outline the management arrangements for the benefits described in Table 2. The likely management arrangements are described below.

Table 2: Description of Petroleum Benefits

Benefit	Description
Royalty	A tax currently set at 2% of the wellhead value of petroleum and paid to the National Government, and subsequently transferred to project area landowners and/or affected provincial and LLGs in proportions determined during the development forum.
Development levy	A tax currently set at 2% of the wellhead value of petroleum and paid to the affected provincial and/or LLGs in proportions determined during the development forum.
Equity	Free equity: Should the State take up its equity entitlement in a petroleum project (which is limited to 22.5%), 2% can be granted to the project area landowners and/or affected LLGs. The cost of acquiring that portion granted to landowners and/or LLGs is borne entirely by the State, up until commercial production commences. Paid equity: Some projects (such as the PNG LNG Project) have included an option for project area landowners and/or affected provincial governments to purchase additional equity in the project. This must be paid for in full by the landowners and/or provincial governments.
Infrastructure development grants	Grants from the National Government for specific infrastructure projects in the project area. The Development Agreement or BSA usually includes a tentative list of projects to be funded from this source of funding.
Business development grants	Grants from the National Government to assist landowner companies from the project area to establish the companies as competitive suppliers of goods and services for the Project.
Tax credit scheme (TCS) expenditure	The TCS allows the National Government, using the project operator as a contractor, to build or maintain public infrastructure without the need for an appropriation from Treasury. For petroleum operations, expenditure is limited to 0.75% of assessable income (from which TCS expenditure is deducted). TCS is administered by the Department of National Planning and Monitoring (DNPM).

Adapted from the Oil and Gas Act 1998 and the PNG Petroleum Division Policy Handbook (2003).

Landowner Benefits

In the past landowner benefits in oil projects have generally been paid through ILGs. The intended purpose of the *Land Groups Incorporation Act* 1974, was to enable customary landowners to form ILGs as corporate entities for registering and managing their customary land. This purpose notwithstanding, the principal use of ILGs has been as a means for obtaining landowner consent for resource extraction projects (primarily oil projects) and as a vehicle for projects to distribute benefits to affected landowners. Although mentioned in the Oil and Gas Act, ILGs or Landowner Associations have been recognized in many resource development agreements. The Stanley Development Agreement, for example, specifies ILGs, there is some uncertainty whether ILGs will be specified as the vehicle for disbursing landowner benefits for new gas projects. An alternative is simply to specify clans and sub-clans.

Some of the concerns around ILGs resulted from widespread complaints over the authenticity and management of ILGs in various sectors (notably petroleum and logging). As a result, amendments to the *Land Groups Incorporation (Amendment) Act 2009* and the *Land Registration (Customary Land) (Amendment) Act 2009* were proposed, and subsequently approved by Parliament in 2010. The amendments strengthen the incorporation process and aim to improve transparency and accountability. Any new ILG requires a complete list of proposed members, including individual birth certificates, and a sketch map (with GPS points if possible) of the actual land to be registered, showing any disputed areas. Existing ILGs were given five years to comply with the new requirement or they would no longer be officially recognized. There is widespread concern that the amendments will be too difficult to implement in many parts of Papua New Guinea.

Mineral Resources Development Company

As defined in Section 176 of the Oil and Gas Act, the Mineral Resources Development Company (MRDC) is the State nominee entrusted with the responsibility for managing landowner, provincial and local-level government equity in mining and petroleum projects.

For provincial and local-level government equity entitlements, MRDC disburses funds to accounts nominated by the relevant provincial or local-level governments. There are no conditions imposed on the disbursement of these funds.

Landowner equity entitlements are split three ways:

- 30% to a Future Generations Trust (FGT);
- 30% to a Community Infrastructure Trust (CIT); and
- 40% cash payment to State recognized landowners/landowner entities (Section 176 (3)(h)).

The cash payments have in the past been paid direct to Government recognized landowner ILG representatives in the field or to their nominated ILG bank accounts at irregular intervals while the CIT and FGT funds are invested and held in trust by MRDC under the auspices of separate MRDC subsidiaries established for each project.

Kumul Petroleum Holdings Limited

Kumul Petroleum Holdings Limited (KPHL) is PNG's national oil and gas company and is mandated to hold the National Government entitlement in any oil and gas project in Papua New Guinea. Since its inception in 2009, the main objective has been to acquire a stake in the PNG LNG Project. KPHL is responsible for managing the State's 16.57% equity in the PNG LNG Project. It is also reportedly managing the paid equity held by the landowners and provincial governments in the PNG LNG Project. For this reason, there is some conjecture that KPHL may broaden its initial mandate and take over from MRDC in the management of the free equity held by landowners and LLGs in future LNG projects.

Expenditure Implementation Committee

The Oil and Gas Act provides for the establishment of an Expenditure Implementation Committee (EIC) to assist provinces and LLGs in the administration and management of capital expenditure derived from petroleum benefits. The Oil and Gas Act states that the expenditure of monies or the implementation of grants by or on behalf of an affected LLG or provincial government shall be made:

- In accordance with development plans submitted by the relevant Local-level Government or Provincial Government; and
- In accordance with the approval of the EIC for the petroleum project in question.

The EIC is responsible for:

- Monitoring budgets and timetables for the construction and implementation of grants and benefit expenditure on behalf of affected LLGs and Provincial Governments and approving such expenditure;
- Monitoring expenditure made pursuant to section 219C of the *Income Tax Act 1959* – tax credit scheme projects - to ensure that projects funded pursuant to that section comply with the development plans submitted by the relevant LLG or Provincial Government; and
- Monitoring the program of ongoing projects for expenditure of monies in accordance with Section 178 of the Act.

Under the Act the EIC is mandated to manage:

- All grants made in the form of monetary payments to an affected LLG or Provincial Government under Section 173 of the Act;
- All monies held on behalf of an affected LLG or Provincial Government under Section 176 of the Act; and
- Any other funds that the State may, through agreement, hold on behalf of the beneficiary provincial government.

The intent, in establishing the EIC, is to centralize management of all provincial benefit streams and to tie the allocation of funds to Government approved projects. Part of the rationale for establishing the committee was the realization that in past years there had been little accountability in the expenditure of royalty, equity benefits (dividends), infrastructure grants and development levy funds, principally by the project impacted provincial governments. However, the committee was not gazetted or established until March 2001 and held its inaugural meeting in May 2004.

DNPM initially took responsibility for mobilizing the EIC, including the management of development agreement funds and convened the first meeting in May 2004. In November 2007, the EIC Secretariat was transferred to DPE and in 2010 was transferred yet again to come under MRDC management (although it has members from DPE, DNPM and the departments of Works, Provincial Affairs and Treasury).

An operational guideline for the EIC was finalized by the DNPM in 2008. The process for approving projects under the mandate of the EIC, derived from this guideline, is outlined in Figure 3.

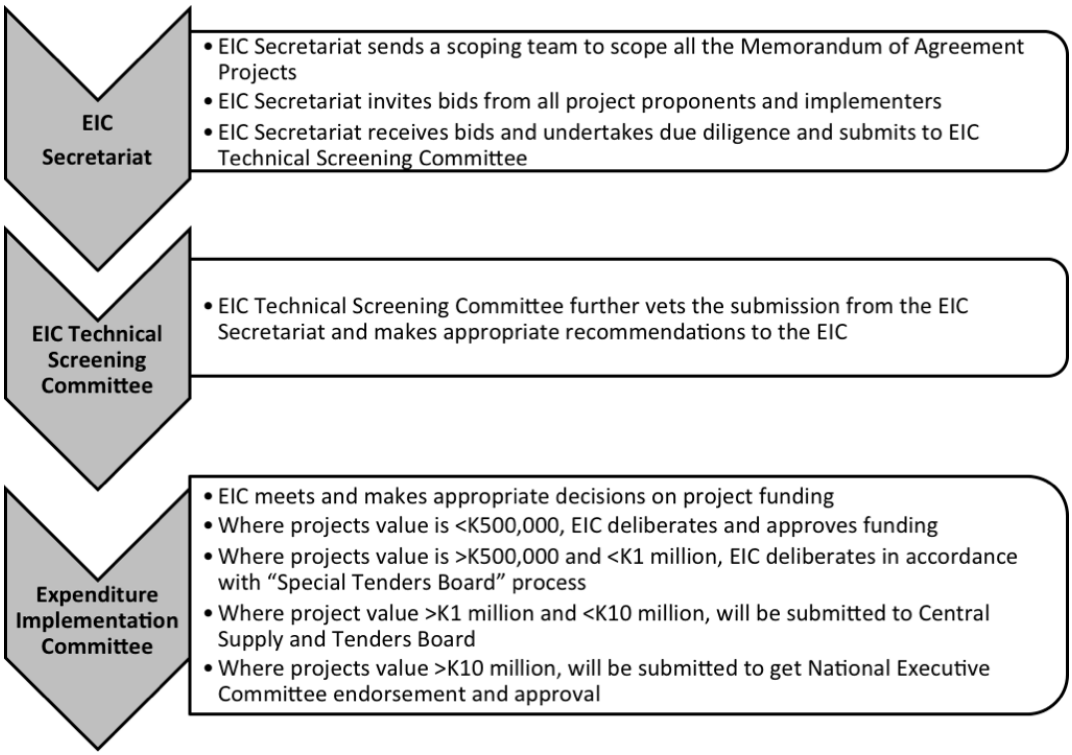


Figure 3: Process for Approving EIC Projects

Although the EIC has a clear mandate, it is yet to be fully operationalized. For the PNG LNG Project, the duties of the EIC were to be transferred to the Economic Corridor Implementation Agency (ECIA) upon its establishment. The economic corridor model is outlined in the PNG Development Strategic Plan (2010-2030) and MTDS (2011-2015). Furthermore, the Petroleum Resource Area Economic Corridor, which reflected the coverage of the PNG LNG Project, was identified in the MTDS as the first economic corridor to be operationalized. However, the

economic corridor approach was an initiative of the previous government: the current government no longer actively pursues it. Although the Stanley Development Agreement refers to the EIC, there is some uncertainty over its role in the management of infrastructure funds for any new petroleum projects.

For the PNG LNG Project, PGK1.5 billion (USD473 million) was allocated for infrastructure grants over 10 years. To date, no infrastructure grants have been paid into tangible projects.

6.1.1.8 The Effectiveness of Petroleum Benefits in Papua New Guinea

Information on the allocation and use of resource project benefits is not always publicly available. However, as part of the SIA for the PNG LNG Project, a review of the Kutubu oil field (PDL 2) was undertaken. Kutubu was the first oil field commercially developed in Papua New Guinea, commencing production in 1992. A summary of the review is presented in Box 1.

Between 1992 and 2007 the Kutubu oil field produced 300 million barrels of oil. Payment of royalties to PDL 2 landowners commenced in 1992, and payment of the first dividends occurred in 1996. Between 1992 and 2007 the landowners were entitled to PGK118 million (USD6 million) in royalties and PGK71 million (USD23 million) in equity benefits (Goldman 2009, pp. 3-122 to 3-124). The landowner's equity is held in Petroleum Resources Kutubu (PRK), a trust managed by MRDC.

PRK distributes dividends to Kutubu landowners through ILGs. There is anecdotal evidence that cash payments have not been equitably distributed among landowners, although cash payments have largely replaced traditional forms of income, creating a dependency on a non-renewable resource (Goldman 2009, p. 3-59). Furthermore, the majority of landowners are not involved in the identification of community investments and have little knowledge of community investment expenditure or the value of the future generation trust, which are both managed by MRDC.

In 2009 it was reported that neither PRK annual reports, accounts or audits, or dividend distribution at ILG level, were publicly available, which adds to the lack of transparency and equity in the project area (Goldman 2009, p. 3-49 to 3-51). Goldman concludes that there is little doubt that more could have been achieved with the flow of oil wealth to date (Goldman 2009, p. 3-60), citing a lack of savings or investment by landowners, a lack of public infrastructure planning, and inadequate provincial government performance. Without immediate change in the planning for and disbursing oil revenue entitlements, most of the future oil and LNG revenues will either be mismanaged or misappropriated (Goldman 2009, p. 3-355). Furthermore, without real change in governance arrangements, mismanagement practices may continue to erode development potential, and perpetuate the wasteful inequities witnessed over the life of the current petroleum projects (Goldman 2009, p. 3-90).

Box 1: Review of Benefits from PDL 2
Source: Derived from Goldman, 2009

In 2011, the acting Prime Minister Sam Abal, commented that more than PGK536 million (USD172 million) in development agreement funds have been paid for petroleum projects in the Southern Highlands since 2004, but no projects have eventuated (Abal, 2011).

More recently, at a presentation at the 2012 PNG Mining and Petroleum Investment Conference in Sydney, Oil Search Limited made the observation that despite having world leading involvement of communities in resource development:

- Material benefits have been paid but basic infrastructure is still lacking;
- Apparent lack of transparency and effectiveness in benefits distribution;
- Ineffective use of development agreement funds:

  - Few projects built;
  - Very focused and sometimes highly divisive; and
- Measurement of socioeconomic change in communities demonstrates that benefits are not always reaching targets (Oil Search Limited, 2012, p. 27).

A common theme derived from the literature, and from direct experience with mining and petroleum projects across Papua New Guinea, is the importance attached to adequate governance. Without adequate governance, many of the potential benefits may not be realized, or a minority of the impacted population may capture the majority of benefits. Effective governance arrangements are therefore critical if broad-based development is to occur, and if landowner disputes are to be minimized.

Extractive Industries Transparency Initiative

Papua New Guinea became an Extractive Industries Transparency Initiative (EITI) candidate country in 2014. The National Government indicated that implementation of EITI will show the direct and indirect contributions of resource companies in Papua New Guinea; improve public understanding of revenue flows in the extractive industry; strengthen revenue generation and collection; and provide a platform for effective engagement between various stakeholders (GoPNG, 2015, pp. iii, 93). However, the first EITI report for Papua New Guinea, viewed by selected parties in early 2016 but not publicly available until 2017, has apparently revealed several problems, including a lack of information, particularly relating to MRDC and sub-national payments.

The implications of the first EITI report, or impact it may have on future resource projects, is not known at this stage.

6.1.1.9 Use of Petroleum Benefits in Gulf Province

The Gulf Provincial Government has received financial benefits from oil production since 1991, and will benefit from the PNG LNG Project once benefit payments are made. Gulf Province has, in fact, already benefitted from the PNG LNG Project as pipeline landowners have received statutory compensations but no royalties or equities. Statutory compensations have been in the form of tax credit scheme and infrastructure grants paid in cash to landowner companies. Benefits stem from PDLs 3 and 4 being located along the Gulf and Southern Highlands border, and the oil and gas export pipelines passing though Kikori District.

The oil benefits received by Gulf Province in the past include equity benefits, special support grants (SSG), infrastructure grants and TCS projects. Details on the amount of benefits received are not publicly available, and no information is available on how the equity benefits, SSG or infrastructure grants have been used. It is reported that SSG payments were originally shared equally between the project area (East and West Kikori LLG areas) and the rest of the province. More recently however, the SSG is allocated to projects in the province without any preference given to the Project area.

The Provincial Government has established the Gulf Investment Trust Fund (GITF), and some provincial officers believe some of the project benefits are paid into this fund. Details on the amount of funding received by the GITF, transfers to the Gulf Provincial Administration, or the current balance, are not known.

TCS expenditure is managed by Oil Search Limited and has been utilized to upgrade the Kikori High School, Kikori District Rural Hospital and Kikori police station. Details on the amount of TCS expenditure allocated to each project are not available from the Provincial Government.

Although not referring specifically to Gulf Province, the above observations sum up a common perspective that there is lack of transparency regarding how the benefits from resource projects are utilized, and that usage is not necessarily contributing to development in the resource areas.

6.1.1.10 Mining Projects

The *Oil and Gas Act, 1998* incorporates several initiatives that were developed in the mining industry, but are not reflected in the current *Mining Act 1992*. However, a brief review of the mining industry in Papua New Guinea is warranted because of its impact on subsequent petroleum legislation.

Arguably all large-scale mining projects in Papua New Guinea have experienced social disruption from employees and/or landowners. Most notably:

- The Panguna mine in Bougainville closed in 1989 due to civil unrest that stemmed from environmental damage and a perception that mine benefits were not equitably distributed; and
- Environmental damage downstream from the Ok Tedi mine in Western Province led to court cases, the withdrawal of BHP Billiton from the project, and renegotiation of benefit sharing arrangements with the provincial government and impacted communities.

The sequence of events that led to the closure of the Panguna mine added to the urgency of a process of policy reform, which had already been initiated (Filer & Imbun, 2004, p. 9). However, the new Mining Act, finalized in 1992, did not articulate many of the changes introduced. Negotiations for the Porgera mine (completed in 1989) introduced the development forum concept and included:

- Payment of an increased share of royalties to landowners;
- Payment of special support grants;
- Establishment of the Porgera Development Authority, to manage local development on behalf of the LLGs;
- Provisions for landowner equity; and
- Introduction of the Infrastructure Tax Credit Scheme (Filer & Imbun, 2004, p. 11).

As noted in a review of World Bank activities in the extractive industries in Papua New Guinea, there has been a trend toward a rising share of benefits for landowners (at the expense of GoPNG) in each successive mining project (Mathrani, 2003, p. 9). Given the large sums of money at stake, project development proposals themselves almost always lead to conflicts over landownership (Mathrani, 2003 p. 10). Furthermore, the national and provincial governments have a poor record for meeting their obligations to landowners, and mining payments have increased social inequality, both within beneficiary groups as well as between beneficiaries and those excluded by geography (Mathrani, 2003, pp. 12-13).

Related to the issue of landowner benefits is the recognition and importance attached to customary land ownership in Papua New Guinea. Customary landowners have the power to decide what happens on their land (Filer, 2006, p. 11). As a result, landowners expect to benefit from large-scale resource projects. When the expectations are not met, landowners may seek to voice concern to the national or provincial government or the developer. If these concerns are not addressed, disruptions to construction or operations may occur. Even if the concern relates to commitments by the national or provincial government, customary landowners are likely to disrupt the project and thereby use the developer to raise attention on their behalf with the relevant authorities. It should be noted that many rural areas of Papua New Guinea have minimal public infrastructure and receive only the most basic services, and there is a common perception that the government has neglected them since the country gained independence. Disgruntled landowners may therefore be seen as a threat to project operations or infrastructure, but in many respects, they are simply following a process which helps secure the commitments made to them in the lead up to the project.

6.1.1.11 Assessment of Governance in Papua New Guinea

The World Bank has supported the preparation of worldwide governance indicators by Daniel Kaufman and Aart Kraay since 1999. Governance is defined as the traditions and institutions by

which authority in a country is exercised, including the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them (Kaufman, Kraay & Mastruzzi, 2010, p. 4).

The assessment of governance is based on the following composite measures or indicators:

- Voice and Accountability;
- Political Stability and Absence of Violence;
- Government Effectiveness;
- Regulatory Quality;
- Rule of Law; and
- Control of Corruption.

The six composite measures or indicators are based on 31 underlying data sources and are used for broad cross-country comparisons and for evaluating broad trends over time (Kaufman, Kraay & Mastruzzi, 2010, p. ii). The percentile ranking method shows PNG's performance against more than 200 countries. Results for Papua New Guinea from 1996 to 2015 are shown in Figure 4, which shows there has been a clear decline in government effectiveness, the rule of law and control of corruption between 1996 and 2015, in comparison to other countries. Furthermore, in 2015 the assessment for the rule of law (19%) and control of corruption (14%) places Papua New Guinea in the lowest 20% of countries worldwide.

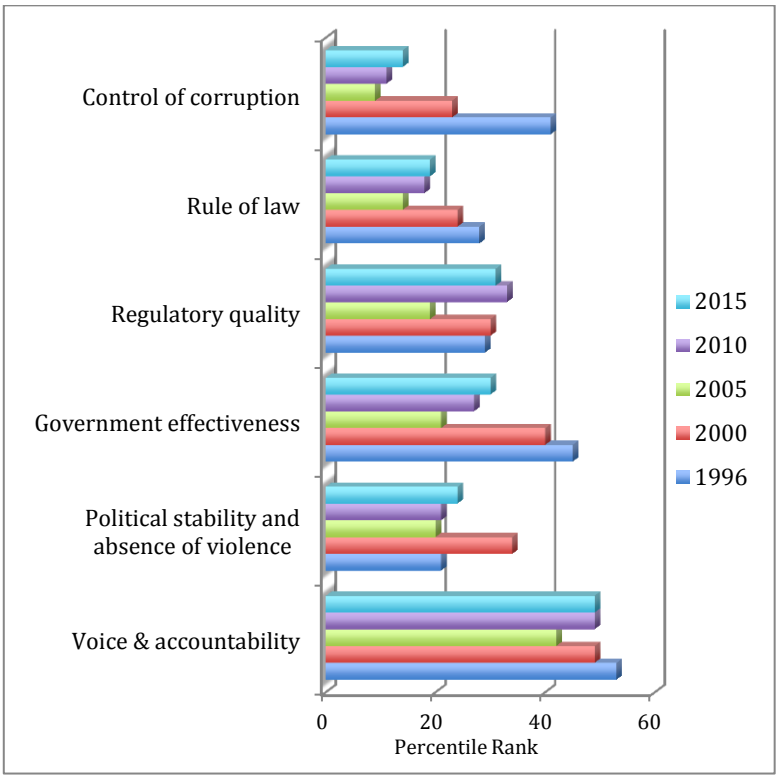


Figure 4: Governance Indicators for Papua New Guinea, 1996-2015

Source: Worldwide Governance Indicators, http://info.worldbank.org/governance/wgi

The Institute of National Affairs has conducted private sector surveys in 2002, 2007 and 2012 to assess the business environment, and particularly the prevailing impediments to business and investment as perceived by private sector participants. Results from 136 completed questionnaires in 2012 support the low governance scores outlined above (Institute of National Affairs, 2013, p. 2). The main priorities identified by survey respondents that needed to be

addressed by government in order to encourage business and investment in Papua New Guinea is shown in Figure 5.

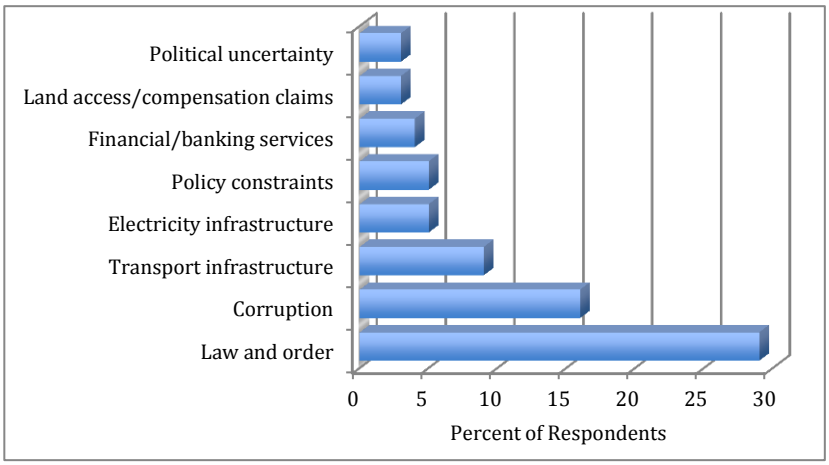


Figure 5: Government Priorities to Support Business Growth in Papua New Guinea

Source: Institute of National Affairs, 2013, p. 95

As shown in Figure 5, law and order and corruption are clearly the two main priorities for the government to address if the business and investment climate is to improve in Papua New Guinea. Law and order was identified as the main priority by 29% of businesses surveyed, with corruption identified by 16% of businesses surveyed.

6.1.2 Economic Infrastructure

6.1.2.1 Roads

Papua New Guinea has approximately 30,000 km of roads. Of these, 8,460 km are national roads, but only 29% of national roads are in good condition (Independent State of Papua New Guinea, 2010, p. 66).

Bourke and Harwood (2009, p. 478) estimated that 47% of the population live five or more kilometers from the nearest national road.

The Government recognizes that substantially more funding is required for road maintenance, however, substantial road development is also included in the PNG Development Strategic Plan.

Gulf Province contains 115 km of national roads and 500 km of provincial roads (Gulf Provincial Government 2011, p. 36). The main national road is the Hiritano Highway, which links Port Moresby and Kerema. This road is 307 km in length (extending through Gulf and Central Provinces and the National Capital District), with all but the final 23 km sealed. Work is currently in progress on 12 km of this section of road. However, travelling from Kerema to Port Moresby takes about five hours due to extensive potholes in some sections of the road, and considerable pedestrian traffic where the road passes though or nearby villages. The other main road in Gulf Province is the road from Moro, in the Southern Highlands, to Kikori. Oil Search Limited maintains this road. Many other roads in the province are logging roads and generally unsuitable for conventional vehicles.

The only proposed roads in Gulf Province that are highlighted in the National Transport Plan are (i) the Kerema-Kopi road, that will provide a link between Port Moresby and the Southern Highlands and has been prioritized as a development commitment associated with the PNG LNG Project, and (ii) the Trans-Island connection from Malalaua to Lae via Wau or through Kaintiba (GoPNG, 2013b, p. 50). Both proposed roads are National Government responsibilities.

It is reported that one of the development agreement commitments made by the National Government as part of the PNG LNG Project, is the funding of the Kerema-Kopi road. However,

the level of funding or construction timeframe is not known, and it appears that the Gulf Provincial Administration has not been consulted in regard to the project.

Gulf Province contains a large network of logging roads, but these are built for the purpose of extracting logs, and generally fall into disrepair after an area has been logged.

Some roads built during the colonial era also exist, but many have also fallen into disrepair. One such road is the Petoe-Ihu road, which extends east along the coast from Kerema Bay towards Ihu. Although a National Government road, the Provincial Government is providing assistance.

6.1.2.2 Air Services

Papua New Guinea has a well-developed system of air services that includes 27 national airports and some 620 smaller airports. However, in 2010 the Government stated that 70% of PNG's national airports did not meet international certification standards (Independent State of Papua New Guinea, March 2010, p.72), and in 2012, an estimated 32% of the smaller airports were closed (GoPNG, 2013b, p. 61).

Several airlines provide regular domestic flights and/or charter services, the largest being the state-owned Air Niugini. Secondary airlines include Regional Air, National Jet, Hevi Lift and PNG Air (formerly Airlines PNG), with missionary groups also providing air services, often flying into otherwise isolated communities.

Maintaining aviation infrastructure has been an ongoing constraint in many parts of Papua New Guinea and has led to airports or airstrips being closed periodically or indefinitely.

Gulf Province contains 30 airstrips, of which 20 are government airstrips and 10 are private airstrips (Gulf Provincial Government, 2011, p. 39). Gulf Province includes two national airports, these being Kerema, which is operated by the National Airports Corporation and can accommodate F100 aircraft during daylight hours, and Kikori, which is the responsibility of the Gulf Provincial Government. The National Transport Strategy states that 26 smaller airstrips were operational in 2012 (GoPNG, 2013b, p. 61).

At present, Kerema airport is open but has no regular passenger services due to the lack of demand. Most people tend to travel to Port Moresby by public motor vehicle (PMV), which costs K50 per person each way. Several airlines do use Kerema airport for charters (such as North Coast Aviation), which has periodic flights to Lae and to remote parts of the province such as Kaintiba and Kotidanga (both in Kerema District).

The airstrip at Baimuru is open, but not receiving regular passenger services, while the airstrips at Kikori and Ihu are closed due to a lack of maintenance and upkeep. Several airstrips in Kikori District have been built by and are maintained by logging companies. The logging companies often provide opportunities for local people to board flights.

6.1.2.3 Shipping

Papua New Guinea has a network of commercial ports that are used for freight and passenger services. Of the 22 ports, 4 are not currently operational, including Kerema. Port Moresby, Lae, Madang, Kimbe, Oro Bay and Rabaul carry international and coastal traffic and can accommodate vessels exceeding 150m length and drawing up to 10m (GoPNG, 2013b, p. 54). Other provincial ports provide limited port services, require manual loading/offloading, and may not be usable in bad weather.

There are a large number of minor port facilities, including small wharves, jetties, ramps and landings. Many of these are in poor condition and a number of ports of call that have been used in the past have become disused.

A network of small trading vessels once serviced most coastal areas of Papua New Guinea. These bought and sold goods, including copra, but many have ceased operation in the period since Independence. As a result, many village people have had to buy their own boats to have

access to markets. Many of these boats are heavily over-loaded and operate over stretches of open sea without basic safety equipment or navigation aids.

Gulf Province contains four jetties, of which two were reported as being operational in 2010 (Gulf Provincial Government, 2011, p. 36). However, it is believed that the only operational government wharf in the province may be the river port at Kikori. The wharf at Kerema is sanded up and neither Baimuru nor Ihu have wharves. Logging camps establish temporary wharves to unload vehicles and supplies, and to load logs, but these fall into disrepair when no longer maintained by the logging company.

The Gulf Provincial Government has proposed to develop a new permanent main sea port facility at Wowei, near Kikori, to serve the new Gulf to Southern Highlands road link (GoPNG, 2013b, p. 79). This port could potentially serve the PNG Highlands and reduce pressure on Lae Port and the Lae-Mt Hagen section of the Highlands Highway.

While freight comes from Port Moresby to Kerema by road, the logging companies provide some opportunities for local people to add cargo to barges carrying freight from Port Moresby to locations within Gulf Province.

6.1.2.4 Communications

Mobile phones have revolutionized communications in Papua New Guinea since the rollout of Digicel's mobile phone network that commenced in 2008. Results from the 2009-2010 Household Income and Expenditure Survey indicated that across Papua New Guinea, 42.5% of rural households contained one or more mobile phones, although only 1.4% of rural households possessed a personal computer (Refer NSO, 2013, p. 72). In 2010, it was estimated that nationwide there were only 150 mobile subscribers per 1,000 people, and only 2.3% of the population accessed the internet (Independent State of Papua New Guinea, March 2010, p. 75).

According to the International Telecommunications Union (ITU), total internet usage in Papua New Guinea (both mobile and desktop) reached around 10% of the population in 2014 (Deloitte Touch Tohmatsu, 2016, p. 9). As shown in Figure 6, substantial growth in internet penetration occurred between 2011 and 2014.

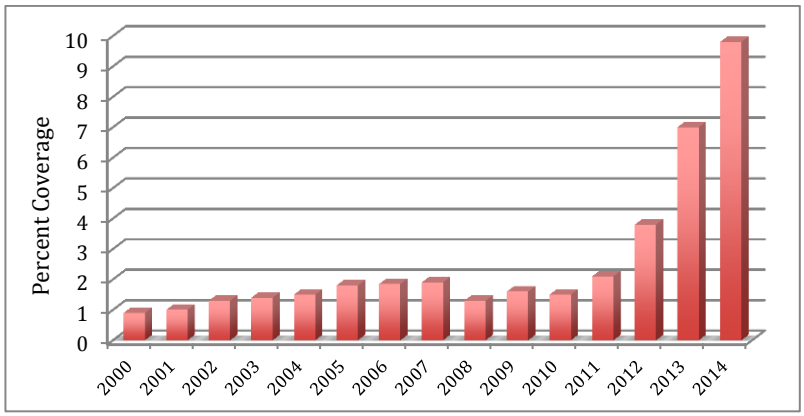


Figure 6: Internet Penetration, 2000-2014

Source: ITU, 2015, reproduced in Deloitte Touch Tohmatsu, 2016, p. 10.

While telecommunications benefited from the introduction of mobile telephones and the introduction of competition, the quality of service is low and dramatically overpriced. It also lacks capacity to run large data services, which prohibits productivity improvements that are occurring elsewhere, such as distance education, remote computer processing and storage, internet protocol voice and video phone calls (Jones & McGavin, 2015, p. 56).

Compared with similar countries in the Asia Pacific region, internet usage in Papua New Guinea is well below average (Deloitte Touch Tohmatsu, 2016, p. 11). While ITU indicate that internet

speed is slower than in Fiji, but ahead of most countries in the Asia Pacific region, including Indonesia and the Philippines (Deloitte Touch Tohmatsu, 2016, p. 12), prices are high.

ITU created an affordability index, based on the proportion of the average citizen's income, based on an estimate of Gross National Income (GNI) per capita, to access entry-level internet services. As shown in Figure 7, the price of a standard fixed internet connection in 2013 was more than twice the annual income of an average PNG citizen, which placed PNG's internet affordability at 163rd out of a global ranking of 169 countries (Deloitte Touch Tohmatsu, 2016, p. 13).

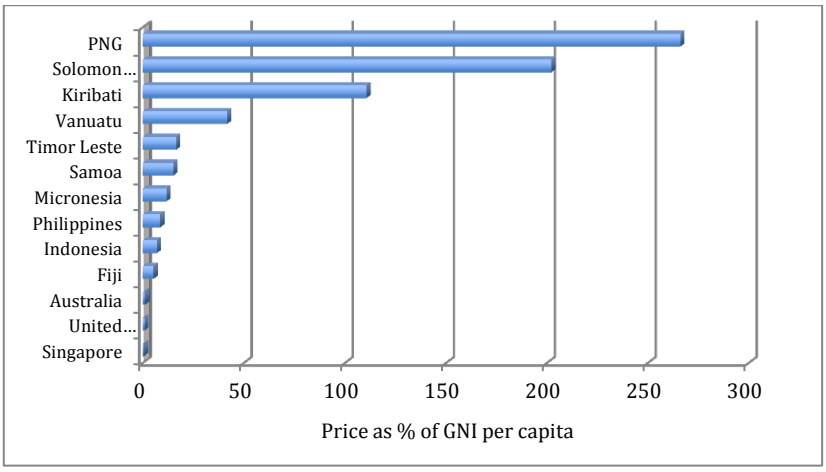


Figure 7: Fixed Broadband Price as % of GNI per capita, 2013

Source: ITU, 2015, reproduced in Deloitte Touch Tohmatsu, 2016, p. 13.

More recent information indicates that the cost of entry level broadband packages has fallen dramatically in Papua New Guinea, to PGK49 to PGK60 (USD16 to USD 19) per month, equivalent to approximately 10 to 20% of average monthly income using the GNI per capita method (Deloitte Touch Tohmatsu, 2016, p. 14). This remains significantly higher than the cost that is predicted to facilitate rapid internet expansion, which is estimated at 3-5% of average monthly income (Deloitte Touch Tohmatsu, 2016, p. 15).

On the back of the expansion of mobile phone and internet services in Papua New Guinea, Bank of South Pacific (BSP) introduced mobile phone banking applications in 2009. This provides the capability for EFTPOS, bill payments, loan repayments and funds transfer to anyone with Digicel mobile phone service, using mobile phones.

In Gulf Province, Digicel provides mobile phone coverage for many rural areas, while B-mobile, the government-owned service provider, provides limited coverage outside of Kerema. Details of mobile phone coverage across the PAOI are provided in Section 6.2.3.2.

While Papua New Guinea has two television stations, channels from Australia and other countries in the Asian Pacific region are commonly broadcast. However, television coverage is generally limited to the main provincial centers and resource project enclaves. Papua New Guinea has two main daily newspapers. These are available in all main urban centers, and are often carried back to village areas and circulated, albeit, sometime after publication. Radio is the other method in which news and information is broadcast in Papua New Guinea, and is the main method in rural areas, particularly those areas without ready access to urban centers.

6.1.2.5 Electricity

Energy is considered an important requirement for economic development. It facilitates economic development that, in turn, stimulates demand for greater energy services. Energy also enables basic human needs, such as food and shelter, to be met and contributes to social development by improving education and public health. In developing countries, the amount of energy used per capita is an indicator of development (IEA, 2004 p.p. 326). Neither the

International Energy Agency (IEA) or the World Bank (which also publishes statistics on power consumption per capita) include statistics for Papua New Guinea. Other sources estimate consumption in Papua New Guinea at between 440-475kWh per capita (based on production, domestic consumption and population)(CIA 2014). By comparison, the World Bank indicates that Indonesia consumes 814kWh per capita (compared with 10,078kWh per capita in Australia, for example). The IEA's statistics for 2014 indicate that in Asia (India, Bangladesh, Indonesia, Pakistan and China) 17% of the population is without access to electricity (IEA, 2014 p.p. 74).

In 2010, an estimated 12.4% of households in Papua New Guinea had access to electricity (Independent State of Papua New Guinea, 2010, p. 77), with these households generally located in Port Moresby, the provincial capitals and areas close to large resource projects.

Until recently, a few households had access to a small generator, but the majority of rural people did not have access to electricity and relied predominantly on kerosene and wood fires for lighting and cooking. In recent years, solar panels are now providing electricity for lighting and providing some additional power, for example, to charge mobile phones.

In Gulf Province, reticulated power is limited to Kerema and Malalaua. Kerema has 24-hour power, provided by a generator operated by PNG Power. Malalaua has a generator providing power in mornings and evenings. Several government stations had generator power previously, including Kikori, Baimuru and Ihu, but are no longer operational.

6.1.2.6 Other Facilities

Kerema is the main commercial center in Gulf Province and has postal services and a bank. Other commercial services are limited to several Chinese trade stores, a hotel and several guesthouses.

Kerema does not have a sewerage system and the water supply, operated by PNG Water, consists of a bore (drilled in 2015) with water pumped into a storage tank and reticulated to Kerema Hospital. The supply of water is apparently inadequate to supply other customers in Kerema. Houses in Kerema rely on tanks (catching water from the roof) and have septic systems. There is no regular garbage collection system in Kerema, with a waste disposal area located at Epo, approximately 5 km from Kerema. The urban council (Kerema Urban LLG) funds some manual cleaning in the town in the vicinity of the main sports field (which is located in the center of town) and surrounding market areas.

Many of the houses in Kerema and the district centers of Kikori and Malalaua are owned by the National Housing Corporation and are occupied by public servants. Few have received any maintenance and many are in very poor condition. Some government houses in Kikori and Baimaru are reported to be occupied by local people or retired public servants, neither of whom have any right to occupy them. There are some privately owned houses in Kerema but little in the way of a housing or rental market.

Kerema itself is located on state land but there are few vacant blocks and limited area for any new construction. Kerema High School is leased from the customary owners. Epo is an area of state land of approximately 1,000 hectares. Garbage from Kerema is currently being dumped at Epo. The road contractors are based at Epo, and another commercial enterprise is under development (possibly a lodge and store). Epo is seen as one area that may accommodate an expansion of Kerema in the future.

6.1.3 Economic Activity

6.1.3.1 Macroeconomic Indicators

The 2016 National Budget included an estimate of Gross Domestic Product (GDP) for 2016 of PGK 55 billion (GoPNG 2015, p. 107). The greatest contribution to GDP was oil and gas (28% of GDP), agriculture, forest and fisheries (21%) and construction (15%).

The Papua New Guinea economy grew by 11.8% in 2015 (Department of Treasury 2016, p. 5), despite lower commodity prices, unfavorable weather for agriculture, and the temporary closure of the Ok Tedi and Porgera mines. This performance followed a decade of strong, uninterrupted growth, which averaged 6.8% per annum (ADB, 2016, p. 244). As shown in Figure 8, strong growth in Gross Domestic Product (GDP) in 2014 and 2015 can be largely attributed to the commencement of production from the PNG LNG Project.

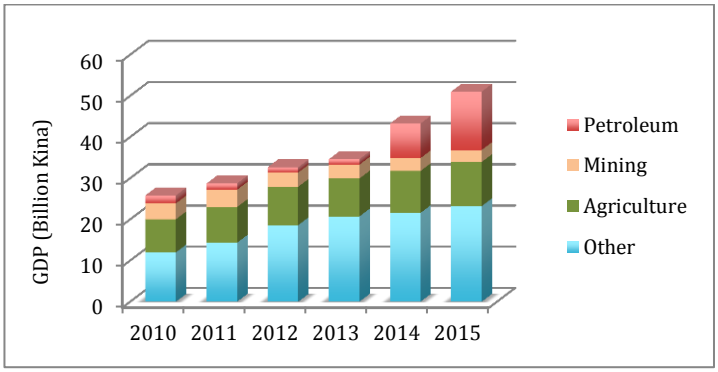


Figure 8: GDP, 2010-2015

Source: GoPNG, 2010, 2012, 2014 & 2015.

LNG production has had a substantial impact on the value and composition of PNG's export receipts since production commenced in 2014, as shown in Figure 9 and Figure 10.

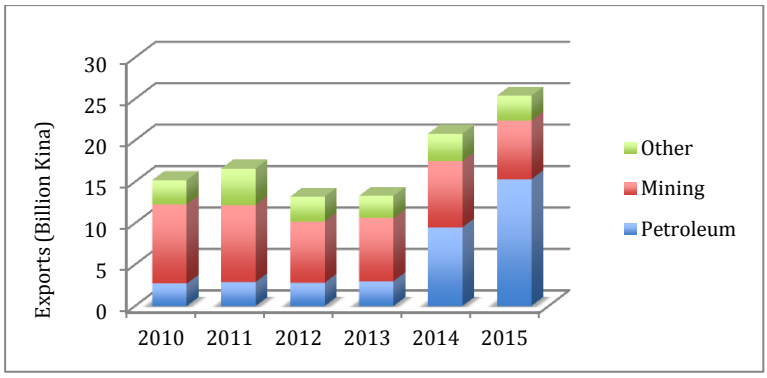


Figure 9: Export Value, 2010-2015

Source: GoPNG, 2010, 2012, 2014 & 2015.

Despite recent falls in petroleum prices, including LNG, the PNG LNG Project contributed – in its first full year of production – PGK5.6 billion (USD1.8 billion) in LNG and PGK1.3 billion (USD 0.4 billion) in condensate to PNG's exports. This represented 55% of total exports for 2015.

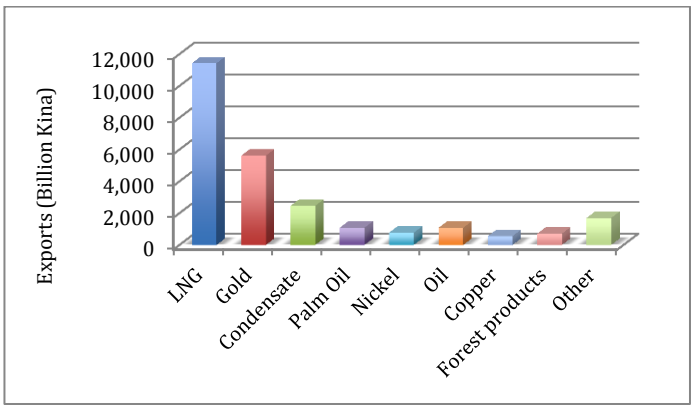


Figure 10: Export Value of Main Commodities, 2015

Source: GoPNG, 2015, p. 111.

6.1.3.2 Government Revenue, Expenditure and Debt

As a precursor to a significant increase in government revenue as a result of the PNG LNG Project, the National Government substantially increased its expenditure, commencing in 2013. At the same time, projected revenue has fallen due to the downturn in commodity prices, adverse weather impacts and the temporary closure of the Ok Tedi and Porgera mines. The result, as shown in Figure 11, has been a significant gap between government revenue and expenditure.

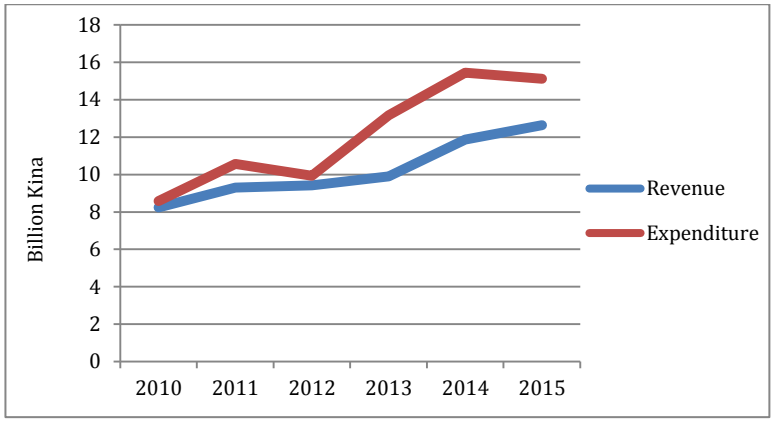


Figure 11: Government Revenue and Expenditure, 2010-15

Source: GoPNG, 2010, 2012, 2014 & 2015.

To fund the increase in government expenditure, the level of public debt has increased in recent years, as shown in Figure 12. To continue expenditure, the National Government had to gain legislative approval to increase the level of debt, which is now capped at 30% GDP, with the exception of the years 2013 to 2015, when it is capped at 35%.

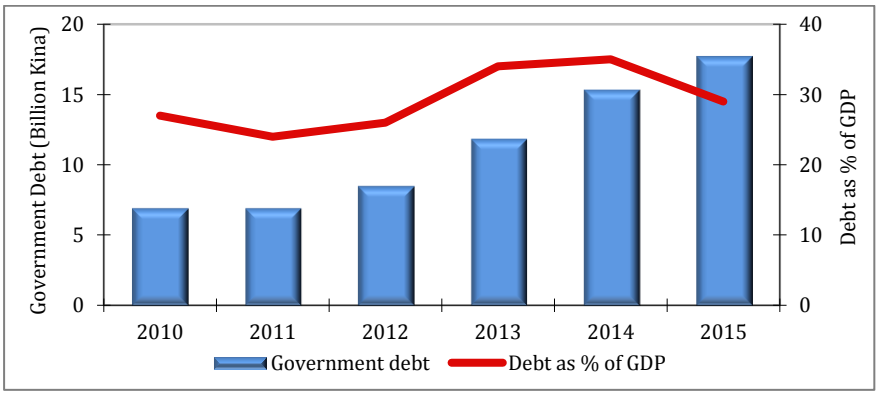


Figure 12: Government Debt, 2010-15

Source: GoPNG, 2010, 2012, 2014 & 2015.

The increase in public debt has been accompanied by a decrease in international reserves (falling from PGK9 billion (USD3 billion) in 2011 to less than PGK6 billion (USD2 billion) in 2015) and has caused concern to several commentators (refer IMF, 2014, p.1; ADB, 2016 p. 246, Department of Treasury, 2016, p. 27). It also reflects a change in direction in terms of stabilizing the economy over the previous decade: government debt was reduced from 70% of GDP in 2002 to 22% of GDP in 2011 (IMF, 2014, p. 3). While rising commodity prices helped the government reduce the level of debt, government revenue has more recently been susceptible to volatility in commodity prices, disruptions to some resource projects, and climatic factors. Furthermore, the government is likely to continue to face pressing cash-flow problems in 2016 and expenditures for hosting a meeting of African, Caribbean and Pacific leaders in 2016, national elections in 2017, and the Asia-Pacific Economic Cooperation summit in 2018 also pose risks to budget integrity and fiscal balances (ADB, 2016, p. 246).

The Mid-Year Economic and Fiscal Outlook Report, released by the Department of Treasury on 30 June 2016, indicated that public debt is at 32.2% of GDP, which is 2.2% higher than the legislated limit (Department of Treasury, 2016, p. 27). This has occurred as a result of various factors, mentioned above, which has greatly reduced government revenue. This has already required substantial reductions in government spending and requests for loan assistance. However, hosting the above events will add pressure on the budget and will likely require additional external borrowing.

Despite substantial growth in government expenditure over the past decade, Papua New Guinea remains one of the poorest and least developed countries in the Pacific (IMF, 2014, p. 3). One of the major impediments to development is the capacity constraint within government (IMF, 2014, p. 3), which means resource revenue will not be used effectively if expenditure outpaces capacity improvement. The Government's stated strategy is to restrain expenditure in the medium term, while prioritizing funding to key sectors, and maintaining the record of macroeconomic stability of recent years that is required for sustainable economic growth (GoPNG, 2015, p. 27). The Government forecasts a balanced budget by 2020, by which time the level of public debt will be reduced to approximately 30% of GDP.

The Government has been relatively successful in limiting inflation since 2007, but as shown in Figure 13, this has not always been the case.

Effectively managing inflation is an important aspect of the National Government's approach to avoiding the 'resource curse'. The 'resource curse' refers to the failure of many resource-rich countries to benefit fully from their natural resource wealth and is often attributed to issues around corruption (discussed in Section 6.1.1.11) and the so-called 'Dutch disease'. 'Dutch disease' occurs as a result of a large increase in natural resource revenues, which adversely affects other sectors of the economy through higher inflation or exchange rate appreciation, or the shifting of labor and capital resources to the resource sector.

Another part of the National Government's strategy to avoid the resource curse is the establishment of a sovereign wealth fund, which is discussed below.

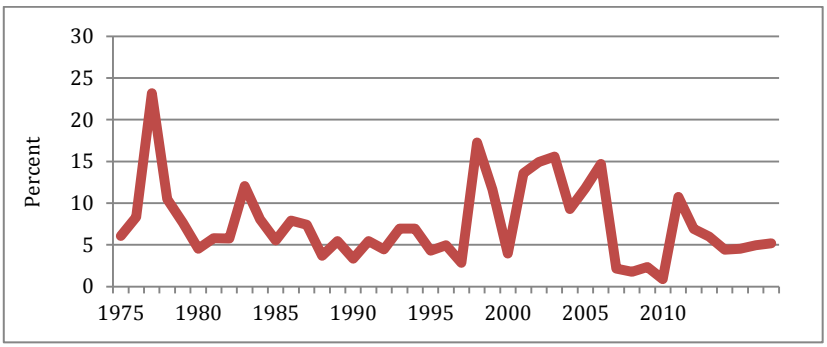


Figure 13: Inflation Rate, 1972-2014

Source: World Bank http://data.worldbank.org/country/papua-new-guinea (visited 25/07/2016).

6.1.3.3 Sovereign Wealth Fund

The Government has also made a commitment to establish a sovereign wealth fund. The establishment of the Papua New Guinea Sovereign Wealth Fund (SWF) is intended to preserve some of the benefits from current resource extraction for future generations (using a savings fund). The government also intends to use the SWF as a mechanism to stabilize government expenditure during periods of commodity price volatility (using a stabilization fund).

The Organic Law on the SWF was passed by Parliament in July 2015 and the Fund came into operation in 2016 (GoPNG, 2015, p. 30). The SWF will include a Stabilization Fund and a Savings Fund. Tax revenues received from mining and petroleum projects will be directed to the Stabilization Fund, and be available to be drawn down into the Budget to fund expenditure

needs. When revenue flows are large, the excess will be deposited into the Savings Fund (GoPNG, 2015, p. 30). Kumul Consolidated Holdings Limited, the entity which holds the National Government's equity in the PNG LNG Project, is expected to contribute PGK300 million (USD96 million) in dividend payments to the National Government in 2016, along with an additional PGK249 million (USD78 million) as its initial contribution to the SWF (Department of Treasury, 2016, p. 17).

6.1.3.4 Gulf Province

Economic data are not available at provincial level in Papua New Guinea, however, Gulf Province has abundant natural resources. Logging, oil and fishing are the main commercial industries, although betel nut and sago are the major cash crops for local people:

- In 2016, hardwood logs were being extracted from five timber projects. Between December 2010 and June 2015 a total of 287,824 m^3 of logs were exported from the province, an average of 63,000 m^3 per annum (Provincial Forest Officer, personal communication, 17 August 2016). The five logging operations employ approximately 1,000 workers;
- Oil is produced from the Gobe Main and South East Gobe oil fields, which straddle the Southern Highlands and Gulf border. Production commenced in 1998 and is exported from the Kumul Marine Terminal in the Gulf of Papua. A share of royalties and development levies from the Gobe projects are paid to the Gulf Provincial Government;
- The main commercial fishing activity is the prawn industry, which although harvesting prawns predominantly from Gulf waters, is based in Port Moresby. Annual prawn production has reached 800,000 kg with a value of PGK18 million (USD6 million)(Gulf Provincial Government, 2011, p. 33).

The copra industry, once the mainstay of the rural economy along the Papuan coast, has been abandoned. The Gulf Provincial Government noted that 612 tonnes of copra was produced in 1972-73, and 40 to 70 tonnes of rubber was produced each year in the mid-1970s (2011, p. 30). Commercial copra production ended due to a prolonged fall in copra prices that meant copra production was no longer economically viable. Rubber plantations were developed in the 1930s, but have either been replaced (by betel nut) or become sterile. There is currently no rubber production in the province, but some rubber has recently been planted in the Kikori area with assistance of the MP. The nearest rubber factory is at Galley Reach, in Central Province. Without a factory at Kikori it would be uneconomical to produce rubber at current price levels.

The main cash crops in the province are now betel nut (sold in Port Moresby, other urban markets and in logging camps), coffee (in the Kaintiba and Kotidanga areas) and the sale of surplus food crops, including sago, bananas and various other fruit and vegetables (generally sold in local markets). Income is also commonly earned from the sale of fish (fresh or cooked) and other seafood products in local markets.

6.1.4 Labor

6.1.4.1 Division of Labor

The division of labor in traditional society in Papua New Guinea is pronounced. Women do the majority of day-to-day chores and child rearing while men perform heavy manual labor and spend considerable time building and maintaining social relationships (Jones & McGavin, 2015, p. 14). Although the activities contributing to subsistence and commercial production will vary across Papua New Guinea, women will often play a greater role in planting and maintaining gardens, harvesting food, collecting water and firewood and cooking and cleaning. Men will usually play the major role when clearing forest to make gardens, making houses or fences, and hunting.

There is evidence that differences in the division of labor are being eroded over time, as young married couples become relatively independent of their parents and share their workload, or women seek to undertake economic activities so they can earn income and spend it as they wish. Education and formal wage employment also creates opportunities for women, including the opportunity to take jobs previously held only by males.

6.1.4.2 Workforce Participation and Unemployment

Analysis of the 2011 National Population and Housing Census indicate that Papua New Guinea had a 61% labor force participation rate and 3% unemployment rate. A summary of key labor force statistics is presented in Table 3.

Table 3: Labor Force Statistics, 2011

Category	Male	Female	Total
Population	3,757,198	3,497,244	7,254,442
Population aged 10 to 64 years	2,817,954	2,635,588	5,453,542
Labor force	1,746,837	1,589,170	3,336,007
Employed (economically active)	1,682,132	1,566,331	3,248,463
Unemployed	64,705	22,839	87,544
Not in the labor force	1,062,353	1,038,995	2,101,348
Not stated	8,764	7,423	16,187
Labor force participation rate	**62%**	**60%**	**61%**
Unemployment rate	**4%**	**1%**	**3%**

Source: Jones & McGavin, 2015, p. 114.

Further analysis of the 2011 census data resulted in projections for 2014 of 2,979,363 economically active people (from 15 to 64 years of age) and 465,000 in formal wage employment. The projections included 3% unemployment and 16% who were in formal wage employment (Jones & McGavin, 2015, p. 116). Most of the unemployed are located in urban areas and are actively seeking wage employment.

6.1.4.3 Formal Employment

The majority of economically active people who were not in formal wage employment were participating through subsistence employment. However, there is inadequate data to describe the hours worked or the extent of under-employment in the subsistence sector (Jones & McGavin, 2015, p. 115).

The number of male and female employees in the main industries of formal wage employment is shown in Figure 14. Males held 73% of total formal wage positions in 2011 and dominated many industries, including mining and quarrying (87% male employees), transport and communications (91%) and construction (96%).

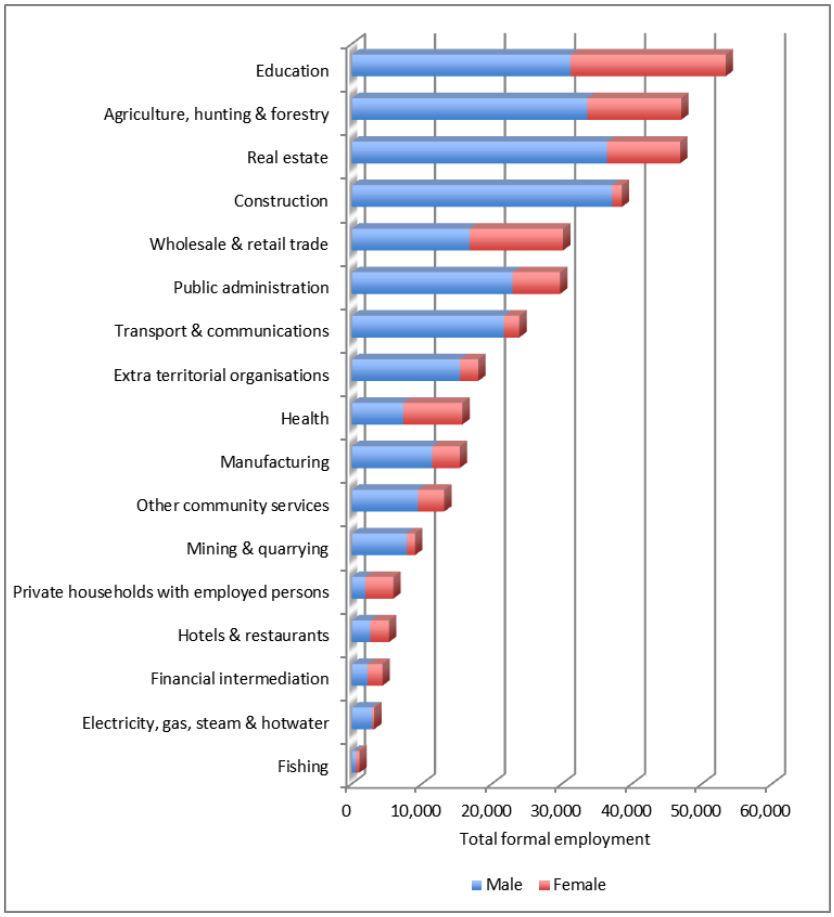


Figure 1: Formal Wage Employment by Industry, 2011

Source: Jones & McGavin, 2015, p. 139.

Jones & McGavin (2015, p.42-43) state that many people are simply not "employable" in the formal sector. This lack of employability reflects a combination of factors including no-education or very low levels of literacy, numeracy and vocational skills. Furthermore, the low levels of employability create simultaneous shortages in the demand for and supply of formal employment in Papua New Guinea: employers face an acute shortage of skilled labor and unskilled labor faces an acute shortage of formal employment opportunities.

Employment in the formal sector is guided by the *Employment Act 1978*. Exemptions in areas such as the number of hours of work have been made for large-scale mining and petroleum industries. Large-scale resource project developers in Papua New Guinea will be required to submit a Training and Employment Plan to the National Government and provide training and give employment preference to local landowners.

The Employment Act states that any person aged 16 years and above may enter an employment contract. Few if any children in Papua New Guinea under the age of 16 are employed in the formal economy. However, children will readily help their parents in many of the household chores, such as collecting water or firewood, and may participate in the harvesting and sale of cash crops. Despite some claims in Papua New Guinea that children are involved in hard physical labor, the majority of children work under parental supervision and outside of school hours.

A report by the International Labor Organization (ILO) documented child labor on the streets of Port Moresby, including under-aged labor and sexual exploitation of children (ILO, 2011). Anecdotal evidence suggests that children under the age of 16 are also working in other urban areas, along with logging camps and various roadside markets to earn income for themselves or their families. In rural areas, children are likely to participate in this work, which might, for

example, involve selling betel nut or other products, outside of school hours. While there is no doubt that some children will not attend school and/or sell products during school hours, the majority of these cases are expected to be in urban areas where families have limited resources and need cash income to survive on a daily basis.

Wage levels are regulated by the Department of Labor and Industrial Relations. In 2014 the Department advised that the minimum wage would increase from PGK2.29 (USD0.73) per hour to PGK3.20 (USD1.02) per hour, with further increases to PGK3.36 (USD1.08) per hour in 2015 and PGK3.50 (USD1.12) per hour in 2016.

6.1.4.4 Wage Levels

A survey conducted by Jones & McGavin published in 2014 indicated an average fortnightly wage of PGK656 (USD210). However, wage rates were highly variable, and the median fortnightly wage of PGK445 (USD142) or PGK11,570 per annum (USD3,702) is a more accurate reflection of wage rates in Papua New Guinea. The median wage rate by industry is shown in Figure 15 and indicates that mining and quarrying provides the highest median gross wage (which includes tax and superannuation contributions) of PGK2,140 (USD685) per fortnight or PGK55,640 (USD 17,805) per annum.

Labor statistics are not available for Gulf Province or Kikori District. However, the main employees are likely to be the public service (with upwards of 500 teachers), the provincial administration (currently with 400 officers) and logging companies (approximately 1,000 workers).

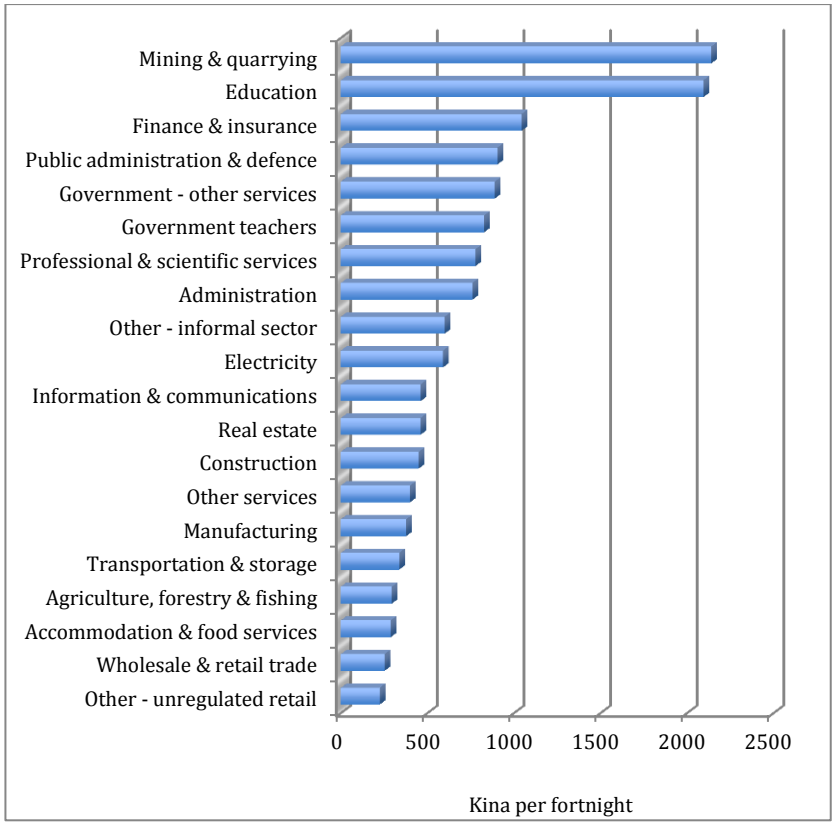


Figure 2: Median Gross Fortnightly Wage by Industry

Source: Jones & McGavin, 2015, p. 176.

6.1.4.5 Women's Participation in the Economy

Women play a key role in subsistence economies. However, as noted above, 73% of all jobs in the formal economy are held by males, and analysis of the 2009-2010 Household Income and

Expenditure Survey indicates that male wages are twice that, on average, of female wages (GoPNG and Development Partners Gender Forum, 2012, p. 53). This can be attributed, in part, to relatively low education and literacy levels, and to cultural barriers facing women who need to travel to work, engage with men, or sleep away from home.

Female literacy rates in Papua New Guinea are lower than those of males, and a lack of numeracy skills and financial literacy are especially critical constraints to both women and men seeking [formal employment or aiming] to start small entrepreneurial activities or grow them into small businesses (GoPNG and Development Partners Gender Forum, 2012, p. 53).

Although results from the National Population and Housing Census in 2000 indicated that 61% of males and 51% of females aged 10 years and above were literate, a more detailed assessment of literacy levels was undertaken by Asia South Pacific Association for Basic and Adult Education (ASPABAE). Results for Gulf Province revealed that just 4% of people between 15 and 60 years of age were literate, with 37% semi-literate (ASPABAE, 2011, p. 65). As shown in Figure 16, there is a marked difference between male and female literacy levels.

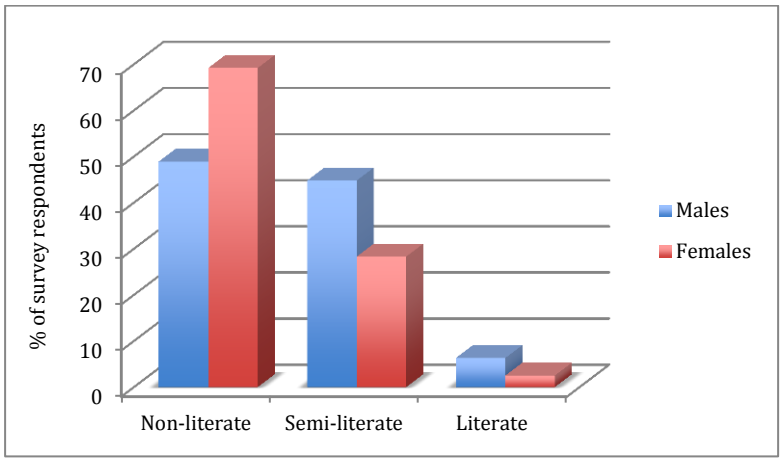


Figure 3: Literacy Assessment, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 65

Across Papua New Guinea, six major projects are focusing on the expansion of access to financial services in Papua New Guinea, and all have outreach to women (GoPNG and Development Partners Gender Forum, 2012, pp. 58-50). These include:

- Government support for the Women's MicroBank, managed by the PNG Women in Business entity;
- The Asian Development Bank PNG Microfinance Expansion Project;
- The Pacific Financial Inclusion Programme, funded by United Nations Capital Development Fund, AusAID, European Union and UNDP;
- The International Finance Corporation (IFC) investment in the PNG Microbank;
- IFC's investment in Bank South Pacific (including special support for BSP Rural); and
- The new International Development Association-IFC Risk Share Facility for small and medium enterprise access to finance, which works through commercial banks.

However, it is the rapid uptake of mobile phones beyond urban areas and the ease with which women have taken up the services available that suggest significant opportunities for expanded financial inclusion for women (GoPNG and Development Partners Gender Forum, 2012, p. 58). Among the benefits of mobile banking is the opportunity to have personal savings and to keep the amount secret.

Women are particularly disadvantaged in rural areas, including much of Gulf Province, where literacy levels are low, access to markets can be expensive and time consuming (making it difficult to care for children and complete other household chores), and training and business support services are limited.

A Country Gender Assessment conducted in 2011 and 2012 by the National Government and various development partners (United Nations, ADB and Australian Government), concluded that the main challenges facing women in relation to employment and economic resources, were:

- Inequalities in men's and women's economic opportunities in the agriculture sector that lead to inefficient use of the country's labor resources;
- Women farmers do not receive the level and type of training and extension support that they need to contribute their full potential to the agricultural economy;
- Women traders are more disadvantaged than men by unsafe and insanitary markets, and poor transport infrastructure;
- There are continuing differences and inequality between women and men in formal labor force participation, occupations and wages;
- In general, women and girls work longer hours than men and boys;
- Women are more negatively affected by the social impacts of, and receive fewer benefits from, resource extraction industries; and
- Some good models exist for giving women a share of the benefits from extractive industries, but these are not applied across all sites and industries (GoPNG and Development Partners Gender Forum, 2012, p. xvii).

6.1.5 Income

GDP per capita, when expressed in constant US dollars, stagnated for a quarter of a century following Independence, but as shown in Figure 17, has increased steadily over the past decade. The World Bank estimated that GDP per capita was the equivalent of USD2,268 in 2014.

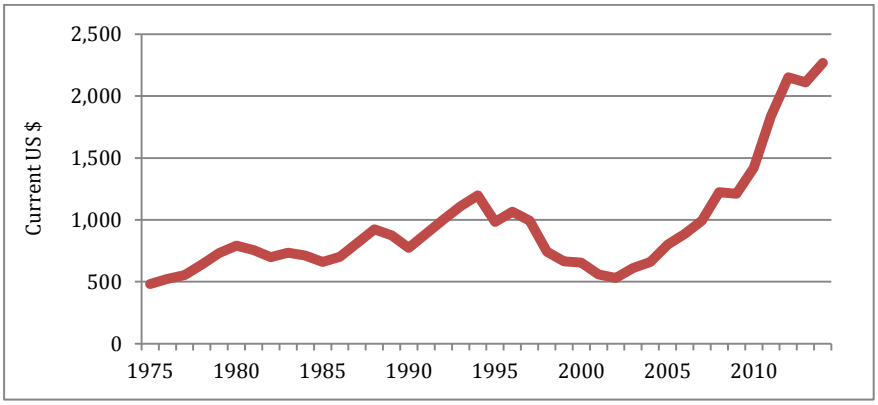


Figure 4: GDP Per Capita, 1975-2014

Source: World Bank4

Despite GDP per capita estimates, the median annual village household income, based on the 2009-2010 Household Income and Expenditure Survey, is estimated at below PGK1,000 (Jones & McGavin, 2015, p. 13). Jones & McGavin note that authors such as Fisk (1964) used "subsistence affluence" to describe Melanesian societies where accepted levels of material satisfaction (such as food and shelter) are satisfied with under-utilization of available labor and land resources (2015, p. 36). Furthermore, the term "affluence" is not used to imply that the local society has an abundance of goods and services, but an economic and social order that

[4] Refer http://data.worldbank.org/country/papua-new-guinea (visited 25 July 2016).

meets subsistence needs and social obligations with less than full utilization of available land and labor resources. Jones & McGavin note that while hours of effort vary throughout the year, most villagers expend less than 30 hours per week on subsistence needs (2015, p. 12). However, the majority of PNG's rural population have experienced little development since Independence, and there remains a pervasive desire for better access to goods and services of the modern market economy: more and better-quality healthcare, more and better-quality education, more and better quality housing, more products, more goods and services and more food (Jones & McGavin, 2015, p. 13). Income data specific to Gulf Province or Kikori District are not available.

6.2 Project Area of Influence

Each village in the PAOI identifies with a single tribe or language group. While clan members may reside in different villages, they only reside in villages speaking the same language. Over many centuries the people have defined their boundaries, adapted to their surroundings and learned to utilize local resources. Their culture, daily practices and material wellbeing are inextricably linked to their tribe, which is inextricably linked to the land on which they live. The baseline characterization is therefore described in terms of tribal or language affiliation, as this is what ultimately unites people within the PAOI.

The PAOI includes the following language groups and villages/government stations (Map 5):

- Pawaia - Poroi 1, Poroi 2, Poroi 3 (Suarido), Subu, Subu 2, Ura, Wabo, Wabo Station;
- Ahia - Evara;
- Koriki - Akoma, Ara'ava, Ikinu including the hamlets of Mirimailau and Araueramiri, Kairimai, Kairu'u;
- Iare - Aivai, Aumu, Kaevaria, Mapaio, Mapaio Fish Camp (Nea Creek);
- Kaimare - Aiere, Upaia;
- Maipua - Apiope; and
- Orokolo - Arehava No. 2, Avavu, Ere, Harevavo, Hepere, Herakela (including the hamlet of Hiloi), Hohoro, Huruta, Iuku, Kaivukavu, Kavava (including the hamlets of Hururu, Mirimurua and Miha-Kavava), Kilavi, Larihairu, Lariau, Marea, Mareke, Oru, Paevera.

As discussed in Section 5.1.3, the Iare villages of Maipenairu and Kapai 2, and Kaimiri village of Mariki, were added to the survey villages. These three villages are included in any subsequent discussion of the PAOI. Individual profiles of each of the villages within the PAOI are available in the Papua LNG Project: Community Directory (ERIAS Group, 2016d).

6.2.1 Governance

This section of the report contains a description of the factors that impact on social structures and governance in the PAOI, including:

- Traditional leadership;
- Religion;
- Government administration;
- Donor programs;
- Civil society;
- Logging projects; and
- Petroleum projects.

6.2.1.1 Traditional Leadership

As in many parts of Papua New Guinea (refer Section 6.1.1), the tribal groups located within the PAOI have retained and continue to practice – to various degrees – some level of traditional leadership. The proportion of villages identifying traditional leaders during the SBS is shown in Table 4.

As shown in Table 4, 74% of the villages surveyed identified traditional leaders. The traditional leaders identified are not just clan leaders (who could also be regarded as traditional leaders), but generally leaders of multiple clans from within a village. They are often elderly statesmen, identified from within the village as a result of their experience, wisdom and character. Thus, their authority is derived from their input to the society in which they live. Traditional leaders have the authority to speak on behalf of their group or village, although consultation among the group or village may be expected before decisions are made or shared with outsiders. Traditional leaders do not have any authority to speak on behalf of other groups or other villages.

The role of traditional leaders in the past has been associated with resource access (including defending land and resources) and social relationships. Social relationships may involve traditional exchange, the timing of cultural rituals or other events, or maintaining peace and law and order, both between and within villages.

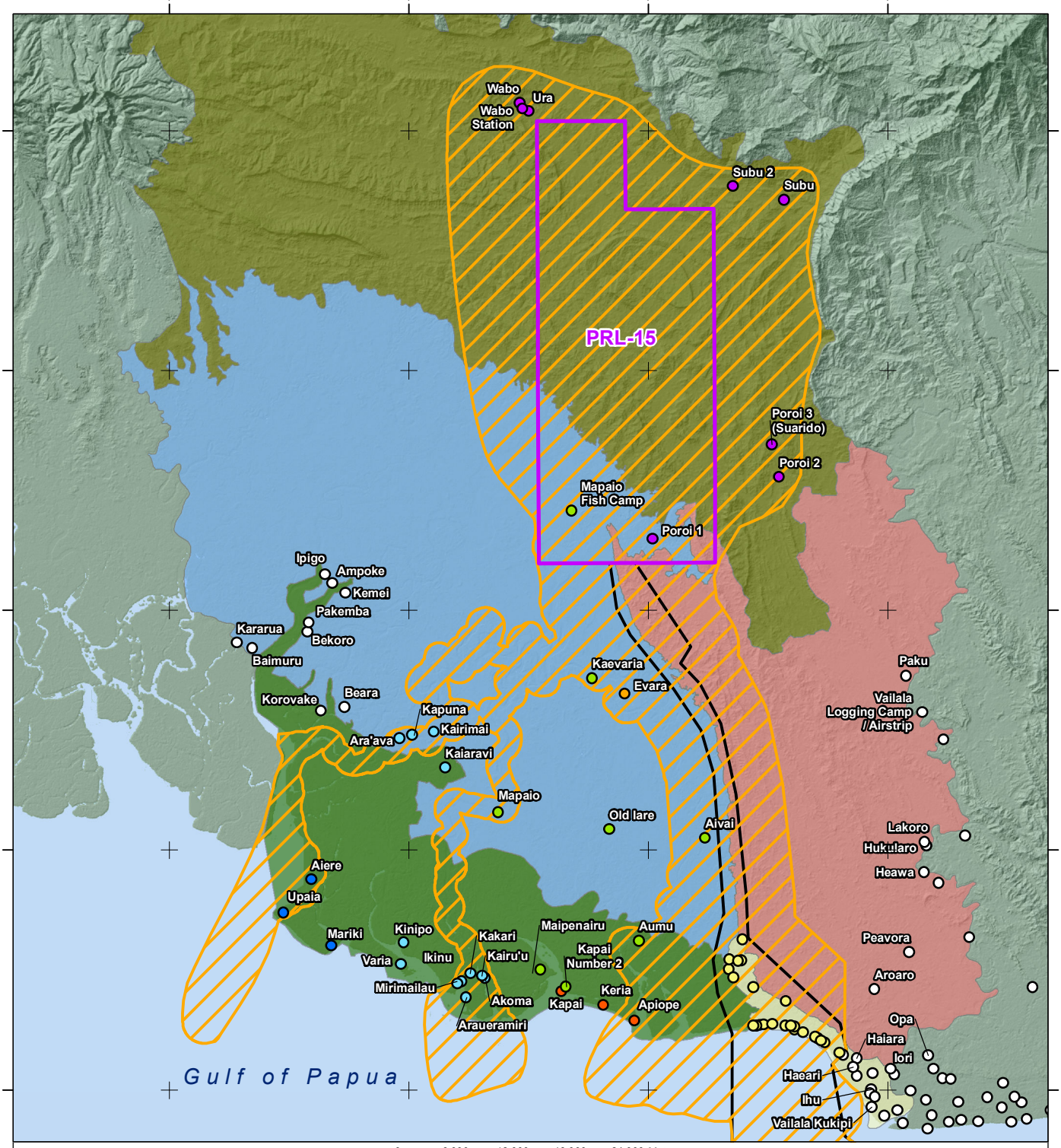
Table 4: Villages with Traditional Leaders

Language Group	Number surveyed	Villages with Traditional Leaders	
		%	Name
Pawaia	7	57	Poroi 2, Subu, Ura, Wabo
Ahia	1	100	Evara
Koriki	4	100	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	6	67	Aivai, Aumu, Kaevaria, Mapaio
Kaimare	3	66	Mariki, Upaia
Maipua	1	100	Apiope
Orokolo	13	77	Avavu, Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Paevera
TOTAL	**35**	**74**	

Source: ERIAS Group, 2016a.

F. E. Williams spent eight months in the Purari riverways in 1923, predominantly with the Koriki tribe. He described the *ravi* (men's house) as being central to the village, and each *ravi* comprised of several *larava* (something akin to a family group). As the villages had split over the years (generally moving towards the coast), people of coastal villages were of the same descent as those upstream. Williams noted that the *larava* of different villages had similar names, and coined the phrase 'river clans' to describe the affiliation of family groups living in different villages (1924, p. 87), although generally along the same river, as this reflected migratory patterns. The clan names collected during the Social Organization FGD have many similarities with the *larava* names documented by Williams (1924, p. 85). Each *ravi* had a *paidi amu* (village chief), a hereditary position, primarily responsible for keeping the peace (Williams, 1924, p. 111). Important decisions are made in the *ravi,* and it provides all men the opportunity to voice any concerns. Women are prohibited from the *ravi* and are basically excluded from important decisions, important ceremonies and communal village activities (Williams, 1924, p. 60).

One of the most important traditional leadership roles is to manage communally owned land. This may involve educating other members in the land boundaries and the history of the boundaries, defending the boundaries, allocating land for intensive purposes to families or family groups (for example, for food gardens) and overseeing any decisions that involve the use of land or resources within the communal area.



SCALE: 1:600,000 @ A4

0 6,000 12,000 18,000 24,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Language Group
- A - Pawaian
- B - Kaimare
- C - Koriki
- D - Iare
- E - Orokolo
- F - Ahia
- G - Maipua
- Not verified

Upstream project area of influence

Proposed Facilities
- Pipeline export route corridor
- PRL-15 License

Ecological Zones
- Delta swamps and plains
- Mangroves
- Middle purari hills
- Southeast coast
- Southeast hills

N

**Note, not all communities have been verified in the field*
***Note, language group does not represent land ownership*

TITLE: Upstream Language Groups and Ecological Zones

MAP: 5

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_126-81623 **REVISION:** A

DATE: 20/07/2017

DATA SOURCES:
Language Groups, villages, PRL-15, hillshade supplied by ERIAS and TOTAL (2015-2016). Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017). Ecological Zones supplied by Iain Woxvold (2016).

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In the PAOI, land ownership is vested in clans. A clan is a group of families with a common ancestor or common lineage. A clan will identify themselves and their customary-owned land through oral histories, including genealogies, stories, beliefs, customs and practices. In the PAOI, members of one clan may reside in several villages, although these villages will be affiliated to only one tribe or language group.

The role of traditional leaders has changed as government officials and church leaders have played more prominent roles in various aspects of village life. As discussed in Section 6.2.1.6 and Section 6.2.1.7 the role and prominence of traditional leaders is also changing as a result of resource projects.

At a lower level, clan leaders represent a group of families that share common ancestry and land resources. Although affiliated with tribal or language groups, the clan is fiercely independent when it comes to land ownership and land management. Land ownership is discussed further in the Upstream Land and Natural Resources (Ecosystem Services – Provisioning) Baseline Report (Booyong, 2017b; Part 18 of ESBS Dossier), but generally, clans have (i) areas of land in which clan members can fish and hunt, and (ii) areas allocated to families where people will make gardens or grow sago. Natural geographic features, such as rivers and mountains, typically define clan boundaries. In the PAOI, land allocated to families is passed down from father to son.

6.2.1.2 Religion

The church did not have a major influence among the Pawaias until the 1960s, when the London Missionary Society established a base at Uraru, upstream from Ura and Wabo. The Catholic priest at Evara indicated that the first church was not established in Evara until the 1970s. However, Christian churches have played a substantial role in the PAOI, and in particular, among the Koriki, Iare, Kaimare, Maipua and Orokolo. Not only did they bring religion, but education, health services and economic development. The churches were particularly active in coastal areas in the 20th Century, establishing bases such as Muro Mission. However, the churches were also influential inland, where, for example, the Lutheran Church established Poroi Primary School.

Tom Kabu, a local person who promoted Christianity in the period following World War II, also played a major role in terms of destroying cultural artefacts and encouraging social change among the Koriki, Iare, Kaimare, Maipua and Orokolo. Tom Kabu is discussed further in the Upstream Cultural Heritage and Archaeology Baseline Report (Skelly, 2017; Part 17 of the ESBS Dossier).

The proportion of villages that identified religious leaders is summarized in Table 5.

Table 5: Villages with Religious Leaders

Language Group	Number Surveyed	Villages with Religious Leaders	
		%	Name
Pawaia	7	86	Poroi 2, Poroi 3, Subu, Subu 2, Ura, Wabo
Ahia	1	100	Evara
Koriki	4	100	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	6	100	Aivai, Aumu, Kaevaria, Kapai 2, Maipenairu, Mapaio
Kaimare	3	100	Aiere, Mariki, Upaia
Maipua	1	100	Apiope
Orokolo	13	100	Avavu, Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera
TOTAL	**35**	**97**	

Source: ERIAS Group, 2016a.

As shown in Table 5, all villages in the PAOI, with the exception of Poroi 1, identified religious leaders. Poroi 1, with a population of only 34, has clearly not been able to attract a religious leader to date. However, the information in Table 5 reinforces the central role played by the churches in the PAOI.

Although the influence of the church may be less now that in previous generations, church leaders play a key role in village society, not only in terms of religion, but in terms of maintaining the peace, resolving disputes, providing youth leadership and providing support for the elderly and other disadvantaged groups.

The main denominations in the PAOI are Catholic, United, Seventh Day Adventists and Lutherans. However, several other churches are present, including Assemblies of God, Reform Revival, Bahai, Pentecostal, Baptist and Christian Life Centre.

6.2.1.3 Government Administration

Under the Organic Law, *e*ach village should be represented by a councilor and have a ward development committee, and be represented by a village court and land mediator. The ward development committee should identify projects and the councilor should submit these to the LLG. In theory, projects should be funded by the Provincial Government or local MPs.

As shown in Table 6, all Orokolo villages surveyed had a ward councilor and village court magistrate, although not all Orokolo villages had a land mediator or ward development committee. In the 22 remaining villages, only 59% had a ward councilor and village court magistrate, 50% had a land mediator, and 50% had a ward development committee. This may imply that the Orokolo villages are better organized, from a government perspective, and may reflect that these villages are generally closer to Kerema and far easier to access than other villages in the PAOI.

In comparison to other villages in the PAOI, relatively few Pawaian villages have a government presence. While this may, in part, be attributed to the relative isolation of the Pawaian villages, it may also be a consequence of the small village size, particularly for Poroi 1, Poroi 3, Subu and Subu 2.

While only half of the villages in the PAOI have a land mediator, this may simply reflect that each land mediator is required to serve a jurisdiction that covers several villages. However, under the Organic Law, each village should either have, or be served by a ward development committee. The vast majority of committees that have submitted projects to the LLG have not received funding. This has probably led to the demise of many ward development committees.

MPs have provided some assistance to villages in the PAOI, including water tanks and health facilities, but the support has often been plagued by implementation problems and is openly seen as a process to buy votes in an impending election. This is discussed further in the following section.

Not surprising, given the problems above, few villages have active ward development committees or expectations that they will receive support from the government. Other than education and health facilities, many of which are managed by church agencies, the government has minimal presence in the PAOI villages and has limited impact on their day-to-day lives.

The village court system was introduced at the time the country obtained independence but has recently been rejuvenated by transferring responsibility from provincial government to the Department of Justice. As discussed in Finlayson (2017) Section 6.5, each village court includes 11 officials, comprising village court magistrates, peace officers (sometimes referred to as police officers) and a village court clerk. The role of the village courts is to promote peace and harmony in the communities in which they operate, and they are obliged to attempt to resolve disputes first by way of mediation.

The majority of village courts appear to be functioning in the PAOI, although there are some issues around the payment of officers that are yet to be resolved.

Under the Organic Law, each LLG should have four land mediators. Their role appears to be relatively poorly understood in the PAOI, and not surprisingly, relatively few villages indicated that they had a land mediator.

6.2.1.4 External Assistance

For the purpose of this report, external assistance is defined as any assistance provided to a village for any public goods. External assistance has been provided to around 84% of the villages in the PAOI in the past. By far the most common source of external assistance has been for water supplies, however, assistance has also been provided for schools, health facilities and communications. Assistance has been provided by the Governor, the MP for Kikori District (according to communities), the European Union, AusAID, the Japanese International Cooperation Agency (JICA), previous PRL-15 operator, InterOil, PNG Energy Developments Limited (EDL), logging companies and the Kapuna and Muro missions. The villages that did not identify any external assistance are all from the Purari riverways and include Akoma, Apiope, Aivai, Kaevaria and Mapaio.

A brief summary of the assistance provided by each entity is provided below.

The Governor provided water tanks to Orokolo villages between 2013 and 2015. The molded polyethylene tanks are either placed near a building with an iron roof, or a small catchment constructed to collect water for the tank. The tanks have been installed and are working in half of the villages surveyed, while in the other half the tanks have not yet been installed. The tanks provide a safe source of drinking water but do not have the capacity to meet the drinking water demand in each village. The Governor also funded the construction of footbridges connecting hamlets in the Hororo and Herekela area of Orokolo Bay in the same period (2013-2015).

The MP for Kikori District, the Honorable Mark Maipakai, provided assistance to build aid posts, health worker housing and/or classrooms in Ara'ava, Ura, Avavu, Evara, Wabo, Kairimai, Oru, Kapai 2, Ikinu and Maipenairu. The assistance was provided between 2008 and 2013. In some cases, the facilities have never been used allegedly due to relatively inferior materials being used in the construction of the facilities.

The European Union provided water supplies in Kairimai, Maipenairu and Upaia between 2008 and 2011. The tanks are still being utilized. AusAID provided water tanks in Mariki and Ikinu in 2004/5 and these continue to work to some degree. AusAID has also funded classrooms in Maipenairu (2000 and 2014) and Mareke (2014). JICA provided satellite dishes and associated electronic equipment for schools in Mareke and Larihairu in an attempt to access televised education programs. The equipment was installed in 2010 but is no longer working.

InterOil provided water supplies (tanks and one reticulated system) to the Pawaian villages of Ura, Wabo, Poroi, Subu and Subu 2 between 2010 and 2015, along with various other support, including building supplies, sawmills, freight and logistical support, training of teachers and health workers, support for health outreach programs, sports equipment and school materials. The water supplies continue to function. The majority of InterOil's support was focused on the Pawaian villages of Wabo, Ura, Subu, Subu 2 and Poroi. InterOil supported the schools at Wabo, Poroi and Subu, including support for the training for primary and elementary teachers. They also provided support for the health facilities at Wabo and Poroi (and Kapuna), including village health volunteer training in both Wabo and Poroi, and village birth attendant training in Poroi, and also funded a health outreach program.

Table 6: Villages with Government Organizations

Language Group	Villages Surveyed	Ward Councilor		Village Court Magistrate		Land Mediator		Ward Development Committee	
		Number	Name	Number	Name	Number	Name	Number	Name
Pawaia	7	2	Poroi 2, Subu 2*	0	N/a	1	Poroi 2	0	N/a
Ahia	1	1	Evara	1	Evara	1	Evara	1	Evara
Koriki	4	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	6	5	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	4	Aivai, Aumu, Maipenairu, Mapaio	2	Kaevaria, Maipenairu	4	Aumu, Kaevaria, Maipenairu, Mapaio
Kaimare	3	1	Upaia	3	Aiere, Upaia, Mariki	2	Upaia, Mariki	2	Upaia, Mariki
Maipua	1	0	N/a	1	Apiope	1	Apiope	0	N/a
Orokolo	13	13	Avavu, Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	13	Avavu, Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	8	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Marea	9	Avavu, Ere-Kilavi, Harevavo, Huruta, Kaivukavu, Kavava, Marea, Mareke, Oru-Lariau-Herekela, Paevera
TOTAL	**35**	**26**		**26**		**19**		**20**	

Source: ERIAS Group, 2016a
* A ward development committee was reportedly active at Subu 2 at the time of the community level baseline survey. However, prior to the completion of this baseline report, ERIAS Group was advised that the committee was not functional (pers comm TEP PNG).

EDL was a joint venture between Origin Energy and PNG Sustainable Development Program, and completed a feasibility study for a dam near Wabo to provide hydropower. EDL provided assistance to Ura in 2014, including assistance to have the Digicel tower installed, public radios, building materials for the school and solar panels. Some of the facilities are still being utilized. Village leaders in Wabo did not identify any assistance from EDL, although it is considered they may have also benefited. Village leaders in Larihairu indicated that EDL provided solar panels for schools in 2010, but the panels are no longer working.

Village leaders from Evara, Kairimai, Ura, Subu 2, Hepere and Paevera all identified assistance provided by logging companies. While this assistance is thought to be part of the logging agreements, it has nevertheless been included in this description of external assistance. In Evara, which is located only a couple kilometers downstream from a logging camp, the company built classrooms, teacher's houses, an aid post and a church between 2005 and 2010. The buildings were made of either second hand or poor quality sheets of iron, and untreated timber. Although poorly made, some facilities continue to be utilized. Assistance provided to other villages included chainsaws, water tanks, fishing nets and roofing iron, which is generally thought to be what is commonly called the annual 'premium' payment (refer Section 6.2.1.6).

Other assistance identified by village leaders includes water supplies in Ara'ava, provided by the Kapuna Mission in 2013, which are still operational, and mosquito nets, provided to residents of Kavava by the Rotary Club. It is likely that many other villages also received mosquito nets.

There is a substantial difference in the quality of assistance provided in the PAOI. Projects that are well thought out and constructed in partnership with local residents are more likely to be appreciated and maintained. Projects that are made of poor quality materials and/or not constructed in partnership with local residents are more likely to fail or work for a limited timeframe, and may cause resentment towards the person or organization providing the assistance.

In addition to the five villages that could not identify any external assistance, it should be noted that the majority of villages have received very limited external assistance over the past decade. As discussed further in Section 6.2.2.2, this has contributed to a perception in many of the villages that 'we have been forgotten by the leaders of Papua New Guinea'.

6.2.1.5 Civil Society Organizations

No NGOs have a permanent presence in the PAOI, although Medecins Sans Frontieres (MSF) has recently established a base at Ihu to implement a program to help combat tuberculosis, and aims to establish another base at Kapuna. However, all villages surveyed had some civil society organizations. The type of organization is shown in Table 7.

Table 7: Villages with CSOs

Language Group	Number of Villages	Youth Groups		Women's Groups		Church Groups		Other Groups	
		Number	Name	Number	Name	Number	Name	Number	Name
Pawaia	5	2	Wabo, Ura	3	Poroi 2, Ura, Wabo	4	Subu, Poroi 2, Subu 2, Ura	0	N/a
Ahia	1	1	Evara	1	Evara	1	Evara	0	N/a
Koriki	4	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	0	N/a
Iare	5	5	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	5	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	5	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	1	Mapaio
Kaimare	2	2	Mariki, Upaia	2	Mariki, Upaia	2	Mariki, Upaia	1	Mariki
Maipua	1	1	Apiope	1	Apiope	1	Apiope	0	N/a
Orokolo	13	11	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	11	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	13	Avavu, Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	2	Harevavo, Iuku
TOTAL	**31**	**26**		**27**		**30**		**4**	

Source: ERIAS Group, 2016a.

As shown in Table 7, 84% of villages had a youth group, 87% of villages had a women's group, and 97% of villages had a church group, although several youth and women's groups doubled as church groups. The only village without a church group was Wabo.

Women's groups combined fellowship, fundraising for the church and community services. The women's group in Poroi 2 was involved in a gardening project, and the women's group in Mariki was involved in various economic activities. The women's groups appear to have a relatively weak link, if any, with that of the district or provincial council of women.

The church groups combined church activities with various social or community services, including care for the aged and sick.

The other groups identified in Table 7 include a sporting group, a theatre group and two women's business groups (these located in Iuku and Mariki). As mentioned above, many of the youth groups had a focus on sports activities.

Youth Groups

Most of the youth groups had a focus on sports, church fellowship and community services. The youth group at Mapaio, for example, had helped build two new churches, and classrooms, teacher's houses and toilets, all within the past two years. A youth group at Aivai had cleared an area and made a basketball court, and had built a canoe for one family. The youth groups from Mareke and Iuku were contracted by the Provincial Government in 2015 to install the water tanks provided by the Governor.

Generally, the youth groups had from 30 to several hundred members, with roughly equal representation of males and females. All youth groups had designated leaders, and an estimated 87% of youth groups met on a regular basis. Membership included boys and girls generally between the age of 15 and 30, although some groups had members as young as nine (Wabo) and some groups had members into their sixties. The 'mature aged' members are said to provide support, leadership or to mentor the youth. Some groups required members to be affiliated with a church, and some imposed a membership fee, varying from PGK 1 (USD0.32) to PGK 15 (USD4.8) per annum.

The average number of male and female youth group members is shown in Table 8.

The youth group at Wabo is particularly active. The group has between 50 and 60 members and aims to reduce drug and alcohol abuse and reduce violence by involving the youth in sports and encourage traditional activities such as making canoes. The youth group undertakes regular activities to raise money, which is used to sponsor students attending secondary school in the Highlands. At the time of the SBS, the group was sponsoring 12 students. Community work has traditionally been common practice in PNG villages.

Table 8: Youth Group Membership

Language Group	Survey Villages	Villages with Youth Groups		Average Number of Males	Average Number of Females
		%	Name		
Pawaia	5	40	Wabo, Ura	45	20
Ahia	1	100	Evara	50	50
Koriki	4	100	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	109	89
Iare	5	100	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	38	31
Kaimare	2	100	Mariki, Upaia	9	11
Maipua	1	100	Apiope	26	18
Orokolo	13	85	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	N/A[5]	N/A[4]
TOTAL	**31**	**84**		**46**	**48**

Source: ERIAS Group, 2016a.

6.2.1.6 Logging Projects

The main logging operations in, or in the vicinity of the PAOI are described in Section 6.2.4.1, and the governance of logging operations generally in Papua New Guinea has been described in Section 6.1.1. In the PAOI, clans that are the landowners of the proposed logging operations have been organized into ILGs for the payment of royalties. The landowners have also generally established a landowner association – to represent landowners in any discussions with the government and developer, and a landowner company – to advance business opportunities arising from the logging operation. Local employment in the logging industry is described in Section 6.2.5.4.

The number of villages within the PAOI with ILGs, landowner associations and landowner companies, is shown in Table 9. As shown in Table 9, leaders from 83% of villages surveyed indicated that the village contained one or more ILGs. Around half of the villages were represented by both a landowner association and a landowner company.

Many of the ILGs and landowner associations were established specifically to participate in the Baimuru or Vailala logging projects, both of which commenced in the mid-1990s. For the Vailala logging project:

- A Timber Permit was granted to Frontier Holdings Ltd in June 1992;
- A Forest Management Agreement was signed by PNGFA and representative land groups in December 1995; and
- Logging commenced in 1997 (The 2003/2004 Review Team, 2004a, p. 2).

The landowners signing the FMA were represented by five landowner companies and 94 ILGs. It is assumed that each tribe signing the FMA is represented by a landowner company, and each clan is represented by an ILG. Logging was suspended in 2003 following a petition by the chairmen of the ILGs, due to a wide range of complaints, documented as part of the review of the Vailala logging operation (refer The 2003/2004 Review Team, 2004a). Subsequently, the landowners negotiated with the PNGFA who then negotiated with Frontier Holdings Ltd for a Project Agreement that was acceptable to all stakeholders (The 2003/2004 Review Team, 2004a, pp. 4, 15).

[5] None of the Orokolo youth group members had membership lists available from which they were able to accurately indicate the number of male and female participants. Groups in all villages except Harevavo and Larihairu thought there was either equal representation or a greater number of male members than female members.

Table 9: Villages with Resource Project Organizations

Language Group	Villages Surveyed	Villages with ILGs		Villages with Landowner Associations		Village with Landowner Companies	
		%	Name	%	Name	%	Name
Pawaia	7	71	Poroi 1, Poroi 2, Poroi 3, Ura, Wabo	43	Poroi 1, Poroi 2, Poroi 3	57	Subu 2, Ura, Wabo, Poroi 2
Ahia	1	100	Evara	100	Evara	100	Evara
Koriki	4	100	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai	75	Akoma-Kairu'u, Ara'ava, Ikinu	100	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	6	100	Aivai, Aumu, Kaevaria, Kapai 2, Maipenairu, Mapaio	20	Maipenairu	60	Aumu, Kaevaria, Mapaio
Kaimare	3	100	Aiere, Mariki, Upaia	66	Aiere, Mariki	33	Mariki
Maipua	1	100	Apiope	100	Apiope	0	N/a
Orokolo	13	69	Ere-Kilavi, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela	23	Ere-Kilavi, Kaivukavu, Larihairu	15	Ere-Kilavi, Mareke
TOTAL	**35**	**83**		**40**		**43**	

Source: ERIAS Group, 2016a.

Although the above example demonstrates that landowners do have the capacity to negotiate, numerous landowners from within the PAOI commented that the government is not present and the logging company does not listen, so complaints regarding environmental damage and project benefits are generally ignored. As a result, the representative landowner bodies generally do not have the capacity or authority to have these issues addressed.

Numerous landowners from within the PAOI also commented that landowner companies are not active or only benefit a few people who are in management positions. They have not been effective as a vehicle for widespread business development or benefits in the PAOI. As stated by village leaders in Kairimai, the executives of our landowner company wasted the money and now the company lies dormant.

The Forestry Review Team noted that at least two of the representative landowner companies involved in Vailala Block 2 were not registered, and most landowners expressed dissatisfaction with the involvement of landowner companies and wanted direct dealings with the PNGFA and the permit holder through their ILGs (The 2003/2004 Review Team, 2004a, p. 11). It is also unlikely that any of the ILGs in the PAOI will meet the requirements outlined in the Land Groups Incorporation (Amendment) Act 2009 (refer Section 6.1.1.8).

Some landowner associations and landowner companies have been established more recently, to participate in the Papua LNG Project (see below), while the exact purpose of some other landowner companies is unclear (refer Section 6.2.1.8).

6.2.1.7 Papua LNG

The only people that have had direct involvement with petroleum operations in the PAOI to date are those in the immediate vicinity of PRL-15. This includes landowning clans residing in Ura, Wabo, Subu, Poroi and Evara. However, the previous operator, InterOil, helped establish a Pawaian Landowner Association, representing the Pawaian landowning clans, and a Pawaian Landowner Company, representing all Pawaias.

Landowner Associations are incorporated under the Associations Incorporation Act. A Landowner Association aims to represent landowners in project negotiations and subsequent discussions with the State, developer and any other parties. Although not formally recognized in the Oil and Gas Act, Landowner Associations have been recognized in some resource agreements.

The Elk Antelope Gas Project Landowners Association was established in 2009 and reportedly represents five Pawaian clans with land in PRL-15. The Association is not active, but is waiting to have project discussions with TEP PNG.

Sakura Osura Resources Limited, the Pawaian local business company, was also formed in 2009. The company has nine directors, and apparently represents the interests of 14 Pawaian villages. InterOil previously provided the support of a Business Development Officer to assist in the establishment of the company and its business activities. The current Managing Director of Sakura Osura Resources Limited has indicated that the company has a constitution and in August 2016 was updating its share registry.

Sakura Osura Resources Limited currently has a labor-hire contract with TEP PNG, and has entered a joint venture with Pagini Transport for the provision of equipment and vehicles to TEP PNG. The company operates a store at Wabo, which previously included banking facilities. Banking facilities ended when fuel was no longer available for the nearby Digicel tower, which provided internet access.

The Managing Director of Sakura Osura Resources Limited also noted the difficulty the company faced in travelling to all Pawaian villages to provide information on the local business company, its business opportunities, and the potential benefits this might provide to all Pawaias.

As discussed in Section 6.1.1.8, the development of a petroleum project requires a complex set of actions that require landowner participation and impose a new set of structures and organizations on landowners. The new structures and organizations do not give any specific mention to existing village organizations or leadership mechanisms, and experience elsewhere in Papua New Guinea suggests that the new organizations provide limited transparency and accountability, and limited effort is made by the organizations, or parties to their formation, to educate and actively involve the majority of landowners in the new organizations.

Village leaders from several Pawaian villages also noted the presence of a landowner company called Pawaia Resources Holdings. It is unclear whether this company differs from Sakura Osura Resources Limited, and if a separate entity, what its purpose is.

6.2.1.8 Purari Development Association

The Purari Development Association Inc. was granted a Special Agricultural and Business Lease (SABL) for an area of 656,034 hectares in 2010. This area stretches from the Papuan coast to the border with Simbu and Eastern Highlands and includes PRL-15 and much of the proposed export pipeline corridor (Map 6). It is unknown who is part of the association, who manages it or who are the beneficiaries. This often-lack of transparency has caused many SABLs to come under scrutiny (refer below).

SABLs are intended to be a process where the government will lease land from customary owners, and the land will be leased from the government by a developer for an agreed

agricultural, or other business activity. The entire process is intended to be underpinned by broad consultation with and consent by the customary landowners.

Irregularities in the allocation of SABLs across Papua New Guinea led to an SABL Commission of Inquiry (COI), which extended from 2011 to 2013. As articulated in the Final Report of the COI, a clear process has not been developed for issuing SABLs since they were introduced in the 1970s (Numapo, 2013, p. 18). However, the process of issuing a SABL is managed by the Department of Lands and Physical Planning (DLPP) and involves the Department of Provincial and Local Government Affairs, the Department of Agriculture and Livestock, the PNG Forest Authority, CEPA and Provincial Governments (Numapo, 2013, p. 19). The COI found widespread abuse, fraud, lack of coordination between agencies, failures and incompetence of government officials to ensure compliance, accountability and transparency within the SABL process from application stage to registration, processing, approval and granting of the SABL (Numapo, 2013, p. 235). The COI recommended that SABLs that were issued under irregular circumstances should be rectified or nullified, and any person or entity implicated in unlawful activity should be prosecuted (Numapo, 2013, p. 4).

A number of irregularities have been identified with the granting of the SABL to the Purari Development Association. The irregularities include a lack of consultation with landowners in the area, the absence of required documentation, and the granting of a SABL over both existing forest management and wildlife conservation areas. Despite these irregularities, there has been no action taken to nullify the SABL or correct those involved (Numapo, 2013, p. 4).

In a media conference on 20 June 2013, Purari Development Association representatives claimed to be the Elk-Antelope resource owners, and encouraged other landowners to join them (refer www.youtube.com/watch?v=V7Q8X-WJEqw). This view contradicts earlier social mapping and landowner identification studies completed by InterOil.

Village leaders from only one village (Maipenairu) identified the Purari Development Association when asked about ILGs, landowner companies or landowner associations in the village. The leaders at Maipenairu indicated that the leaders of the Purari Development Association were based in Port Moresby and did not represent people in the village.

6.2.2 Economic Infrastructure

6.2.2.1 Transport

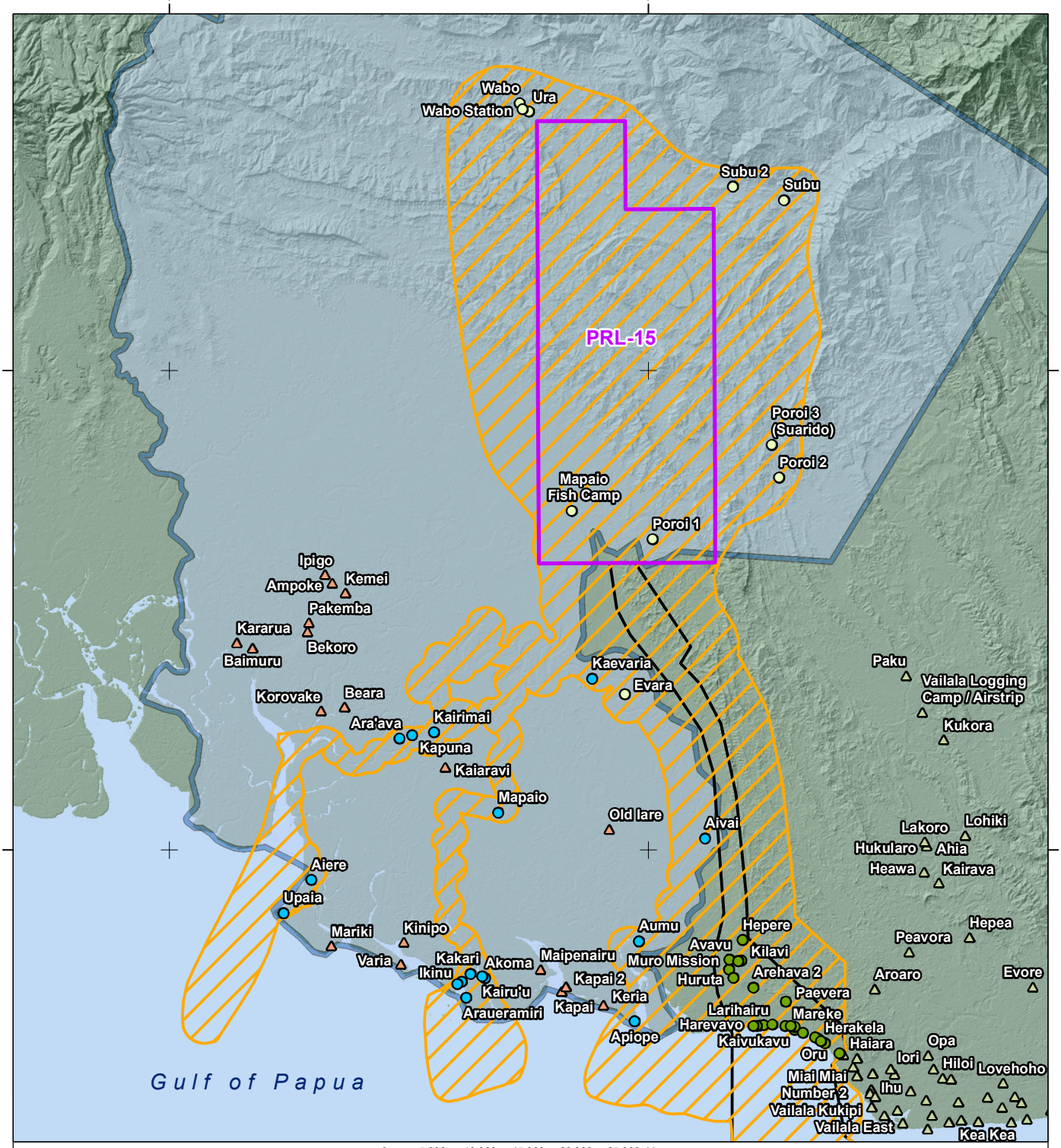
People living within the PAOI rely predominantly on dinghies and canoes for transport. The only roads in the PAOI are temporary logging roads in the forest concessions (discussed further in Section 6.2.4). These are located to the east of the Purari River, and end at river ports near Poroi 2, Evara and in the past, Aivai. During the colonial era, roads also extended from Ihu Station along the Orokolo coast (as far as Harevavo), and inland to Muro Mission.

The only operational airstrips in the PAOI are those at Wabo and Herd Base. The airstrips do not have regular commercial air services but are used by TEP PNG and some private charter flights.

Coastal shipping services ended in the 1980s. Although TEP PNG and the logging companies contract barges to deliver equipment, materials and other goods to the Project area, local people rely on dinghies and canoes. The proportion of households owning transport assets is shown in Table 10.

As shown in Table 10, two thirds of households had canoes, while only 15% of households had a dinghy and 21% of households owned an outboard motor, which could be attached to either a canoe or dinghy. There were no motor vehicles or motorbikes recorded in the PAOI.

The only permanent port in the PAOI is at Herd Base. Logging companies construct temporary ports for loading and unloading barges.



SCALE: 1:600,000 @ A4

0 5,000 10,000 15,000 20,000 25,000 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Towns and Villages

Project Affected Communities

- PRL-15
- Export pipeline corridor
- Riverways

Host LLG Communities

- Baimuru Rural
- Ihu Rural

- Special Agriculture and Business Lease (SABL)
- Upstream project area of influence

Proposed Facilities

- Pipeline export route corridor
- PRL-15 License

N

**Note, not all communities have been verified in the field*
***Note, language group does not represent land ownership*

TITLE: Purari Special Agriculture and Business Lease (SABL)

MAP: 6

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_126-81621 **REVISION:** A

DATE: 20/07/2017

DATA SOURCES:
Towns and villages, rivers, Export pipeline corridor, PRL-15, hillshade supplied by ERIAS and TOTAL (2015-2016). Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017). SABL digitised from Survey Plan (2016).

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Table 10: Level of Ownership of Transport Items (%)

Language Group	Canoe	Dinghy	Outboard Motor	Motor Vehicle	Motor Bike
Pawaia	74	16	35	0	0
Ahia	86	43	43	0	0
Koriki	85	3	15	0	0
Iare	82	18	27	0	0
Kaimare	89	17	22	0	0
Maipua	88	19	25	0	0
Orokolo	38	12	9	0	0
TOTAL	**67**	**15**	**21**	**0**	**0**

Source: ERIAS Group, 2016b.

6.2.2.2 Communication

Digicel has constructed several towers in the PAOI and now provides mobile phone coverage to approximately 66% of the villages[6] in the PAOI. The proportion of villages in the PAOI with mobile phone coverage, and the average number of mobile phones per household, is summarized in Table 11.

Table 11: Methods of Communication for Villages and Households

Language Group	Villages Surveyed	Villages with Mobile Phone Reception		Households with the Following Items			
		Number	Name	Mobile Phones (%)	Computers or iPads (%)	TVs (%)	Radios (%)
Pawaia	7	3	Subu, Ura, Wabo[7]	61	5	15	32
Ahia	1	0	N/a	29	0	36	43
Koriki	4	1	Ikinu	50	0	18	30
Iare	6	4	Aivai, Aumu, Maipenairu, Mapaio	70	9	21	32
Kaimare	3	2	Aiere, Upaia	67	0	31	44
Maipua	1	1	Apiope	75	6	31	44
Orokolo	13	12	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	64	3	12	30
TOTAL	**35**	**23**		**62**	**4**	**18**	**33**

Source: ERIAS Group, 2016a&b.

As shown in Table 11, approximately 66% of villages had mobile phone reception, and 62% of households had one or more mobile phones. Mobile phones are charged using solar power or generators. Some people charge a small fee for others to charge their phones (e.g. 50 toea or PGK1.00), while others provide the service free of charge. Mobile phones are not only owned by

[6] Mobile phone coverage may not be comprehensively available in all areas across the villages noted. However, it is available from one or more locations either within the villages or within close proximity to the villages.

[7] Village leaders in these villages indicated that they had mobile phone reception however this is understood to be true only when the nearby Digicel tower is operating. At the time of the SBS survey, it was not operating.

people living in villages with mobile phone reception, as some people will own a phone to use when they travel to Kerema or other locations. Mobile phone receptions across the PAOI are shown in Map 7.

Also shown in Table 11, only 4% of households own a computer or iPad, 18% own a TV and 33% own a radio. Radio therefore remains as the main method of receiving news and other information.

Newspapers are not delivered to villages within the PAOI, although people returning from Kerema will often bring several newspapers back to the village. The only location within the PAOI to have TV on a regular basis is at Herd Base. This provides a means for employees to watch news on Papua New Guinea or Australian broadcasters. For the majority of the population, the only way to receive news is via radio or internet-based news using mobile phones.

6.2.2.3 Electricity

PNG's electricity grid does not extend to the Project area. Large scale business opportunities are therefore constrained by lack of access to electricity. Commercial activity is discussed in Section 6.2.4.

The only source of electricity in the PAOI is from petrol-fired generators or solar power. The ownership of generators and solar panels is shown in Table 12.

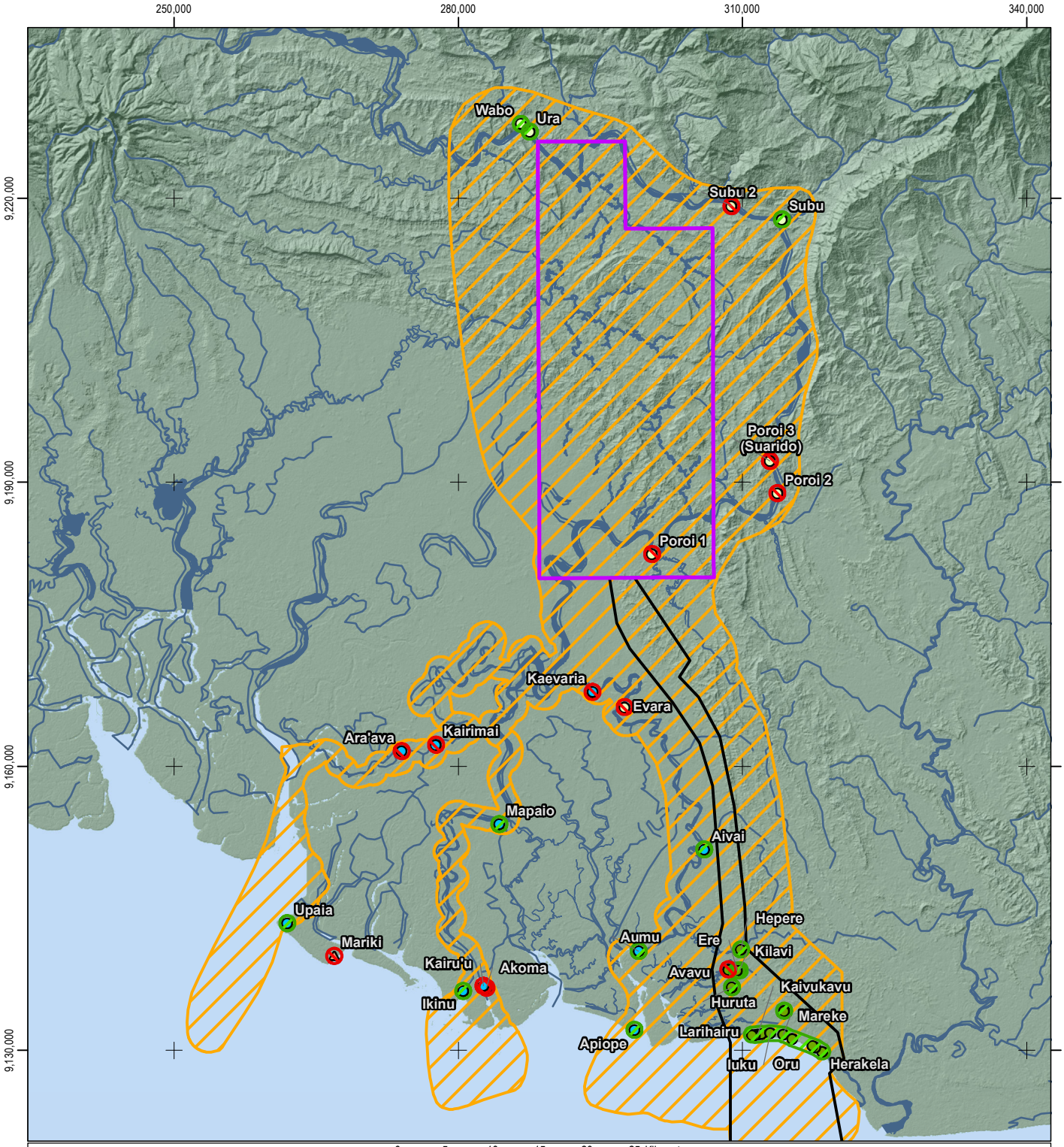
Table 12: Households with Access to Generators or Solar Panels

Language Group	Generator (%)	Solar Panels (%)
Pawaia	8	62
Ahia	29	14
Koriki	23	35
Iare	43	64
Kaimare	47	67
Maipua	63	56
Orokolo	25	48
TOTAL	**28**	**53**

Source: ERIAS Group, 201b6.

As shown in Table 12, 28% of households have access to generators, and 53% have access to solar panels[8]. Solar has provided a far less expensive option for households to have light and to utilize other items requiring electricity (which in the PAOI typically includes charging mobile phones and, less frequently, powering electric radios, CD players and small household appliances). In a short period of time, solar has replaced generators as the main source of electricity in the PAOI. Solar panels and lights are readily available in Port Moresby and a simple system, suitable for powering two or three lights, and charging mobile phones, can be acquired for several hundred kina. Typically across the PAOI, households were observed to have solar panels ranging in size from approximately 100mm by 150mm (handheld size possibly generating approximately 1W) to approximately 1 meter by 600mm (possibly generating approximately 150W). Some households had more than one panel.

[8] 40% of households stated that solar provided the main source of lighting (and a secondary source of lighting for 10%). Some households had access to solar power but it didn't provide the main source of lighting.



SCALE: 1:600,000 @ A4

0 5 10 15 20 25 Kilometres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

Towns and Villages

Project Affected Communities

- PRL-15
- Export pipeline corridor
- Riverways

Host LLG Communities

- Baimuru Rural

- Waterways
- Towns and villages with coverage
- Towns and villages without coverage
- Upstream project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Mobile Phone Coverage

MAP: 7

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_126-81624 **REVISION:** A

DATE: 20/07/2017

DATA SOURCES:

Towns and villages (mobile phone coverage), upstream project area of influence, export pipeline corridor supplied by ERIAS Group (2015-2017). PRL-15, waterways supplied by TOTAL (2015).

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6.2.2.4 Banking and Credit

There are no banks or banking agencies in the PAOI, although Sakura Osura Resources Limited, the Pawaian local business company, previously provided banking services at its store in Wabo (however when the Digicel tower failed several years ago the automatic bank no longer operated and the service was suspended). The nearest bank to the PAOI is at Kerema. However, some people from Maipenairu said that they would paddle out to sea until they gained mobile phone reception so they could use SMS banking to obtain cash supplied by the trade store at Maipenairu. The proportion of households with bank accounts, and the proportion of households with access to other forms of savings, is shown in Table 13.

Table 13: Households with Bank Accounts or Access to Other Savings

Language Group	HHs with Bank Accounts (%)	HHs with no Bank A/C but Access to Other Savings (%)
Pawaia	31	76
Ahia	14	91
Koriki	27	73
Iare	27	75
Kaimare	39	81
Maipua	25	75
Orokolo	36	71
TOTAL	**31**	**75**

Source: ERIAS Group, 2016b.

As shown in Table 13, 31% of households surveyed during the SBS indicated that they (or at least one family member) had a bank account. Although specific information was not collected on how often bank accounts were accessed, it is likely to be infrequently due to the need to travel considerable distance to access a bank. However, 75% of households indicated that they had access to other cash savings.

Household Survey respondents were asked how they would access money if, for example, they needed to pay for school costs (which typically require a relatively large outlay). The results, which are used as a proxy for how many people have cash savings, or how people would obtain credit, are shown in Table 14.

Table 14: Access to Money

Source of Access to Money	Main Option (%)
Use savings from bank account	3
Use other cash savings	25
Borrow from friends or relatives	12
Sell produce	50
Seek employment	2
Other	8

Source: ERIAS Group, 2016b.

As shown in Table 14, the most common methods to access money are to sell produce (50% of households), then use cash savings not held in a bank (25% of households). Only 3% of households said they would access savings held in bank accounts, which indicates how few people use their bank accounts. Furthermore, while 8% of households identified 'other' methods of accessing money, the majority of these were either selling betel nut, pigs or other produce, or relying on remittances. One household said they would borrow money from the Teacher's Association, one household said they would borrow money from the church, and one

household said they would ask for assistance from a company. However, no households said they would borrow money from a private entity or person, indicating that there are very few options for obtaining credit or borrowing money in the PAOI.

Village leaders were asked if anyone in the village acted as a formal money lender, that is, someone who lent money and required repayment of a fixed amount or in a fixed time period. Results are presented in Table 15, and indicate that around 23% of villages responding to the question have people lending money. Excluding the Pawaia villages, only 15% of villages have people lending money. The reason for a higher proportion of Pawaia villages with money lenders may be associated with their involvement with the Papua LNG Project over the past decade, as it was stated in Subu that it is the wage earners that can lend money to others.

Table 15: Villages with Money Lenders

Language Group	Villages	Villages with Money Lenders	
		Number	Name
Pawaia	5	3	Subu, Subu 2, Wabo
Ahia	1	0	N/a
Koriki	4	1	Ara'ava
Iare	5	1	Maipenairu
Kaimare	2	1	Mariki
Maipua	1	0	N/a
Orokolo	13	1	Ere-Kilavi
TOTAL	**31**	**7**	

Source: ERIAS Group, 2016a

In Ara'ava, it is said that government employees are the ones borrowing money, as they have a reliable source of income and can repay. In Ere, the village leaders indicated that people generally borrow money to help them travel (for example, to sell produce in other areas). In such a case, the people lending money might not operate on a commercial basis, but simply expect to be refunded once they return to the village. However, in Mariki and Maipenairu, people do lend money on a commercial basis. It is said that 50% interest is charged in Mariki, and 40% in Maipenairu. Furthermore, it is likely that the loan will extend for a limited duration (possibly only weeks), implying the interest charges could equate to several hundred percent.

The majority of people in the PAOI appear to borrow money from friends or relatives, if money is required, with no interest and no fixed repayment period. Most often, this would be to raise money to travel to Port Moresby, Baimuru or elsewhere, both to sell betel nut and/or other products, and buy various store products.

6.2.2.5 Access to Other Commercial Services

There are no postal services in the PAOI. The nearest post office is at Kerema.

In comparison to most provincial capitals, Kerema has relatively few stores and provides little in the way of other commercial services (agricultural inputs, freight services, etc). Most people in the PAOI regard the stores in Kerema as too expensive. Having paid to reach Kerema, it was more worthwhile to continue on to Port Moresby and buy everything there at a much lower cost.

Village leaders were asked where people usually go to buy various items, including building materials, clothes, mobile phones and other household items. The leaders generally indicated that most purchases were done in the same location, which is summarized in Table 16.

Table 16: Where do Families Generally Buy Building Materials

Language Group	Kerema	Baimuru	POM	Elsewhere
Pawaia		3		2
Ahia		1		
Koriki		2	1	1
Iare		4	1	
Kaimare		1	1	
Maipua	1			
Orokolo	1		12	
TOTAL	**2**	**11**	**15**	**3**

Source: ERIAS Group, 2016b.

As shown in Table 16, Baimuru is a key destination to procure building materials for several Pawaia, Koriki and Iare villages, and Evara. Baimuru is connected by river and is relatively close in comparison to Kerema and beyond. However, the majority of Orokolo villages, and coastal villages of Ikinu, Maipenairu and Mariki, prefer to travel to Port Moresby to buy building materials. Port Moresby offers a wider range of materials and lower prices. This compensates the travel cost, which is around K100 between coastal villages in the PAOI and Kerema, and another K50 for a PMV from Kerema to Port Moresby. Kerema prices are generally regarded as too high, and the range of materials available too limited.

While Table 16 summarizes where most people from the PAOI go to buy building materials, they generally go to the same location to buy bulk store food, cooking items and other kitchen utensils, gardening equipment, clothes, mobile phones and other household items.

Other than the two villages that identified Kerema as the main source of building materials (Kavava and Apiope), village leaders in Ura identified Goroka (which can only be reached by air charter), village leaders from Poroi 2 identified Wabo and Evara, and village leaders from Ara'ava indicated that building materials were generally bought from within the village.

Although there are various business support programs funded by the National Government, none are active in Kerema or the PAOI. Furthermore, there is no knowledge of any ongoing business development or business support activities being undertaken by the business development officers in Gulf Province.

6.2.3 Economic Activity

This section of the report summarizes the main economic activities in the PAOI.

6.2.3.1 Logging

The only large-scale economic activity in operation in the PAOI is the Vailala logging operation. Frontier Holdings is currently logging in Vailala Block 3 and has log ponds (where logs are stockpiled for loading) near Poroi and Evara (and previously near Aivai and Herd Base). Activity in Block 3 is reportedly winding down, and Frontier Holdings is expected to move into Vailala Block 2 within the next year or two (Provincial Forestry Officer, personal communication, 16 August 2016). Vailala Blocks 2 and 3 are covered under the same timber permit (refer Map 4).

The Provincial Forestry Officer estimated that Frontier Holdings would employ around 200 people at its Vailala logging operation. However, results from Village Leaders FGD indicate that relatively few people from within the PAOI work in logging camps. Results of the household survey indicate that 7% of people surveyed in the PAOI in employment worked for a logging company.

Village leaders from Mapaio, Aivai, Upaia and Wabo identified logging royalties as a main source of cash income for their villages. Results from the Household Survey indicate that only one

individual from 354 households was currently employed with a logging company, although 10% of households received income from logging royalties in the past fortnight.

A logging permit has also been issued for Baimuru Block 3 which encompasses all of PRL-15. Landowners from Pawaian, Koriki and potentially other language groups entered an agreement with the operator, Turama Forest Industries, in 1994. However, Turama Forest Industries is still logging in Baimuru Block 1, and, at the time of the SBS it was unclear when they will commence logging in Block 3.

In several villages in the PAOI, there is a vocal anti-logging sentiment, the result of the logging benefits allegedly failing to live up to expectations, along with alleged damage to canoes, and environmental damage, among other concerns.

Photo 3: Logging operation near Evara.
Source: ERIAS Group, 2016a

Photo 4: Logs awaiting shipment from Evara logging operation.
Source: ERIAS Group, 2016a

6.2.3.2 Petroleum Exploration

Although not in operation, the exploration and development stages of the Papua LNG Project have provided a substantial source of local employment (and various other services), particularly among Pawaia villages.

Although employment levels vary, TEP PNG or their contractors currently employ 17 individuals from the 354 households surveyed, and many others gained experience with InterOil during the earlier exploration program.

6.2.3.3 Sale of Local Produce

Until the 1980s, the Papuan coast was a major source of copra, and copra was the main source of income for coastal villages. Since coastal shipping services stopped, coconuts plantations have basically been abandoned due to the high cost of transportation in the PAOI and low unit price for copra (although prices have trended higher over the past decade). However, when

shipping services stopped, local people turned to commodities that could be sold locally, or commodities with higher unit values that could be transported economically outside the local area.

As shown in Table 17 the most common sources of cash income in the PAOI, based on interviews with village leaders, are betel nut, sago and fish/seafood. Betel nut is the main source of cash income in 15 villages (or 48% of villages surveyed) in the PAOI, and was particularly common among Orokolo villages. The main season for betel nut appears to vary within the PAOI but is mid-year along the Orokolo coast and a little later further inland.

Sago was the main source of cash income in six villages (or 20% of villages surveyed) in the PAOI, particularly for villages in the riverways area (Kairimai, Mapaio and Ikinu) and selected Orokolo villages (Harevavo, Kaivukavu and Kavava). Sago can be harvested year-round.

The main products categorized as fish/seafood included fresh and dried fish (including salmon, mackerel, catfish and mullet), sharks and mud crabs, although some sales of other products, including prawns and shellfish also occur. Food crops commonly include bananas, sweet potatoes, various green vegetables, pumpkin, corn and cucumbers.

In the four villages in Table 17 that identified other main income sources, three identified paid employment (Ura, Subu and Subu 2) and one identified woven mats. The mats made in Maipenairu are made of nipa palm and are used to sleep on. Of all villages identifying a main source of income, 28 villages (or 93% of those surveyed) identified a product derived from the local environment, a clear indication of the high level of dependency on the natural resources available in the PAOI.

Village leaders were asked to identify several sources of cash income. The responses received, allowing multiple responses from each village, are summarized in Table 18.

Photo 5: Freshly caught fish, ready for sale at Marea.
Source: ERIAS Group, 2016a

Table 17: Main Source of Cash Income in PAOI Villages

Language Group	Betel Nut		Fish or Seafood		Food Crops		Sago		Other Sources	
	Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
Pawaia	2	Poroi 2, Wabo	0	N/a	0	N/a	0	N/a	3	Subu, Subu 2, Ura
Ahia	0	N/a	0	N/a	1	Evara	0	N/a	0	N/a
Koriki	1	Akoma-Kairu'u	1	Ara'ava	0	N/a	2	Ikinu, Kairimai	0	N/a
Iare	1	Aivai	1	Aumu	0	N/a	1	Mapaio	1	Maipenairu
Kaimare	0	N/a	2	Mariki, Upaia	0	N/a	0	N/a	0	N/a
Maipua	1	Apiope	0	N/a	0	N/a	0	N/a	0	N/a
Orokolo	9	Avavu, Ere-Kilavi, Hepere, Huruta, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	0	N/a	1	Iuku	3	Harevavo, Kaivukavu, Kavava		
TOTAL	**14**		**4**		**2**		**6**		**4**	

Source: ERIAS Group, 2016a.

Table 18: Sources of Cash Income in PAOI Villages

Language Group	Betel Nut	Fish or Seafood	Food Crops	Sago	Other Local Products	Other
Pawaia	3	3	4	3	2	5
Ahia	1	1	1	1		
Koriki	3	4	2	4	4	1
Iare	1	5	4	3	5	3
Kaimare	1	2	1		3	1
Maipua	1	1	1	1	1	
Orokolo	13	11	10	12	6	4
TOTAL	**23**	**27**	**23**	**24**	**21**	**14**

Source: ERIAS Group, 2016a.

As shown in Table 18, betel nut, fish/seafood, food crops and sago are all important sources of cash income in the PAOI, indicating not only that most villages have a range of natural resources, but chose to sell a range of products to earn cash income. A number of other local products are also sold to earn cash income, including pigs (particularly in the villages of Ara'ava, Apiope, Mareke, Kavava, Mariki and Kaevaria), chickens (Marea, Mareke, Kavava and Mariki), timber or logs (Subu 2 and Ara'ava), canoes (Ara'ava, Aumu and Akoma), crocodiles (Subu 2) and cassowary (Kaevaria). The villages of Mariki, Ikinu and Maipenairu specifically mentioned coconuts as a source of cash income, while Hepere identified *daka* (a pepper used to chew with betel nut) and Paevera identified garlic.

Cassowaries and crocodiles are either harvested from the wild, or caught in the wild when young and raised. At times, crocodile skins have been an important source of income, but in recent times the price of crocodile skins has been so low that few people hunt or raise crocodiles. Residents at Apiope reported extracting the layer of fat on the gut of catfish and barramundi, drying it in the sun, and selling it to Chinese buyers. For 50kg, they received PGK1,000 (USD320).

While betel nut is commonly sold in logging camps and urban areas, such as Kerema, Baimuru, Kikori and as far away as Daru, the majority of fish, vegetables and sago are sold in local markets.

The main market in the Orokolo area is at Kaivukavu (refer Photos 10, 11 and 12), which operates every Saturday, Monday and Thursday mornings.

Photo 6: Dried fish and sago at Upaia.

Source: ERIAS Group, 2016a

Photo 7: Young cassowary in pen at Kairimai.
Source: ERIAS Group, 2016a

Photo 8: Crocodile skin at Aivai.
Source: ERIAS Group, 2016a

Photo 9: Betel nut.

Source: ERIAS Group, 2016a

Photo 10: Market at Kaivukavu. Vendors display their goods.

Source: ERIAS Group, 2016a

Photo 11: Market at Kaivukavu. Shoppers browse the items for sale.

Source: ERIAS Group, 2016a.

Photo 12: Market at Kaivukavu. Bananas, betel nut and tobacco for sale.

Source: ERIAS Group, 2016a.

On the day Photos 10, 11 and 12 were taken, the market had around 100 sellers, and all produce was sold within an hour of opening, and purchased by local families or families who had travelled from nearby to attend (as opposed to commercial buyers).

Other markets are located at the Kapuna and Muro missions and at the logging camps. The Evara logging camp provides a market for people selling produce from Evara, Kaevaria, Aivai, Mapaio and other villages, particular on pay Fridays. Informal sales of local produce also occur in most villages on a daily basis, as shown in Photo 13. In addition to local products, people will often sell store products such as processed foods, soap, shampoo or cigarettes, after bringing surplus product back from a visit to an urban area. The small stalls are called table markets, or more commonly within the PAOI, a black market.

Photo 13: Tobacco and betel nut for sale at Ura

Source: ERIAS Group, 2016a.

Some villages (such as Ara'ava and Kairimai) along the Pie River (the western arm of the Purari riverways) have in the past felled hardwood logs and floated them to a sawmill in Baimuru, a task taking two to three days. However, the sawmill is no longer operating. Rather than selling logs, timber is now sold to some local businesses, generally on an ad hoc basis, for use in the local area.

Some people interviewed during the SBS acknowledged that both marijuana and home brew were bought and sold in the PAOI. No information regarding the number of households or actual income or expenditure levels were collected for marijuana, however, three households

acknowledged the sale of home brew. These households earned approximately PGK 30 (USD9.60) each during the previous fortnight.

6.2.3.2 Livestock

The proportion of households with pigs, chickens, cassowary and crocodiles is shown in Table 19.

Table 19: Households with Livestock

Language Group	HHs with One or More Pigs (%)	HHs with One or More Chickens (%)	HHs with Cassowary (%)	HHs with Crocodiles (%)
Pawaia	41	45	7	0
Ahia	0	86	7	0
Koriki	38	53	0	0
Iare	16	73	13	5
Kaimare	64	83	0	8
Maipua	63	75	0	0
Orokolo	36	64	3	0
TOTAL	**36**	**64**	**5**	**2**

Source: ERIAS Group, 2016b.

The main livestock within the PAOI are pigs and chickens: 36% of households own one or more pigs and 64% of households own one or more chickens. A small number of households held cassowary and crocodiles. There were no cattle, sheep or goats reported or observed in the PAOI.

The number of pigs and chickens per household is shown in Figure 18 and Figure 19, respectively.

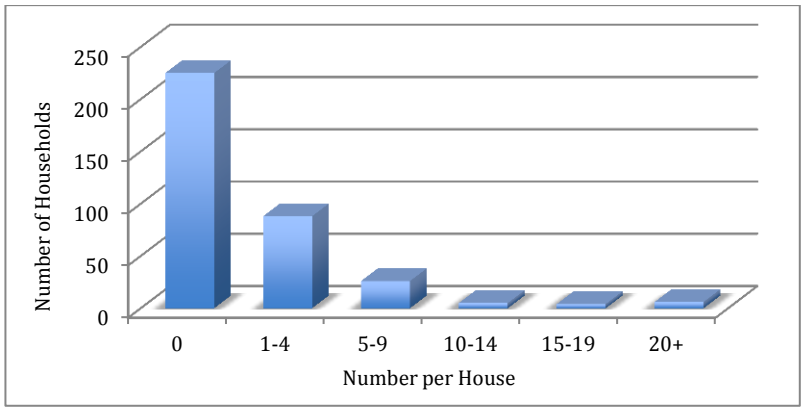

Figure 18: Ownership of Pigs in the PAOI

Source: ERIAS Group, 2016b

As shown in Figure 18, only 4% of the households surveyed had 10 pigs or more, and only six households (2% of households surveyed) had 20 or more pigs. While the maximum number of pigs owned by any household was 25, it is likely that those with 20 or more pigs sold them on a commercial basis.

As shown in Figure 19, more than half of the households with chickens had fewer than 10, while four households (1% of households surveyed) had 40 or more chickens. The maximum number recorded, in Poroi 2, was 115. It is likely that this included a recent batch of 100-day-old chicks, which can be ordered within Papua New Guinea with suitable arrangements. In this case, one of the household members worked in the post office.

Income generated from livestock ranged from PGK12 (USD4) to PGK500 (USD160) per annum.

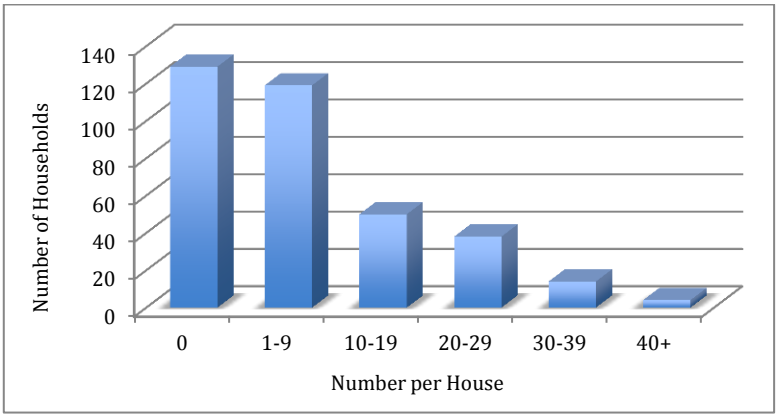

Figure 19: Ownership of Chickens in the PAOI

Source: ERIAS Group, 2016b

6.2.3.3 Local Business Activities

The number of villages with trade stores, fuel sellers and other business activities in the PAOI is summarized in Table 20.

Table 20: Villages with One of More of the Following Businesses

Language Group	Villages Surveyed	Trade Store		Fuel Sellers		Other Business	
		Number	Name	Number	Name	Number	Name
Pawaia	7	4	Poroi 1, Poroi 2, Ura, Wabo	3	Poroi 3, Ura, Wabo	0	N/a
Ahia	1	0	N/a	0	N/a	0	N/a
Koriki	4	3	Ara'ava, Ikinu, Kairimai	3	Ara'ava, Ikinu, Kairimai	0	N/a
Iare	6	3	Aumu, Maipenairu, Mapaio	4	Aumu, Kapai 2, Maipenairu, Mapaio	1	Maipenairu
Kaimare	3	1	Mariki	2	Mariki, Upaia	0	N/a
Maipua	1	0	Apiope	1	Apiope	0	N/a
Orokolo	13	6	Iuku, Kaivukavu, Kavava, Marea, Mareke, Oru-Lariau-Herekela	9	Avavu, Harevavo, Huruta, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela	0	
TOTAL	**35**	**17**		**22**		**1**	

Source: ERIAS Group, 2016a.

As shown in Table 20, 49% of villages contained one or more trade stores, and 63% of villages contained one or more fuel retailers. Generally, those villages that had trade stores also had

people selling fuel. It is likely that none of the trade stores or fuel retailers were registered businesses. Generally trade stores sell basic products such as rice, noodles, biscuits, oil, salt, sugar, flour, tinned fish and sometimes tinned meat, matches, batteries and soap. The ownership of trade stores is variable; they are owned by local families, absent families, and in some cases outsiders (including foreign migrants).

One local contractor was identified in the PAOI. This was a building contractor, based at Maipenairu, called Baimuru Builders. The contractor had recently completed classrooms at the school but had no earlier contract experience. The survey villages contained a total of 39 trade stores and 57 fuel retailers. Thus, while around half of all villages surveyed had no trade stores or fuel retailers, the other villages often had two or three trade stores and fuel retailers. Many stores and fuel retailers operate on an intermittent basis: selling store goods or fuel when in stock, but often having no stock for weeks on end.

Photo 14: Trade store at Maipenairu, August 2016

Source: ERIAS Group, 2016a.

Several ad hoc business opportunities also occur but are not included in Table , such as canoe/motor hire, chainsaw hire and the infrequent sale of produce in the village in black markets. Results from the Household Survey indicate that 35% of households were engaged in some kind of business activity. The number of businesses recorded during the Household Survey is shown in Figure 20.

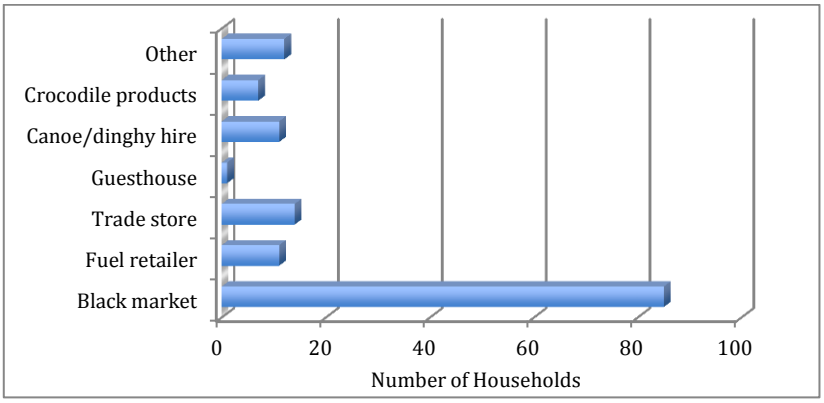

Figure 20: Business Activities in the PAOI

Source: ERIAS Group, 2016b

As shown in Figure 20, black markets (small table markets often conducted from people's houses) were by far the most frequent type of business activity in the PAOI. More than 80 households indicated they sold produce in black markets on a regular occurrence. The types of products sold included store products, such as tinned fish, rice, cigarettes, matches and soap, or locally produced products, such as fruit, vegetables, *brus* (locally grown tobacco), betel nut or seafood products. Other types of business included chainsaw hire, pig production, selling clothes, selling wild meat and money lending.

As discussed in Section 6.1.5, the majority of Papua New Guinea's rural population desire better healthcare, better education, better housing, more products, more goods and services and more food (Jones & McGavin, 2015, p. 13). This is no different in the PAOI. In the past, many people relied on the sale of copra to earn cash income. Copra has largely been replaced by betel nut as the main cash crop in the PAOI, but many people also sell sago, fish, wild animal meat, fruit and vegetables. Although there are limited markets within the PAOI, people travel great distances to sell their produce. Many people from within the PAOI have shown great ingenuity in terms of what they sell and where they sell it.

With the exception of the owner of Baimuru Builders (discussed above), the same cannot be said for business activity. Although formal business opportunities are limited in the PAOI, due predominantly to limited purchasing capacity (itself due to low income levels), there is limited evidence of any local entrepreneurship. The main business activities are trade stores, other retail activity, and dinghy hire. Landowner companies established to capitalize on logging operations are not active and according to local elders have not benefited from logging operations at any point in time. Furthermore, buyers who visit the PAOI are often from the Highlands or from Port Moresby. While there is limited evidence of any business entrepreneurs in the PAOI, it may be that the more entrepreneurial people have relocated to Port Moresby or other parts of Papua New Guinea where there are larger markets and more business opportunities.

6.2.3.4 Exchange

The exchange of goods has important economic, social and cultural values for most language groups in the PAOI. Exchange is a fundamental part of Papua New Guinean society that contributes to social relationships. Linked to exchange is the principle of reciprocity, which is a tactic to avoid waste (share resources when they are abundant) and to help cope in times of hardship (seek assistance from those with more resources when necessary). Exchange occurs at different levels: with families and also between families, clans, villages and language groups.

The exception to exchange occurring with other language groups may be the Pawaians, as the social mapping survey could not establish any major trading patterns between the neighboring tribes and the Pawaia speaking people (Kinkin & Kewibu, 2008, p. 23).

The most famous trading practice in Papua New Guinea is the Hiri (or *Lakatoi)* trade, which commenced centuries ago and continued until the 1950s. Men from the Motu villages in the Port Moresby area would load clay pots and other items into their *lakatois* (large, multi-hulled sailing canoes) and sail with the *laurabada* (south-east trade winds) towards the Papuan Gulf. They may stay in a village for as long as five months (Williams, 1924, p. 127), in which time they will exchange pots (shell and bone ornaments and other items) for sago, before returning with the *lahara*, the monsoon wind from the northwest. This practice was embedded in the culture of the Motu and Gulf communities and provided opportunity for social exchange in addition to economic trade.

The Orokolo and coastal communities from the Purari delta were involved in the Hiri trade. Other exchange occurred within the Purari delta, but external trade was restricted in earlier times by cannibalism (Williams, 1924, p. 125). However, the government's introduction of the rule of law during the 20th Century facilitated increased trade, which continues today. Most exchange occurs between coastal and inland communities. The coastal communities, such as

Apiope, Maipenairu, Ikinu and Mariki catch mud crabs and fish and load their canoes with these and coconuts and perhaps pigs, and travel upstream to villages such as Mapaio and Ara'ava and exchange their goods with sago, canoe trees and garden produce, such as sweet potato and bananas[9]. Often the exchange is within the same language group, for example, exchange between Ikinu and Ara'ava (Koriki) or Aumu and Mapaio (Iare). However, exchange also occurs between villages of different language groups and with villages from other areas. Williams noted that people from the Purari delta traded with the Kauru to the east, exchanging fish and crabs for bows, cassowary bones (used to make knives and daggers) and dogs, while the Urama and Goaribari people to the west, came to the Purari with the principle objective of prostituting their women for arm-shells (Williams, 1924, p. 125). At the time, arm-shells were the primary units of currency.

Exchange is a method used to utilize surplus commodities from one area with surplus commodities from another. Both groups benefit from the exchange in terms of more effectively utilizing abundant resources and diversifying their diet, and in all likelihood, is a practice that helps deal with natural disasters (such as a flood or cyclonic winds) that may reduce the availability of food in a particular area.

The exchange also provides opportunity for social interaction and no doubt has resulted in marriage arrangements that may help cement trade links in future years.

Information on exchange collected during the SBS is summarized in Figure 21.

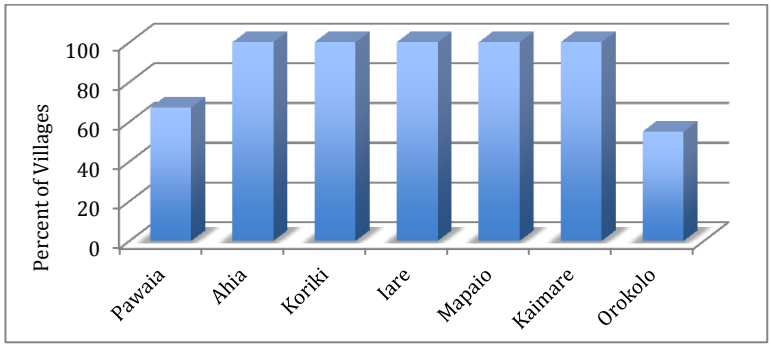

Figure 21: Villages Practicing Exchange in the PAOI

Source: ERIAS Group, 2016a

As shown in Figure 21, all villages in the Purari delta continue to exchange products with other villages. Only the village leaders from Poroi 2, and several of the coastal Orokolo villages, indicated that exchange no longer occurred and trade was now cash based. The products exchanged include sago, fish, crabs, other seafood, pigs, chickens, coconuts, garden produce, logs used to make canoes and logs used for other timber products.

6.2.4 Labor

6.2.4.1 Division of Labor

The division of labor among the Koriki, described by Williams in 1923, is reproduced in Table 21.

It is interesting to note that the traditional fishing nets used by men and women in the 1920s continue to be used in the PAOI almost a century later, although they have been supplemented by nylon fishing nets and nylon fishing line, both of which are now common in the PAOI.

[9] Although the coastal villages make their own sago, the sago from further inland is regarded as more appetizing as it is made with fresher water.

Table 21: Division of Labor Among the Koriki, 1923

Man's Work	Women's Work
Hunting Gardening Tree-cutting Canoe-making Carving and other woodwork Trading Building	Housework Cooking Feeding pigs and dogs
Sago: Felling Bringing in palm-trunks	*Sago:* Scraping Beating
Fishing: Line Spear and arrows Trap (*laupai*) Net (*keve*)	*Fishing:* Net (*evidi*) Trap (*orea*)
Manufacture of: Weapons Masks Bark-cloth Ornaments Mats	*Manufacture of:* String Fish nets and traps Frayed sago Pandanus mats Plaited bags

Source: Williams, 1924, p. 128.

Williams remarks that the man's work is more difficult, and requires greater skill, courage, and physical strength, but they have monopolized all that is varied and interesting. He says that on the other hand, women have menial and relatively dull work, but go about their business in a systematic manner with fewer intervals for leisure. He notes however that "it must not be thought that she is continually slaving at hard work" (Williams, 1924, pp. 129). Ironically, one who spends any time in a village in the PAOI will almost certainly notice women making sago, often for hours on hand, and close observation indicates that the scraping, beating (as shown in Photo 15) and washing are all physical and tiring jobs.

Although Williams notes that most Koriki households are basically independent and self-sufficient, they do cooperate when performing large tasks, such as clearing a garden site, building a new house, or building a new *ravi.* This level of cooperation continues today, both for *wok bung* (community work), which was introduced by government as a day to clean the village and achieve other useful tasks for the community, and to hunt, fish or extract poles from the forest to build a new house. Results of the Household Survey indicate that 59% of men and 56% of women had performed some community work in the previous two weeks.

Photo 15: Lady making sago near Evara

Source: ERIAS Group, 2016.

During the SBS, village leaders and women were asked about the main responsibilities of men and women and how frequently the main activities were undertaken. The division of labor varies between tribes in the PAOI. However, key subsistence activities undertaken by men and women are described in Table 22, along with results from the Household Survey, which indicate the proportion of households that performed the activity in the past two weeks.

Table 22: Key Subsistence Activities Undertaken by Men and Women in the PAOI

Activity	Responsibility	Did in Last 2 Weeks	
		Males	Females
Protecting the family	Male responsibility	NA	NA
Caring for children	Responsibility shared by men and women, although women often more actively involved	NA	NA
Making sago	Men generally fell and transport the log, and sometimes scrape. Women more often scrape, and beat and wash the sago. Although sago can be stored in the house for up to a month, sago is the main staple in the PAOI and making sago occurs regularly (e.g. for 4 or 5 consecutive days every couple of weeks)	50%	68%
Making gardens	Men primarily responsible for felling trees but clearing and burning undertaken by both males and females. Gardening not as important in coastal villages as in other villages	57%	44%
Tending gardens	Women primarily responsible but males also active. Women in Mariki indicated that it wasn't an important task, as gardens contribute less food in coastal villages of the Purari delta than in other areas (due primarily to the shortage of suitable gardening land)	66%	56%
Raising livestock	Both men and women share the responsibility, although 25% of households do not have livestock (pigs, chickens, cassowary or crocodiles)	NA	NA
Hunting	Primarily an activity undertaken by men and boys. Occurs less frequently in coastal villages	42%	5%
Fishing	Both men and women active. Men set nets and fish with lines, while women use traditional baskets and traditional nets and also use lines. Fish provide the main source of protein. Fishing generally occurs on a daily basis	75%	72%

Activity	Responsibility	Did in Last 2 Weeks	
		Males	Females
Collecting seafood	Primarily a female responsibility, although men sometimes participate. More important in coastal areas, although some shellfish and crabs can be collected throughout the tidal reaches	31%	42%
Collecting edible plants	Primarily a female responsibility, although men sometimes participate. Can be a designated activity when okari, galip or other foods are in season, otherwise more often a supplementary activity. More important for inland villages that generally have access to larger areas of forest	51%	50%
Collecting water	A task usually shared among family members, although women and girls are mainly responsible. Women were primarily responsible for the collection of water in Kairimai, Ara'ava, Poroi 2, Ere, Avavu, Hepere, Huruta, Oru and Aiere	NA	NA
Collecting firewood	A task usually shared among family members, although men in Larihairu and Iuku said it was not an important task for males	NA	NA
Cooking and cleaning	Predominantly a female responsibility	NA	NA
Building a house	Cutting logs, preparing timber and erecting the frame is primarily a male responsibility. Both men and women can make woven wall panels or mats (from nipa or sago palms) and women can assist men during construction	31%	5%
Making canoes	Predominantly a male responsibility. Canoes typically last two to three years, so occurs relatively infrequently	51%	16%
Community work	Undertaken by both males and females, generally on a designated day during the week	59%	56%

Source: ERIAS Group, 2016a.

As shown in Table 22, making sago, making and tending to gardens, fishing, collecting seafood, collecting edible plants and community work are all important tasks performed by both men and women. It should be noted that the Household Survey was undertaken in September/October, a relatively dry period when many people were making new gardens. This may bias the results towards making new gardens to some degree. Table 22 also indicates that hunting, making canoes and building houses are tasks that are primarily but not totally the responsibility of men, while women probably spend more time making sago and performing other duties around the house, including caring for children, collecting water, cleaning the house and cooking.

There are distinct roles performed by men and women in the PAOI. Furthermore, while both men and women may be involved in an activity, such as making a new garden or making sago, the specific activities may be quite different. For example, men may fell trees while women focus on clearing the underbrush. For sago, men may fell the palm and transport it to a suitable location, where the women will generally assume responsibility for processing. Fishing is often done by small groups of men or small groups of women, and they will often employ different fishing techniques. Men will often use nets and lines, whereas women will often use various (traditional) nets and baskets. However, results from the Household Survey indicate that the traditional division of labor may be changing. While men from 40% of households fished using gill nets in the past fortnight, women from 34% of households also partook in this activity. Similarly, while women from 53% of households fished using nets and baskets, men from 37% of households did also. Certainly, young married couples appear to perform many activities together, including for example, making new gardens and fishing.

It appears that labor is shared between males and females of the same family unit for a range of tasks, including making sago, gardens and houses, even though the roles may differ. Furthermore, the labor burden will be shared when either males or females are sick or have

limited time due to other responsibilities, and some traditional differences in the division of labor may be eroding.

Photo 16: Men making roof thatch from nipa at Avavu

Source: ERIAS Group, 2016a.

While many of the labor practices in the PAOI are similar to those described by Williams almost a century ago, the main changes include:

- An increase in time spent earning income (as Williams observed a subsistence-based economy); and
- A decrease in time allocated to customary practices and making certain artefacts (as these were largely destroyed in the 1950s under the influence of Tom Kabu, and efforts appear not to have been made for their reintroduction).

6.2.4.2 Seasonality

Subsistence and cash-earning activities are heavily influenced by the seasons. Although discussed in more detail in Booyong (2017b), a brief overview is provided here to highlight the implications on labor.

The PAOI receives rainfall year round, with the most rainfall occurring between April and August. The dry season is more pronounced along the coast than inland, with the area around PRL-15 receiving substantially more rainfall year round. The PAOI is relatively warm year round with slightly lower temperatures between May and September.

As most people collect drinking water from tanks, shallow wells and small streams, rainfall has a major impact on the availability of drinking water. People may be required to travel further to collect drinking water during dry periods, or they may be forced to drink water of poorer quality. Rainfall affects the water level and water flow, and this in turn affects travel by canoe. This is a major consideration as the majority of Pawaias and people from the Purari delta use canoes to access sago and gardens and to fish and hunt.

Food supplies are also influenced by the seasons: okari and galip nuts are harvested mid-year, while breadfruit and mangoes are harvested around Christmas. As gardens are generally made at the start of the dry season, the first vegetables to be produced, such as pumpkin, corn and watermelons, are also prevalent around Christmas, after which sweet potato will be more common.

Different fish species are more prevalent at certain times of the year, but can be difficult to catch during floods when the water is high, dirty and fast flowing. Crocodiles and turtles lay eggs when water levels are low during the dry season, providing an opportunity for people to supplement their diet with their eggs. Conversely, the wet season is often regarded as an opportune time to hunt, as animals can be stranded on higher areas of land. On the coast, strong

southeast trade winds occur mid-year and can limit ocean fishing activities and sea travel. Strong winds can also inflict damage to houses.

Daily activities are therefore influenced by seasons and the weather, and this affects the choice of activities that men, women and children undertake on a daily basis.

Generally across the PAOI, participants in community and household surveys perceived adequate quantities of food being available for most people most of the time under normal environmental conditions. Food security could be threatened during times of significant flooding and drought (e.g. El Nino events), but generally there was considered enough to eat. As described above, the availability of certain plant and animal foods is, in many cases, seasonal but generally when one item is not available, another is and most communities have access to sago and coconuts (famine foods) all of the time. The seasonal influences on food availability and adequacy of availability of food for subsistence are discussed further in the Booyong (2017b) and NewFields (2017).

6.2.4.3 Occupations

The main occupations of people from the PAOI, aged 16 years and above, is summarized in Table 23. As shown in Table 23, 63% of males and 76% of females aged 16 years and above were engaged primarily in subsistence activities. Approximately 15% of males and 7% of females were employed, while only one male, who was from Orokolo, identified their main occupation to be business activities.

A relatively low proportion of males and females were retired or disabled, while 12% of males and 7% of females were attending school. Around 8% of all males and 5% of all females aged 16 years and above indicated that they were unemployed but looking for work. Particularly high numbers of people from Pawaian and Iare villages, and Evara, indicated they were looking for work. For the Pawaian villages and Evara, this may be due to previous work experience with InterOil or Frontier Holdings, respectively.

Labor force information, utilizing the above information, is presented in Table 24.

As shown in Table 24, the labor force participation rate is 86% for males and 88% for females. This is high in comparison to estimates for Papua New Guinea in 2011, which included estimates of 62% for males and 60% for females. This may be higher in the PAOI due in part to low attendance in schools and other training institutions, and in part due to a normal practice of continuing with subsistence activities well into retirement age.

Table 24 also indicates that 9% of males and 6% of females are unemployed and looking for work. This is high in comparison to estimates for Papua New Guinea, in which 4% of males and 1% of females were said to be unemployed in 2011. Table also indicates that 17% of males and 8% of females aged 16 years and above have formal employment or full-time business activities. Overall this represents 13% of the workforce, compared to 16% for Papua New Guinea as a whole in 2011. Thus, while some parts of the PAOI have had considerable employment opportunities and experience in the past, the majority of the workforce continues to be engaged primarily in subsistence activities.

Table 23: Main Occupation (People Aged 16 Years & Above)

Language Group	Subsistence	Employed	Business	Retired	Disabled	School	Un-employed
Pawaia - males	54%	24%	0%	2%	0%	8%	11%
Pawaia – females	80%	6%	0%	5%	0%	5%	4%
Ahia – males	65%	9%	0%	0%	0%	13%	13%
Ahia – females	78%	6%	0%	0%	0%	17%	13%
Koriki – males	55%	8%	0%	3%	0%	15%	7%
Koriki – females	78%	5%	0%	3%	0%	12%	2%
Iare – males	60%	14%	0%	0%	0%	14%	13%
Iare – females	72%	8%	0%	1%	0%	7%	12%
Kaimare – males	63%	25%	0%	4%	4%	0%	4%
Kaimare – females	79%	11%	0%	0%	0%	4%	7%
Maipua – males	64%	12%	0%	0%	0%	24%	0%
Maipua – females	90%	7%	0%	0%	0%	4%	0%
Orokolo – males	71%	11%	<1%	2%	1%	12%	4%
Orokolo – females	74%	7%	0%	6%	1%	8%	4%
TOTAL – males	**63%**	**15%**	**<1%**	**2%**	**<1%**	**12%**	**8%**
TOTAL - females	**76%**	**7%**	**0%**	**4%**	**<%**	**7%**	**5%**

Source: ERIAS Group, 2016b.

Table 24: Labor Force Statistics, 2011

Category	Male	Female	Total
Population aged 16 years & above	675	623	1,298
Labor force	578	551	1,129
Employed	525	519	1,045
In business	1	0	1
Unemployed	52	32	84
Not in the labor force	97	72	169
Not stated	61	89	150
Labor force participation rate	86%	88%	87%
Formal employment as % of the workforce	17%	8%	13%
Unemployment rate	9%	6%	7%

Source: ERIAS Group, 2016b.

6.2.4.4 Formal Employment

The number of males and females with formal wage employment is shown in Table 25.

Table 25: Current Employment (People Aged 16 Years & Above)

Employment Type	Males		Females		Total
	Number	%	Number	%	%
Laborer	6	6	2	0	4
Pastor	8	8	2	5	7
Policeman	5	5	0	0	3
Village court officials/ ward councilors	10	10	5	12	10
Logging/milling	6	6	0	0	4
Loadmaster	3	3	1	2	3
Driver	3	3	0	0	2
Carpenter	10	10	1	2	8
Mechanic	1	1	1	2	1
Electrician	1	1	0	0	1
Welder	1	1	0	0	1
Stevedore	1	1	0	0	1
Admin/finance	2	2	2	5	3
Cook/catering	5	5	2	5	5
Security	4	4	2	5	4
Cleaner	2	2	0	0	1
Teacher	9	9	16	37	17
Health worker	4	4	1	2	3
Other	19	19	8	19	19
TOTAL	**100**	**100**	**43**	**100**	**100**

Source: ERIAS Group, 2016b.

As shown in Table 25, 100 males and 43 females from the households surveyed included people with current employment. The most common jobs included teachers, village court officials and ward councilors, pastors, carpenters, cooks and laborers. Six males (6%) but no females from the PAOI are employed in logging.

Table 26 shows that 9 males (9%) are currently employed by logging companies (there are a greater number of people who are employed by logging companies than who described themselves as loggers or millers as while they work for logging companies they perform roles such as drivers and mechanics). Logging companies employ 7% of the males and females from the PAOI involved in the household survey who were in formal employment. Despite the occurrence of logging operations in the PAOI, the low employment levels may indicate low pay and poor conditions for local logging jobs.

The employer for those people from the PAOI with wage employment is shown in Table 26 and illustrated in Figure 22. Note that employment data presented below is derived from a survey of households. TEP PNG and other employers listed, employ more people that recorded in the survey.

Table 26: Current Employer

Employer	Males		Females		Total
	Number	%	Number	%	%
Logging company	9	9	0	0	7
TEP PNG	16	16	1	3	13
Church group	14	14	11	33	19
Government	26	26	16	5	32
PNG LNG	0	0	0	0	0
Other	34	34	5	2	30
TOTAL	**99**	**100**	**33**	**100**	**100**

Source: ERIAS Group, 2016b.

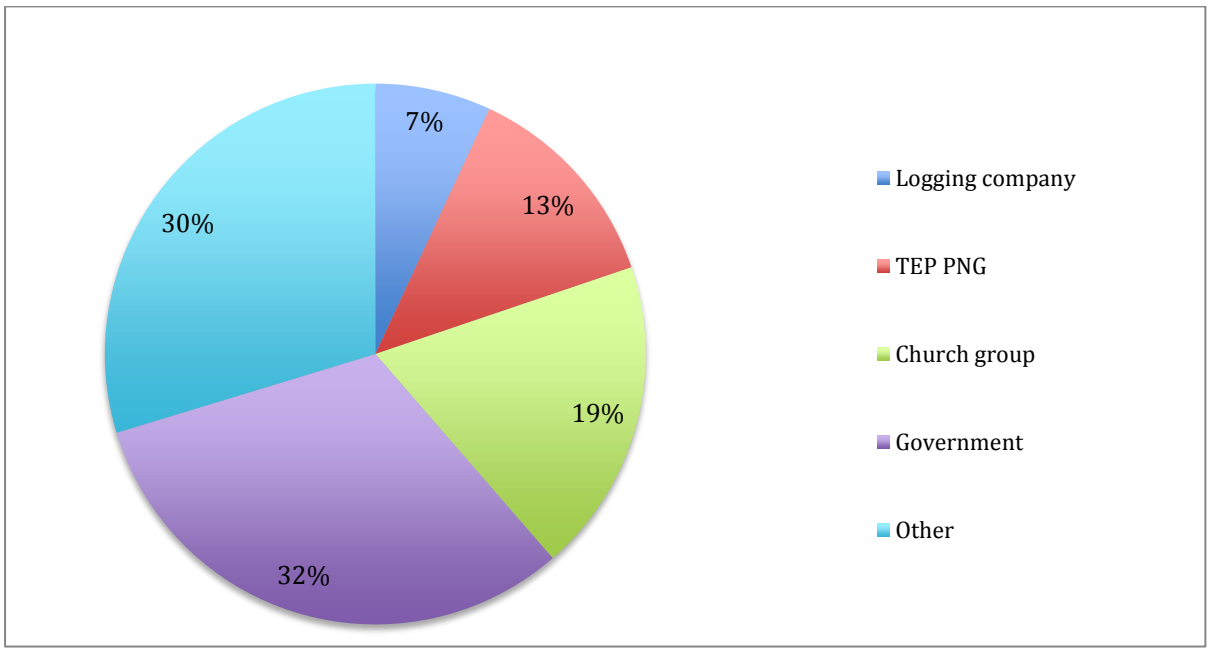

Figure 22: Main Employers in the Direct PAOI

Source: ERIAS Group, 2016b.

As shown in Table 26, the major employer in the PAOI is the government (32% of employees), followed by church groups (19% of employees) and TEP PNG (13% of employees). Other employers represented 30% of employees. It is expected that this includes employees working in stores in the PAOI, and in stores and other business activities outside the PAOI (discussed below).

The location of formal wage employment is summarized in Table 27 and shows that 60% of employees work in the village in which they reside. This is likely to include most government employees (teachers, health workers and village court officials). An additional 25% of employees work elsewhere in the village. This will include those people employed by TEP PNG and some logging companies. A further 15% work outside the LLG or outside Gulf Province, presumably engaged on a work roster that allows them to return home during breaks. Interestingly, 84% of those people working outside the LLG or Province are male, indicating how difficult it is for females to travel for their work.

Table 27: Location of Current Employment

Location	Males (Number)	Females (Number)
In village	53	25
Other location in LLG	26	7
Outside LLG	4	1
Outside province	12	2
TOTAL	95	35

Source: ERIAS Group, 2016b.

The number of males and females with previous employment experience is shown in Table 28.

Approximately 46% of males and 14% of females aged 16 years and above indicated that they had some previous formal work experience. As shown in Table 28, the most common types of employment included laboring positions, logging/milling, admin/clerical positions, carpenters, cooks/catering, pastors and security. However, a range of additional technical positions was also identified, including plumbers, plasterers, painters and surveyors.

6.2.5 Income

PAOI communities are no longer willing to live a subsistence lifestyle. Cash income is required for clothes, housing materials, household items, batteries, soap, tea, travel and education costs. Estimating income levels is difficult in communities in which the majority of income is opportunistic rather than regular (such as permanent employment or ongoing business activities). As discussed in Section 6.2.4, households have earned income in the past from copra, crocodile skins, timber, fish, crabs, shellfish, sago, betel nut and other products. In general, people are quick to respond to market opportunities: it is their isolation and high transportation costs that have greatly limited these opportunities, and therefore, their income levels.

Table 28: Previous Employment Experience

Employment Type	Males (Number)	Females (Number)
Laborer	54	8
Pastor	23	9
Policeman	1	0
Village court officials/ councilors	3	1
Logging/milling	33	8
Fisher	5	0
Driver	13	5
Carpenter	37	0
Mechanic	9	1
Electrician	7	0
Welder	6	0
Pipefitter	2	0
Loadmaster	13	2
Stevedore	2	1
Supervisor	2	2
Operations/Maintenance	8	0

Employment Type	Males (Number)	Females (Number)
Admin/office/clerical	21	17
Cook/catering	30	6
Security	29	1
Cleaner	1	2
Teacher	6	5
Health worker	1	2
Other technical jobs	17	3
Other	27	25
TOTAL	**350**	**98**

Source: ERIAS Group, 2016b.

6.2.5.1 Source and Level of Household Income

During the Household Survey, households were asked what their main three sources of income were over the previous year, and how much they earned from each of these sources. Households were also asked to recall all forms of income over the previous two-week period. This dual approach provided recall of the major sources of cash income (some of which may be seasonal or irregular), with the added detail from the previous two-week period.

As income recall can be difficult, particularly over a period as long as a year, households were only asked what their three main sources of income have been over the past year, and how much money they had earned from each of these sources.

The main sources of household income in the PAOI over the previous year, is summarized in Table 29.

Table 29: Main Source of Household Income

Language Group	Wages	Betel Nut	Sago	Garden Produce	Fish	Trade Store	Other Business	Remittances	Other
Pawaia	13	10	4	21	6	3	3	0	13
Ahia	1	3	3	1	4	0	0	0	2
Koriki	3	3	13	3	7	0	7	0	7
Iare	4	11	6	4	18	0	2	1	8
Kaimare	1	2	0	2	21	1	0	0	9
Maipua	2	2	1	0	8	0	1	2	0
Orokolo	9	20	24	10	7	4	5	2	6
TOTAL	**33**	**51**	**51**	**41**	**70**	**8**	**18**	**5**	**45**

Source: ERIAS Group, 2016b.

As shown in Table 29, the main sources of cash income were fish (20% of households), sago and betel nut (both 14% of households) and garden produce (12% of households). Wages provided the main source of income for 9% of households, and business activities the main source of income for an additional 7% of households. A wide range of 'other' main sources of income were identified, the most frequent being the sale of pigs, bush meat, including wild pigs, bandicoots and possums, mud crabs, coconuts, black markets (which could entail the sale of virtually

anything), and logging royalties. In all, 76% of households identified their main income source as a product derived directly from the local environment (that is, a product which they produced or harvested and sold).

The top three sources of household income over the previous year are combined and shown in Table 30.

Table 30: Top Three Sources of Household Income

Language Group	Wages	Betel Nut	Sago	Garden Produce	Fish	Trade Store	Other Business	Remittances	Other
Pawaia	19	32	21	46	27	4	6	2	36
Ahia	2	9	7	2	13	0	0	0	32
Koriki	5	17	25	11	25	0	4	0	14
Iare	5	23	28	15	39	1	7	4	35
Kaimare	2	5	5	3	34	2	2	0	39
Maipua	2	4	11	4	15	0	1	0	5
Orokolo	14	81	63	51	32	6	17	7	31
TOTAL	**49**	**171**	**160**	**132**	**185**	**13**	**37**	**13**	**192**

Source: ERIAS Group, 2016b.

As shown in Table 30, fish, betel nut, sago and garden produce again dominate the main sources of household income.

The level of income from the top three sources of household income over the previous year is shown in Table 31.

Table 31: Annual Household Income from the Top Three Income Sources

Language Group	Average		Median		Maximum		Minimum	
	PGK	USD	PGK	USD	PGK	USD	PGK	USD
Pawaia	5,229	1673	1,040	333	84,000	26,880	20	6
Ahia	3,073	983	1,140	365	24,000	7,680	50	16
Koriki	1,564	500	600	192	13,000	4,160	30	10
Iare	2,203	705	750	240	21,000	6,720	30	10
Kaimare	1,920	614	1,020	326	21,810	6,979	80	26
Maipua	1,965	629	780	250	30,000	9,600	90	29
Orokolo	2,214	708	600	192	108,000	34,560	4	1
TOTAL	**2,780**	**890**	**720**	**230**	**108,000**	**34,560**	**4**	**1**

Source: ERIAS Group, 2016b.

As shown in Table 31, the amount of household income earned from the three main income sources in the past year varies substantially, from a low of PGK4 (USD1.3) to a high exceeding PGK100,000 (more than USD32,000). The median income, at PGK720 (USD230) per household, equates to PGK108 per capita.

The distribution of annual household income – derived solely from the three main income sources – is shown in Figure 23.

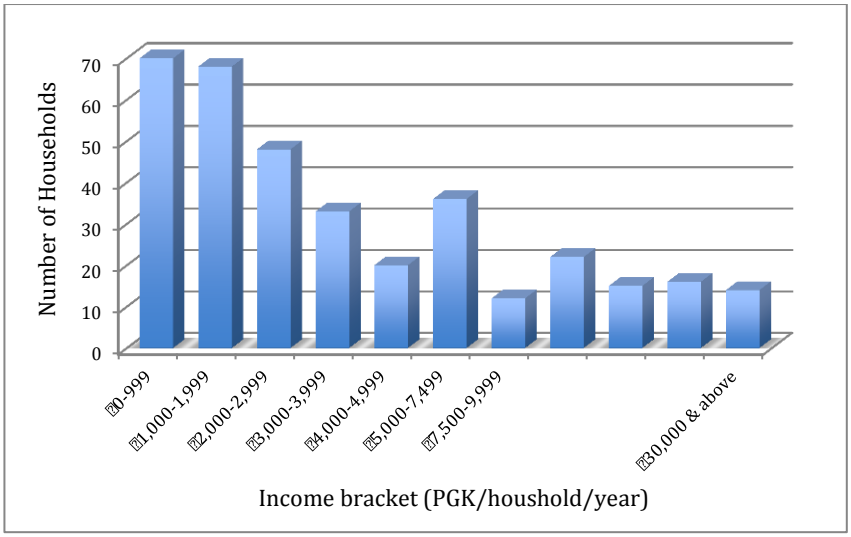

Figure 23: Household Income Distribution (from three main income sources), PGK per Annum

Source: ERIAS Group, 2016b.

As shown in Figure 23, around 20% of households surveyed indicated that their annual income, from the three main income sources, was less than PGK1,000, and another 20% of households indicated that their annual income, from the three main sources, was less than PGK2,000. At the other end of the scale, almost 20% of households indicated that their annual income, from the three main sources, was PGK10,000 or more.

To reduce problems with the accuracy of recalling information over a long-time period, households were asked to recall all sources of income, and the amount earned, over the previous two weeks. A summary of the results is presented in Table 32.

Table 32: Household Income Past Two Weeks

Language Group	Average/ Fortnight		Median/Fortnight		Maximum/Fortnight		Median Income per Capita	
	PGK	USD	PGK	USD	PGK	USD	PGK	USD
Pawaia	584	187	95	30	6,180	1,978	12	4
Ahia	438	140	170	54	1,630	522	24	8
Koriki	150	48	44	14	1,170	374	5	2
Iare	211	68	54	17	1,500	480	7	2
Kaimare	218	70	85	27	950	304	22	7
Maipua	240	77	28	9	1,740	557	4	1
Orokolo	252	81	98	31	1,950	624	13	4
TOTAL	**299**	**96**	**80**	**26**	**6,180**	**1,978**	**12**	**4**

Source: ERIAS Group, 2016b.

As shown in Table 32, the average fortnightly income was PGK299 (USD96) per household. However, this was heavily skewed as a result of a few, relatively high incomes. The median income level, which is often a better reflection of the population, was PGK80 (USD26) per household per fortnight, which could be extrapolated to PGK2,080 (USD666) per household per annum. When expressed on a per capita basis, this is PGK312 (USD100) per capita per annum.

As noted in Table 32, income levels varied from zero to PGK6,180 (USD1,978) over the previous fortnight. The distribution of household income levels is shown in Figure 24.

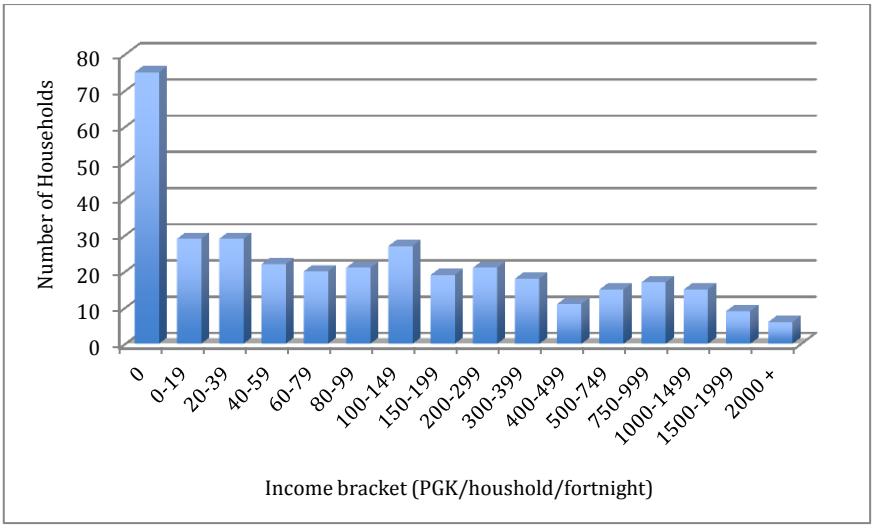

Figure 24: Household Income Distribution, PGK per Fortnight

Source: ERIAS Group, 2016b.

As shown in in Figure 24, 21% of households recorded no cash income in the past fortnight, while 55% of households earned less than PGK100 and 92% of households earned less than PGK1,000 (USD320). A total of 30 households earned more than PGK1,000 (USD320) in the previous two weeks, with the maximum for one household of PGK6,180 (USD1,978).

The number of households recording each type of income is shown in Figure 25, and confirms the information presented in Table 30, that the main sources of cash income are from the sale of betel nut, sago, garden produce, fish, *brus* (tobacco) and crabs.

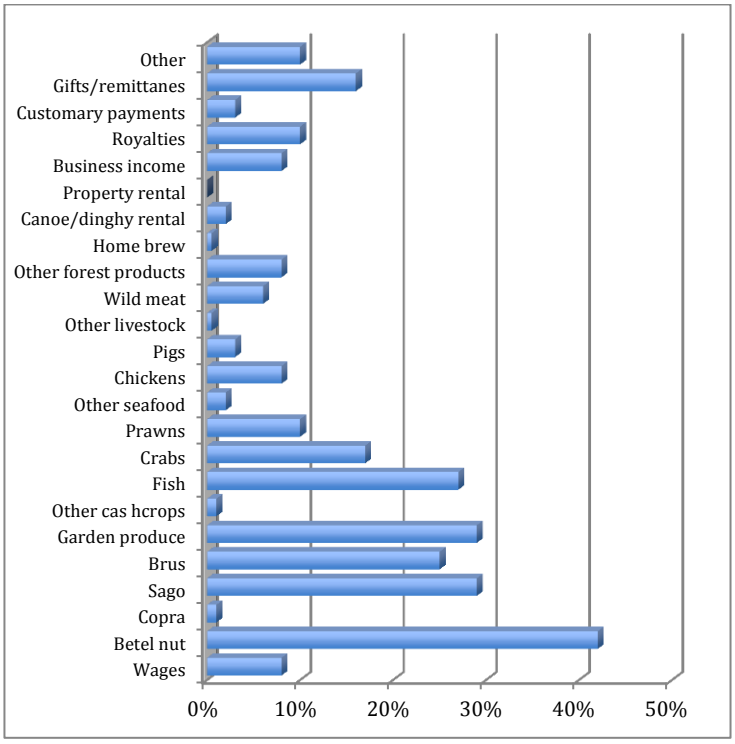

Figure 25: Households Income Sources in the Past Two Weeks

Source: ERIAS Group, 2016b.

The average income earned by those households selling each type of income is shown in Figure 26.

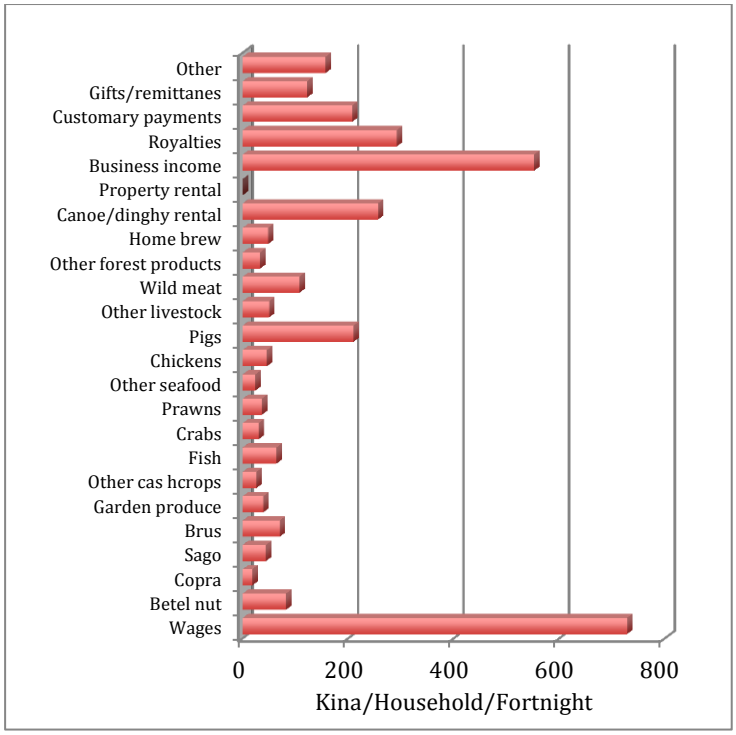

Figure 26: Average Income Earned by Source, Past Two Weeks

Source: ERIAS Group, 2016b.

As shown in Figure 26, the highest levels of income were earned from wages and business activities. Households with wage earners received an average of PGK730 (USD234) in the past fortnight from wage payments, while households with business activities received PGK550 (USD176) in the past fortnight from business income. Other relatively high amounts of income were received as royalties, canoe or dinghy hire, the sale of pigs and customary payments, all of which tend to be received in relatively large but infrequent amounts.

The amount received by each household from the sale of local products, including betel nut, sago, fish, crabs and garden produce was low. However, as noted in Figure , it provided income for a much larger number of households. The total value of different types of income over the previous fortnight is summarized in Figure 27.

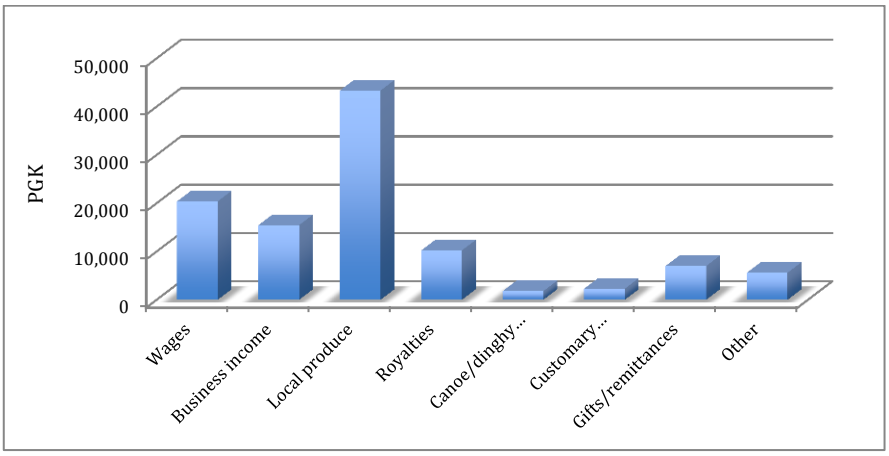

Figure 27: Aggregate Income Over the Past Two Weeks

Source: ERIAS Group, 2016b.

Despite high individual incomes for wage earners and business operators, 48% of all income recorded in the Household Surveys for the previous two weeks was derived from local products.

As shown in Figure 27, the combined value of all local products dwarfed the other income sources.

One of the main constraints to household income, identified during the SBS, was access and high transport costs. Added to this, relatively few buyers visit the PAOI to buy local products, as shown in Table 33.

When buyers come to the village they often arrive by dinghy and buy as much produce as can be loaded into the dinghy before departing to other parts of Papua New Guinea to re-sell the produce. As observed during the SBS, a small group of men had travelled by road from the Highlands to Kikori, where they hired a dinghy, travelled to the Orokolo area and purchased large quantities of betel nut at wholesale prices. The betel nut would be taken back to the Highlands, via Kikori, and sold at greatly inflated prices.

Despite having limited markets in the PAOI, and few buyers, many people are resourceful when it comes to earning income. The large number of income sources identified during the Household Survey demonstrates this. The number of income sources that households identified during the previous two weeks is shown in Figure 28.

Table 33: Villages in which Buyers Come to the Village

Language Group	Villages Surveyed	Yes		No	
		Number	Name	Number	Name
Pawaia	5	2	Subu, Subu 2	3	Poroi 2, Ura, Wabo
Ahia	1	1	Evara	0	N/a
Koriki	4	3	Akoma-Kairu'u, Ara'ava, Ikinu	1	Kairimai
Iare	5	2	Aumu, Kaevaria	3	Aivai, Maipenairu, Mapaio
Kaimare	2	1	Mariki	1	Upaia
Maipua	1	1	Apiope	0	N/a
Orokolo	13	7	Avavu, Ere-Kilavi, Iuku, Kaivukavu, Kavava, Mareke, Paevera	6	Harevavo, Hepere, Huruta, Larihairu, Marea, Oru-Lariau-Herekela
TOTAL	**31**	**17**		**14**	

Source: ERIAS Group, 2016b.

As shown in Figure 28, 43% of households recorded three or more sources of income in the previous two weeks, and seven households (2% of households surveyed) recorded 10 or more income sources. This provides some indication of the number of local products that can be sold, and also the skills within the PAOI to be able to commercialize so many products within a short period of time.

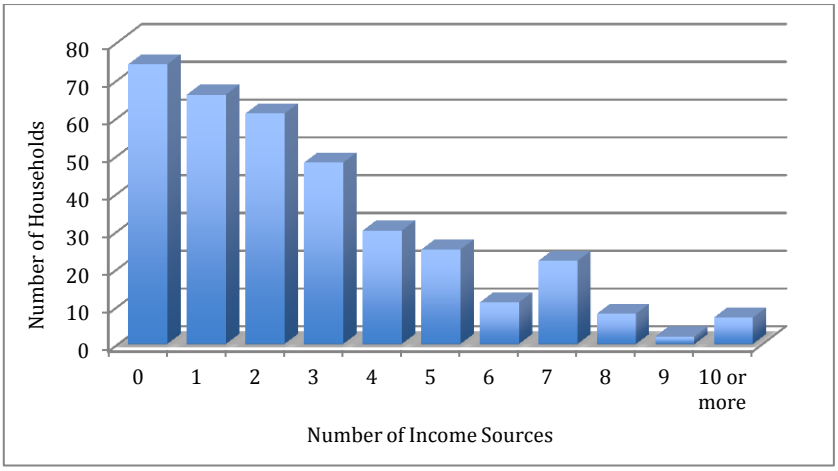

Figure 28: Number of Income Sources per Household, Past Two Weeks

Source: ERIAS Group, 2016b.

6.2.5.2 Business Income

As noted in Section 6.2.4.4, the businesses operating in the PAOI are generally quite small and many, if not all, are not registered. Some operate intermittently, making it difficult to distinguish between an ongoing business activity and an ad hoc opportunity to earn income. Ongoing business activities are generally considered to be those that are performed regularly and contribute a sizeable proportion of the household's income. Furthermore, the activity generally requires an outlay in cost before income is received, distinguishing business activities from the sale of local produce. Based on these criteria, the Household Survey contained 38 households with business activities. These businesses are summarized in Table 34.

Table 34: Business Income and Expenditure

Business Type	Number of Commercial Operators	Average Annual Income	
		PGK	USD
Trade stores	13	12,000	3,840
Fuel sellers	10	9,000	2,880
Canoe/dinghy hire	5	29,000	9,280
Chainsaw hire	3	12,000	3,840
Clothes sales	2	6,000	1,920
Crocodiles	2	4,000	1,280
Other	3	20,000	6,400
TOTAL	**38**	**12,000**	**3,840**

Source: ERIAS Group, 2016b.

Although specific information is not available, discussions with business owners indicate that most businesses rely entirely on family labor, and do not pay wages.

While information was collected on business income and costs, the quality of that information is relatively poor and information on business costs will not be presented in this report. It is likely that in some cases the respondent was unwilling to provide reasonable estimates of business income and costs, while in others, the information was likely not available. It is believed that few businesses maintain an accurate set of accounts. For the same reason, information on business profit levels will not be presented in this report, however, it appears, from those questionnaires with relatively complete information, that profit levels may be quite high. Nonetheless, business risks are not insubstantial, as most business people will procure goods from Port Moresby or Kerema and have to transport them back to the PAOI. There is always a

risk of damage or loss of goods during transportation, as accidents at sea are relatively common, and businesses are unlikely to have any insurance cover.

6.2.5.3 Household Expenditure

The level of household expenditure in the two weeks prior to the household survey is shown in Table 35.

As shown in Table 35, the average fortnightly expenditure was PGK283 (USD91) per household. The median expenditure level was PGK76 (USD24) per household per fortnight or PGK1,976 (USD632) per household per annum. This equates to PGK286 (USD92) per person per annum.

The distribution of household expenditure is shown in Figure 29.

Table 35: Expenditure Past Two Weeks

Language Group	Average/ Fortnight		Median/Fortnight		Maximum/Fortnight		Median Expenditure per Capita/Fortnight	
	PGK	USD	PGK	USD	PGK	USD	PGK	USD
Pawaia	436	140	102	33	6,060	1,939	13	4
Ahia	406	130	153	49	2,754	881	22	7
Koriki	92	29	32	10	687	220	4	1
Iare	352	113	55	18	6,850	2,192	7	2
Kaimare	136	44	74	24	713	228	20	6
Maipua	170	54	50	16	900	288	7	2
Orokolo	265	85	98	31	4,823	1,543	13	4
TOTAL	**283**	**91**	**76**	**24**	**6,850**	**2,192**	**11**	**4**

Source: ERIAS Group, 2016b.

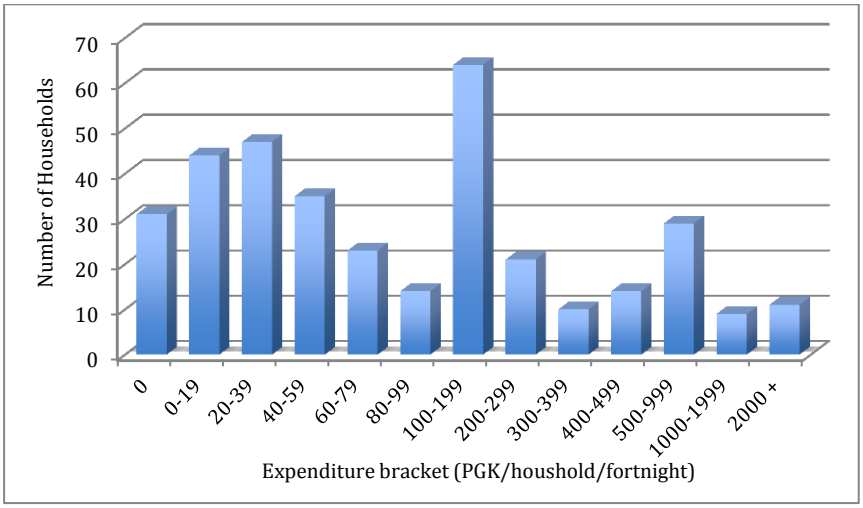

Figure 29: Household Expenditure Distribution, PGK per Fortnight

Source: ERIAS Group, 2016b.

As shown in Figure 29, 9% of households recorded no expenditure in the past fortnight, while 55% of households recorded expenditure of less than PGK100 (USD32). Only 20 households (6% of households surveyed) recorded expenditure of PGK1,000 (USD320) or more in the previous fortnight, with the maximum for any household being PGK6,850 (USD2,192).

The number of households recording expenditure on various items is shown in Figure 30 and illustrates that more than 60% of households surveyed had spent some money on store food,

batteries and other store products in the past two weeks. The other most common types of expenditure were on tobacco, church donations and food from the market.

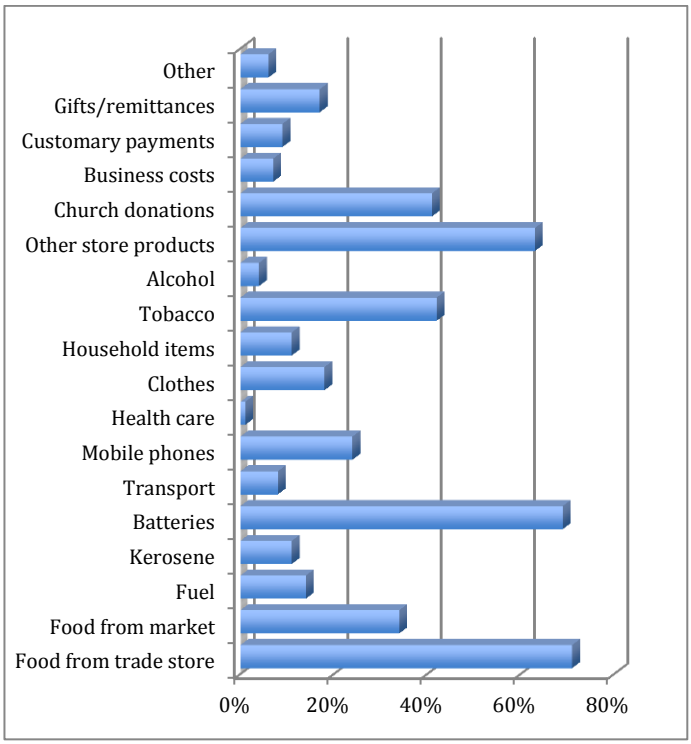

Figure 30: Households with Expenditure on Specific Items in the Past Two Weeks

Source: ERIAS Group, 2016b.

The average expenditure for households expending money on each item is shown in Figure 31.

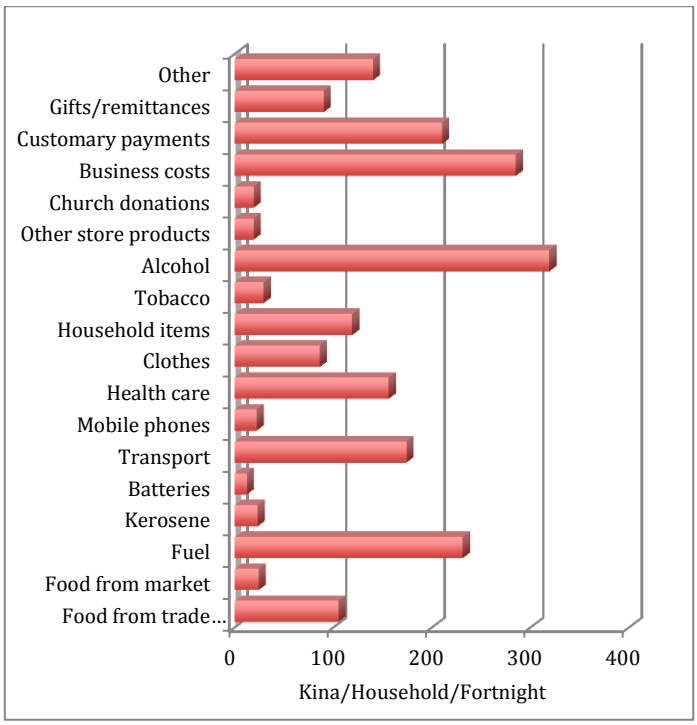

Figure 31: Average Expenditure per Item, Past Two Weeks

Source: ERIAS Group, 2016b.

As shown in Figure 31, the highest expenditure (for households recording expenditure on each particular item) over the previous two weeks was alcohol (PGK319/USD102), business costs

(PGK285/USD91), fuel (PGK231/USD74), customary payments (PGK210/USD67) and transport (PGK174/USD56).

The aggregate level of expenditure over the previous two weeks is shown in Figure 32 and illustrates that the highest expenditure is on food (29% of all expenditure), followed by fuel and transport costs (16% of all expenditure), alcohol and tobacco (9% of all expenditure) and customary payments and business costs (both 7% of all expenditure).

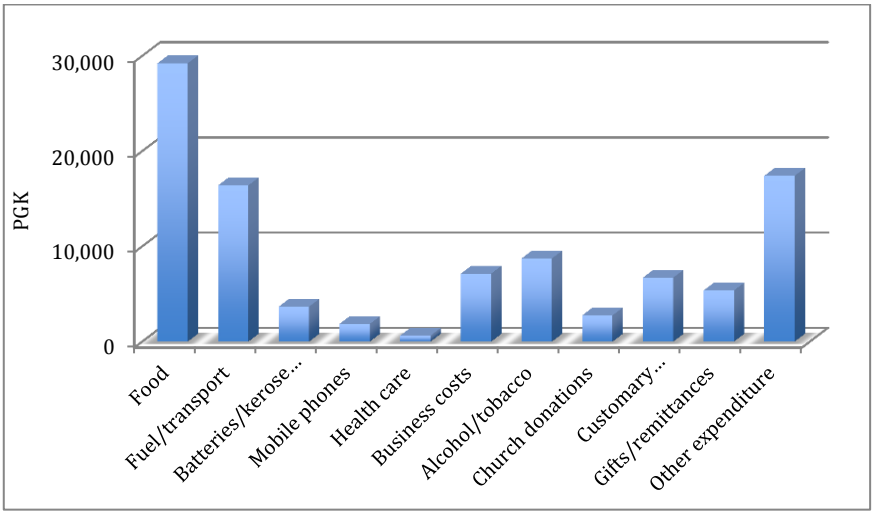

Figure 32: Aggregate Expenditure by Item, Past Two Weeks

Source: ERIAS Group, 2016b.

Other expenditure in Figure 32 included clothes, household items, other store products and other (unclassified). As many people buy clothes, household items and store food from Port Moresby, Kerema and other centers, a relatively low proportion of total expenditure is likely to be expended in the PAOI. Although additional details would be required to confirm this, it is estimated, based on the results from the Household Surveys, that no more than 50% of all expenditure occurs within the PAOI, and at least 50% occurs in other areas. This will have implications when estimating the indirect benefits of the Project, as much of the increase in expenditure is likely to be from outside the PAOI.

6.2.5.4 Income and Expenditure

The aggregate level of income recorded in the Household Survey over the previous two weeks was PGK106,000 (USD33,920). This compares to aggregate expenditure of PGK100,000 (USD32,000). At a household level, the median income was PGK80 (USD26) and median expenditure was PGK76 (USD24) for the previous two weeks. The difference implies some savings within the PAOI as a whole, although each household will be different. A simple analysis of household income and expenditure has been undertaken, with income less expenditure calculated for each household for the previous two-week period. Results are shown in Figure 33 and indicate that 58% of households had income and expenditure that was more or less in balance (within PGK100 (USD32) each way).

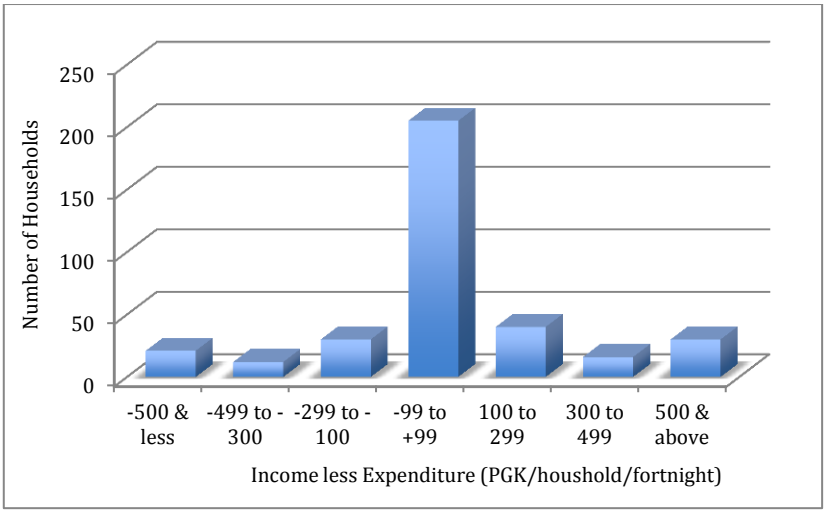

Figure 33: Household Income Less Expenditure, PGK per Fortnight

Source: ERIAS Group, 2016b.

As shown in Figure 33, around 6% of households spent more than PGK500 (USD160) than they had earned in the previous two weeks, while around 9% of households earned more than PGK500 (USD160) than they spent in the past two weeks. This is not unexpected given (i) several key sources of income are received infrequently (for example, sales of betel nut and wild meat, along with royalties, gifts, remittances and customary payments) and (ii) some people outlay a large amount of money to travel outside the PAOI, where they will buy most of what they need for several months or more. In addition, the income and expenditure data includes business income and expenditure, so any stock bought will be included in the household data.

6.2.6 Prices

6.2.6.1 Food Prices

Information from the Household Surveys conducted in the PAOI in 2016 indicates that the majority of food consumed is derived from subsistence sources. However, the price of various store products was recorded as part of the SBS. Limited opportunity was available for recording the price of food and other products sold in local markets. The only market in which the weight and price of food was recorded was in Kaivukavu on 28 May 2016.

The price of store food varied substantially within the PAOI, and is relatively high in comparison to the cost of the same products in Kerema. The price of rice and tinned fish in stores in Port Moresby, Kerema and the PAOI are shown in Figure 34.

As shown in Figure 34, prices of rice and tinned fish varied substantially within the PAOI. Rice averaged around 16% higher than in Kerema and 66% higher than in Port Moresby, while tinned fish averaged 41% higher than in Kerema and 64% higher than in Port Moresby.

The highest prices were recorded in the Pawaia villages, presumably because they faced the highest freight costs. Prices in certain POAI villages were relatively low, such as Evara, where freight may have been subsidized by the logging company, and Ara'ava, where freight for Kapuna may have been subsidized by InterOil and subsequently TEP PNG. The range of store products available in the PAOI was generally quite limited. Most stores sold only the most basic items, as shown in Photo 17, which generally included rice, tinned fish, tea, sugar, salt and noodles.

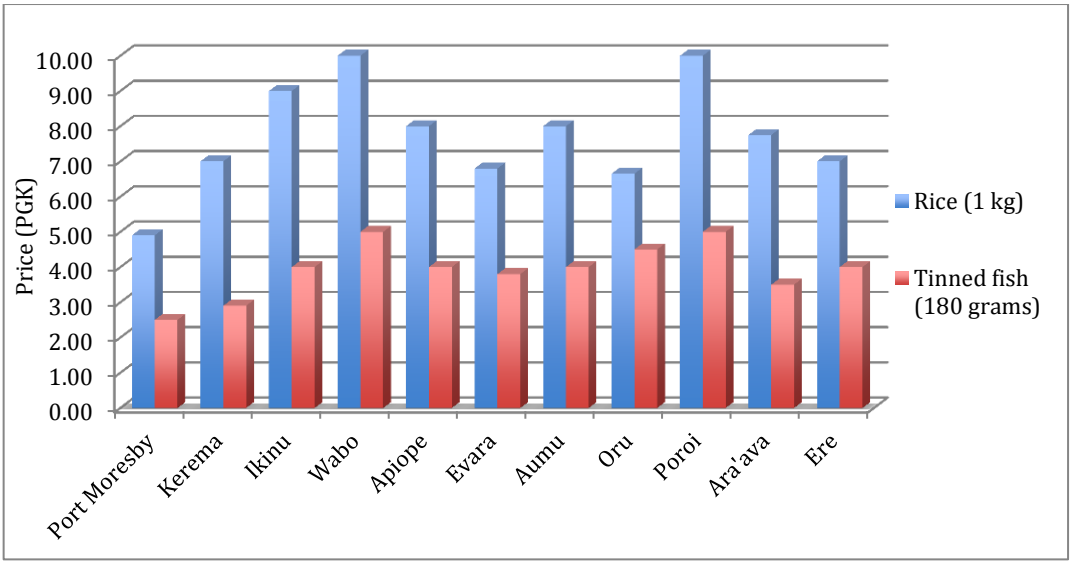

Figure 34: Rice and Tinned Fish Prices, 2016

Source: ERIAS Group, 2016b.

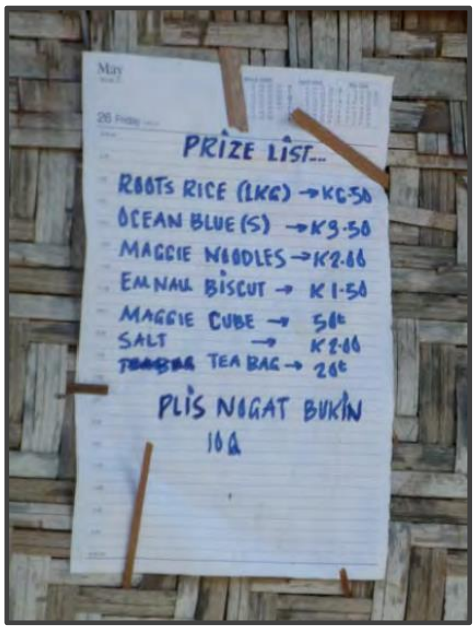

Photo 17: Price list at a Harevavo store

Source: ERIAS Group, 2016b

The price of various food items sold in the market in Kaivukavu is shown in Figure 35. Other than for three samples of cooking bananas, the unit price of all other produce is based on one sample only.

Although limited produce was weighed in the market at Kaivukavu, the price of freshly caught shark, salmon and catfish was quite similar, varying from PGK 11.90 to PGK 13.75 (USD3.80 to USD4.40) per kg. Also, as shown in Figure 35, the price of green vegetables was relatively uniform, varying from PGK 1.59 (USD0.51) per kg for pumpkin leaves to PGK 4.17 (USD1.33) per kg for aibika. The only staples weighed were cooking bananas, which averaged PGK 2.04 (USD0.65) per kg, and cassava, which cost PGK 2.63 (USD0.84) per kg. The price of pumpkin was unexpectedly high.

The price of chickens in the PAOI is generally around PGK20 (USD6.40), while pigs can cost from PGK70 to PGK500 (USD22 to USD160) depending on size.

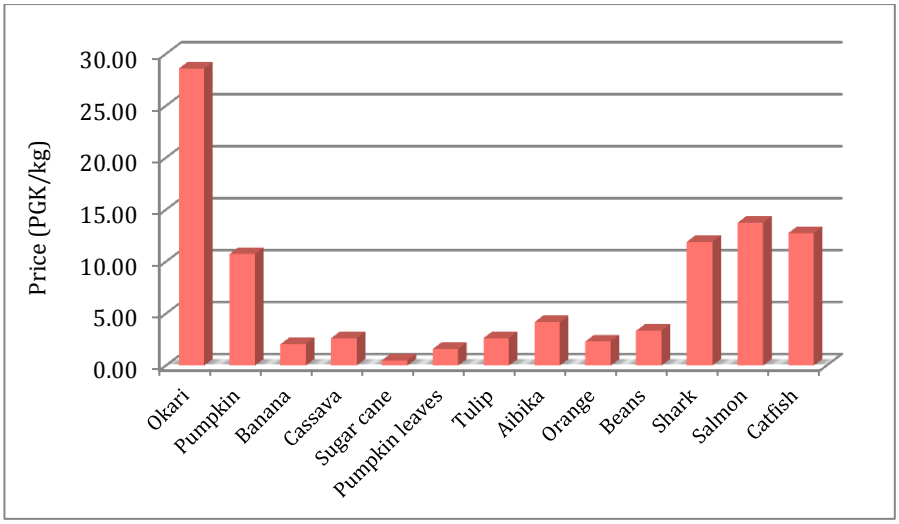

Figure 35: Price of Market Food Items at Kaivukavu, May 2016

Source: ERIAS Group, 2016b.

6.2.6.2 Transport Prices

Charter flights from Wabo to Port Moresby cost PGK900 (USD288) one way, while from Wabo to Goroka cost PGK400 (USD128) one way.

The price of a dinghy fare from the Purari coastal areas to Kerema is about PGK200 (USD64) per passenger (with extra costs for freight). The cost of a PMV fare from Kerema to Port Moresby is PGK50 (USD16) each way, again, with extra charges for freight. The cost to reach Kerema from further up the Purari is higher.

The price of a new 23-foot dinghy and 60 horsepower (hp) outboard motor is more than PGK30,000 (USD9,600). The price of outboard motor fuel, commonly referred to as 'zoom', is typically sold at a price of PGK30 (USD9.60) per gallon in the Orokolo area to PGK40 (USD12.80) per gallon in more remote parts of the PAOI. However, sellers at both Ura and Wabo claimed to be selling zoom for PGK60 (USD19.20) per gallon during the SBS.

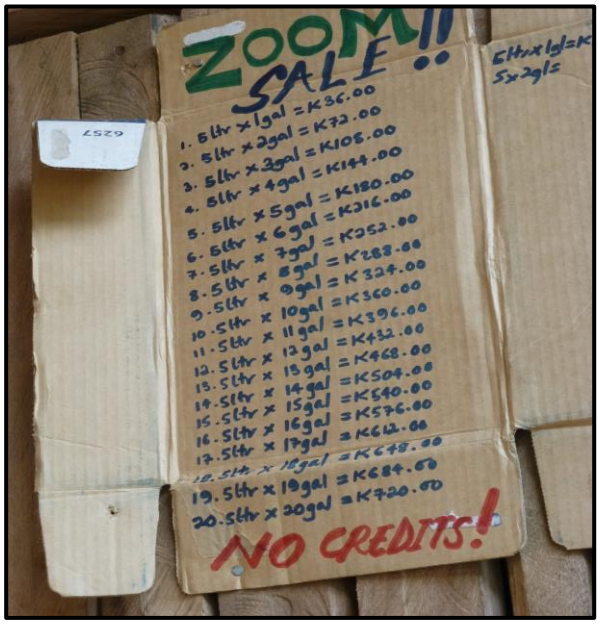

Photo 18: Zoom price list, Avavu.

Source: ERIAS Group, 2016a

6.2.6.3 Bride Price

Bride price is one area that appears to have been substantially commercialized. Williams describes marriage in the Koriki tribe in the 1920s as lacking a feast or great ceremony, and the actual bride price may have consisted of ten arm-shells, ten *mairi* (pearl-shell crescent), a pig and maybe a dog (Williams, 1924, p. 54). The bride price payments in 2016 vary substantially, however, at Aivai, a typical bride price was described as up to PGK5,000 (USD1,600) plus pigs, chickens, cooked food and ornaments. In return, the bride's family will provide food on the day of the wedding.

6.2.7 Women's Participation in the Economy

Groups of women interviewed during the SBS were asked whether women from the village earned income for the household. Results are summarized in Table 36.

Table 36: Do Women Earn Income for the Household

Language Group	Villages Surveyed	Most		Some		No or NR	
		%	Name	%	Name	%	Name
Pawaia	5	20%	Poroi 2	80%	Subu, Subu 2, Ura, Wabo	0%	N/a
Ahia	1	100%	Evara	0%	N/a	0%	N/a
Koriki	4	75%	Akoma-Kairu'u, Ara'ava, Ikinu	25%	Kairimai	0%	N/a
Iare	5	80%	Aivai, Aumu, Maipenairu, Mapaio	20%	Kaevaria	0%	N/a
Kaimare	2	100%	Mariki, Upaia	0%	N/a	0%	N/a
Maipua	1	100%	Apiope	0%	N/a	0%	N/a
Orokolo	13	77%	Avavu, Ere-Kilavi, Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Marea, Oru-Lariau-Herekela, Paevera	23%	Hepere, Larihairu, Mareke	0%	N/a
TOTAL	**31**	**71%**		**29%**		**0%**	

Source: ERIAS Group, 2016a.

As shown in Table 36, most women from 71% of villages in the PAOI earn income for the household, while some women from the remaining 29% of villages earn income for the household. No villages responded that women do not contribute to household income. The lowest apparent contribution to household income occurs in the Pawaia villages, where Wabo, Ura, Subu and Subu 2 all indicated that some women earn income for the household.

One of the main constraints to women earning income is the limited number of markets within the PAOI and the time and cost to travel to markets outside the PAOI. Many women are required to attend to various domestic duties, as discussed in Section 6.2.5.1, and this often precludes

women from travelling to sell produce. There are also barriers to female employment among the Pawaia villages, with anecdotal evidence suggesting resistance from some husbands, fathers or clan leaders to female employment.

Women were also asked if they had their own money to spend. Results are summarized in Table 37.

Table 37: Do Women have their Own Money to Spend

Language Group	Villages Surveyed	Most		Some		None	
		%	Name	%	Name	%	Name
Pawaia	5	40%	Poroi 2, Wabo	40%	Subu, Ura	20%	Subu 2
Ahia	1	100%	Evara	0%	N/a	0%	N/a
Koriki	4	50%	Akoma-Kairu'u, Ikinu	0%	N/a	50%	Ara'ava, Kairimai
Iare	5	60%	Aivai, Maipenairu, Mapaio	40%	Kaevaria	0%	N/a
Kaimare	2	100%	Mariki, Upaia	0%	N/a	0%	N/a
Maipua	1	0%	N/a	100%	Apiope	0%	N/a
Orokolo	13	85%	Avavu, Ere-Kilavi, Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Marea, Mareke, Oru-Lariau-Herekela, Paevera	15%	Hepere, Larihairu	0%	N/a
TOTAL	**31**	**68%**		**22%**		**10%**	

Source: ERIAS Group, 2016a.

As shown in Table 37, the women indicated that in 68% of villages women have their own money to spend. A further 22% of villages indicated that some women had their own money to spend, while the remaining 10% of villages indicated that women did not have their own money to spend. These villages included Kairimai, Ara'ava and Subu 2.

Women were asked whether they were involved in expenditure decision. Results are shown in Table 38 and indicate that most women from 71% of villages do contribute to household spending decisions, with some women from the remaining villages contributing to spending decisions.

Table 38: Do Women Contribute to Spending Decisions

Language Group	Villages Surveyed	Most		Some		None	
		%	Name	%	Name	%	Name
Pawaia	5	0%	N/a	100%	Poroi 2, Subu, Subu 2, Ura, Wabo	0%	N/a
Ahia	1	100%	Evara	0%	N/a	0%	N/a
Koriki	4	50%	Ara'ava, Kairimai	50%	Akoma-Kairu'u, Ikinu	0%	N/a
Iare	5	100%	Aivai, Aumu, Kaevaria, Maipenairu, Mapaio	0%	N/a	0%	N/a
Kaimare	2	50%	Mariki	50%	Upaia	0%	N/a
Maipua	1	100%	Apiope	0%	N/a	0%	N/a
Orokolo	13	92%	Avavu, Ere-Kilavi, Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	8%	Hepere	0%	N/a
TOTAL	**31**	**71%**		**29%**		**0%**	

Source: ERIAS Group, 2016a.

As shown in Table 39, women from very few villages in the PAOI are able to borrow money. As discussed in Section 6.2.3.4, there are very few formal credit lenders in the PAOI for males or females.

The types of products sold by women are shown Table 47, and indicate that the most common products are sago, fish, betel nut and bananas.

Other products sold by women include crabs, prawns and shellfish, coconuts, garden produce and various forest products. Women from Ikinu also said that they made and sold mats and baskets.

As shown in the above tables, most women in the PAOI are quite actively involved in the cash economy, generally contributing to household income and earning some income for themselves. However, there are few markets in the PAOI and income-earning opportunities are therefore limited. Some women's groups undertake business activities, as discussed in Section 6.2.1.5, but these appear to be in their infancy and have limited external support.

Table 39: Are Women Able to Borrow Money

Language Group	Most		Some		None	
	%	Name	%	Name	%	Name
Pawaia	20%	Ura	60%	Subu, Subu 2, Wabo	20%	Poroi 2
Ahia	0%	N/a	0%	N/a	100%	Evara
Koriki	25%	Ara'ava	50%	Akoma-Kairu'u, Kairimai	25%	Ikinu
Iare	0%	N/a	40%	Aumu, Maipenairu	60%	Aivai, Kaevaria, Mapaio
Kaimare	50%	Mariki	50%	Upaia	0%	N/a
Maipua	0%	N/a	100%	Apiope	0%	N/a
Orokolo	15%	Avavu, Paevera	15%	Marea, Kaivukavu	70%	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kavava, Larihairu, Oru-Lariau-Herekela
TOTAL	**16%**		**36%**		**48%**	

Source: ERIAS Group, 2016a.

Table 1: Products Typically Sold by Women

Language Group	Number of Villages	Betel Nut		Sago		Fish		Banana		Other Products	
		Number	Name	Number	Name	Number	Name	Number	Name	Number	Name
Pawaia	5	0	N/a	2	Subu 2, Wabo	0	N/a	3	Poroi 2, Subu, Subu 2	5	Poroi 2, Subu, Subu 2, Ura, Wabo
Ahia	1	1	Evara	1	Evara	0	N/a	1	Evara	1	Evara
Koriki	4	4	Akoma-Kairu'u, Ara'ava, Kairimai, Ikinu	4	Akoma-Kairu'u, Ara'ava, Kairimai, Ikinu	4	Akoma-Kairu'u, Ara'ava, Kairimai, Ikinu	1	Kairimai	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	6	3	Aivai, Kaevaria, Mapaio	4	Aivai, Aumu, Maipenairu, Mapaio	3	Aivai, Aumu, Maipenairu	2	Kaevaria, Mapaio	3	Aivai, Aumu, Kaevaria
Kaimare	2	0	N/a	0	N/a	2	Mariki, Upaia	0	N/a	2	Mariki, Upaia
Maipua	1	0	N/a	0	N/a	1	Apiope	0	N/a	1	Apiope
Orokolo	13	5	Avavu, Ere-Kilavi, Hepere, Huruta, Paevera	11	Avavu, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela	9	Avavu, Harevavo, Hepere, Iuku, Kaivukavu, Larihairu, Marea, Mareke, Oru-Lariau-Herekela	5	Avavu, Ere-Kilavi, Harevavo, Huruta, Kaivukavu	12	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Oru-Lariau-Herekela, Paevera
TOTAL	**32**	**13**		**22**		**18**		**12**		**26**	

Source: ERIAS Group, 2016a.

6.2.8 Women's Assessment of Vulnerable or Disadvantaged Persons

The identification of vulnerable people and/or groups that may be potentially impacted by project development is a requirement of TOTAL's general specifications, the International Finance Corporation's (IFC) Performance Standards on Environmental and Social Sustainability and international good practice and guidance notes from various industry and human rights organizations (such as the Danish Institute for Human Rights and the International Petroleum Industry Environmental Conservations Association(IPIECA)). TOTAL's SBS general specification defines vulnerability as an individual or group's diminished or lack of capacity to understand, anticipate, cope with, resist or recover from the consequences of a potential impact or other threat (TOTAL, 2014, p. 75). IFC Performance Standard 1 (PS1): Assessment and Management of Environmental and Social Risks defines the concept of vulnerability and project sponsor obligations with respect to identifying vulnerable households and paying particular attention to ensuring they are consulted and able to fully participate in project benefits. In this context, vulnerability is an assessment of project impact and will therefore receive more detailed analysis in the Environmental Impact Statement.

In a context such as Papua New Guinea where a majority of people could be construed as vulnerable or disadvantaged, the criteria used by community members to discriminate those amongst them that are particularly vulnerable is often a useful starting point for identifying those that need particular attention as required by IFC PS 1. Based on the full suite of baseline data, including that presented in this report, more comprehensive criteria for screening and identifying vulnerable and disadvantaged households will be developed. Once directly impacted communities have been identified, a procedure will be developed to register vulnerable persons and groups as the basis for meeting PS 1 and TOTAL's requirements.

A preliminary assessment is presented below, noting that there is no Tok Pisin term for 'vulnerability', thus FGDs explored alternative concepts such as 'disadvantage'.

Women from 58% of villages indicated that the village contained people that were disadvantaged. The number of villages with disadvantaged people is shown in Table 41[10].

Table 41: Villages with Disadvantaged People

Language Group	Villages Surveyed	Yes		No	
		Number	Name	Number	Name
Pawaia	5	2	Subu, Poroi 2	3	Subu 2, Ura, Wabo
Ahia	1	1	Evara	0	N/a
Koriki	4	3	Akoma-Kairu'u, Ara'ava, Ikinu	1	Kairimai
Iare	5	3	Aumu, Kaevaria, Maipenairu	2	Aivai, Mapaio
Kaimare	2	1	Mariki	1	Upaia
Maipua	1	0	N/a	1	Apiope
Orokolo	13	8	Harevavo, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela	5	Avavu, Ere-Kilavi, Hepere, Huruta, Paevera
TOTAL	**31**	**18**		**13**	

Source: ERIAS Group, 2016a.

[10] Although the survey instruments used the word 'vulnerable' the questions focused on disadvantaged groups or disadvantaged people when asked in Melanesian Pidgin.

The women's groups that indicated the village contained disadvantaged people were asked to describe why the people were disadvantaged. A summary of the results is presented in Table 42.

Table 42: Types of Disadvantaged People

Language Group	Women Headed Household	Elderly Headed Household	Single Mothers	People with a Disability	Widows	Orphans	Other
Pawaia	1	2	1	1		1	
Ahia	1	1		1			
Koriki		1	1		2		
Iare	2		2	2	1		1
Kaimare	1		1				
Maipua							
Orokolo	2		2	1	4	3	1
TOTAL	**7**	4	7	5	7	4	2

Source: ERIAS Group, 2016b.

As shown in Table 42, the main types of disadvantaged people in the PAOI included women headed households, single mothers and widows. Based on results of the Household Survey, 7% of households in the PAOI are headed by women. Several villages also identified elderly headed households, people with a disability and orphans as disadvantaged. Again, based on results of the Household Survey, approximately 8% of people had a disability of some kind. It is unlikely that people with a serious disability, or orphans, will attend school, and will therefore remain illiterate. The other reasons shown in Table for being disadvantaged include one village that identified people with long-term serious medical problems, and one village in which two clans were constantly fighting.

For those villages identifying people that were disadvantaged, the number of disadvantaged people was generally described as 'some'. However, there are other aspects of disadvantage that could apply to many people, particularly those from Pawaia villages and the villages in the Purari delta. For example:

- Other than the villages of Ara'ava and Kairimai, which are located in close proximity to Kapuna, few people have access to anything but the most basic medical services;
- Few children have access to anything but the most basic elementary and primary schools, and attendance at secondary or vocational schools will require boarding; and
- There are very few income-earning opportunities due to limited markets within the PAOI and a lack of buyers or market infrastructure to enable sales to other areas.

Without reasonable medical facilities, education and markets, it could be argued that the entire PAOI is substantially disadvantaged. Women from the Pawaia villages also face cultural barriers that are not generally experienced in the other villages. As an example, married Pawaian women are not allowed to look at other men, let alone talk to them. This may affect the ability of Pawaian women to seek medical assistance from male health workers, or prevent them from travelling and/or selling goods in markets. In one Pawaia village, a councilor stopped a training program to teach women how to sew. Although difficult to understand, this reflects the type of constraints facing women in the Pawaia villages.

Returning to the Women's FGD, the women indicated that people that are disadvantaged are primarily cared for by their families. While some CSOs (particularly women's and youth groups) appear to play an important role in supporting disadvantaged people, there are no government services or facilities in the PAOI to provide assistance. The care provided by the families not only includes the provision of shelter, food and clothing, but also integrating the disadvantaged members of the community into everyday society as much as possible.

The children of single mothers are often cared for and integrated within the mother's family. This ensures the child is cared for and provides the mother an opportunity to participate in other aspects of village life, although young mothers often withdraw from school and experience some level of discrimination.

7. Conclusions

Adequate information has been collected, analyzed and presented in this report to meet the specific objectives outlined in Section 1.2. Social indicators should be identified from the baseline to monitor the impact of the Project (and any other changes) in each of the villages in the PAOI. These and other project monitoring details will be outlined in the EIS for the Papua LNG Project.

The following key conclusions have been drawn from the study.

Governance

According to the country's laws, each village should be represented by a councilor, have a ward development committee, and be represented by a village court and land mediator. However, in the PAOI, only 13 of 35 villages surveyed have all four positions in place. Orokolo villages are better organized from a government perspective; on the other hand, relatively few Pawaia villages have a government presence.

Other than education and health facilities, many of which are managed by church agencies, the government has a minimal presence in the PAOI villages and has limited impact on their day-to-day lives.

As in many parts of Papua New Guinea, the tribal groups located within the PAOI have retained and continue to practice – to various degrees – some level of traditional leadership. Traditional leaders have the authority to speak on behalf of their group or village, although consultation among the group or village may be expected before decisions are made or shared with outsiders. One of the most important traditional leadership roles is to manage communally owned land.

Economic Infrastructure

There are no functional public roads in the PAOI. The only operational airstrips are those at Wabo and Herd Base. The airstrips do not have regular commercial air services but are used by TEP PNG and some private charter flights.

Approximately 66% of villages have mobile phone reception, and 62% of households have one or more mobile phones.

The only source of electricity in the PAOI is from petrol-fired generators or solar power and 28% of households have access to generators, and 53% have access to solar panels.

There are no banks or banking agencies in the PAOI. Some people on the coast use SMS banking to obtain cash supplied by a trade store.

There are no postal services in the PAOI.

Economic Activity

The main industries in Gulf Province are oil, prawns and logging. The province contains five large-scale logging operations however benefits from logging are not visible at the community level and the provincial government does not benefit financially.

In the PAOI the main industries are logging and petroleum exploration. The only logging occurring within the PAOI is Vailala Block 3, operated by Frontier Holdings. Turama Forest Industries has a permit to log in Baimuru Block 3, which covers PRL-15 in its entirety. Both Frontier Holdings and Turama Holdings are affiliates of the Rimbunan Hijau (PNG) Group, the Malaysian logging company.

For the majority of people living in the PAOI, the main sources of income are the sale of betel nut, fish, crabs, garden produce and sago. Outside the logging and petroleum operations, business activities in the PAOI include trade stores and fuel retailers.

Labor

The majority of people in the PAOI are involved in subsistence activities and are not formally employed. Across the PAOI during the household survey, 15% of males and 7% of females were employed. The most common jobs include teachers, village court officials and ward councilors, pastors, carpenters, cooks and laborers.

Income and Expenditure

The main sources of household income in the PAOI were from the sale of fish, sago, betel nut and garden produce. The median household income level in the PAOI was PGK80 (US$26) per fortnight. Wages provide the main source of income for 9% of households and business activities the main source for an additional 7% of households.

The median level of household expenditure in the PAOI was PGK76 (US$24) per fortnight.

Prices

The price of store food varied substantially within the PAOI, and is relatively high in comparison to the cost of the same products in Kerema and Port Moresby.

The highest prices were recorded in the Pawaia villages, presumably because they faced the highest freight costs.

At the Kaivukavu market, the price of freshly caught shark, salmon and catfish was quite similar, varying from PGK 11.90 to PGK 13.75 (USD3.80 to USD4.40) per kg. The price of green vegetables was relatively uniform, varying from PGK 1.59 (USD0.51) per kg to PGK 4.17 (USD1.33) per kg. The only staples weighed were cooking bananas, which averaged PGK 2.04 (USD0.65) per kg, and cassava, which cost PGK 2.63 (USD0.84) per kg.

The cost of transport was high across the PAOI. Petrol (known as “zoom”) sold for between PGK30 (USD9.60) per gallon in the Orokolo Bay area to up to PGK60 (USD19.20) per gallon at Ura and Wabo.

Women’s Participation in the Economy

‘Most’ women from most villages and to a lesser extent ‘some’ women a smaller number of villages in the PAOI earn income for the household. No villages responded that women do not contribute to household income.

One of the main constraints to women earning income is the limited number of markets within the PAOI and the time and cost to travel to markets outside the PAOI.

‘Most’ women from most villages and to a lesser extent ‘some’ women a smaller number of villages in the PAOI have their own money to spend. Women in 10% of villages indicated they did not have their own money to spend.

‘Most’ women from most villages contributed to household spending decisions.

Disadvantage

Women from 58% of villages indicated that the village contained people that were disadvantaged. The main types of disadvantaged people in the PAOI included women headed households, single mothers and widows. Seven percent of households in the PAOI are headed by women. Several villages also identified elderly headed households, people with a disability and orphans as disadvantaged. Eight percent of people had a disability of some kind.

For those villages identifying people that were disadvantaged, the number of disadvantaged people was generally described as 'some'. However, there are other aspects of disadvantage that could apply to many people, particularly those from Pawaia villages and the villages in the Purari delta. For example:

- Other than the villages of Ara'ava and Kairimai, which are located in close proximity to Kapuna, few people have access to anything but the most basic medical services;
- Few children have access to anything but the most basic elementary and primary schools, and attendance at secondary or vocational schools will require boarding; and
- There are very few income-earning opportunities due to limited markets within the PAOI and a lack of buyers or market infrastructure to enable sales to other areas.

Without reasonable medical facilities, education and markets, it could be argued that the entire PAOI is substantially disadvantaged. Women from the Pawaia villages also face cultural barriers that are not generally experienced in the other villages.

8. Study Team

Mike Finlayson prepared the Upstream Governance and Economics Baseline Report. Data compilation, cleansing and analysis were conducted by ERIAS Group. A description of the teams conducting the community and household level SBS surveys is presented in Section 5.1.5.

Table 43 and Table 44 list the full SBS study team.

Table 43: Community Level Survey Study Team

Personnel	Role	Company	Nationality
Community Level Survey			
Mike Finlayson	• Technical Lead • FGD – Village leaders • FGD – Youths	ERIAS Group	Australian
Danielle Martin	• Technical Lead • FGD – Women • FGD – Youths	ERIAS Group	Australian
Brett Perry/Kobus Meulenbroeks	• Logistics and support	ERIAS Group	Australian
David Kombako	• Team Liaison • FGD – Village leaders • KII – Social organization and settlement	ERIAS Group	Papua New Guinean
Yvonne Hani	• FGD – Women • KII – Education, markets and store	ERIAS Group	Papua New Guinean
Sally Jerome	• FGD – Women • KII – Education, markets and stores	Booyong Forest Science	Papua New Guinean
Marci Balge	• KII – Community health	NewFields	American
Sue Phuanukoonon	• KII – Community health	NewFields	American
Howard Rogers	• KII – Land and natural resource use • Mapping (land use and infrastructure)	Booyong Forest Resources	Australian
Benjamin Kelimbua and Amos Ona	• Mapping (land use) • Mapping (housing, infrastructure, land use)	Booyong Forest Resources	Papua New Guinean
Robert Skelly	• KII – Cultural Heritage • Field survey/inspection	ERIAS Group	Australian
John Sepe	• KII – Cultural Heritage • Field survey/inspection	Social Research Institute	Papua New Guinean

Table 44: Household Level Survey Study Team

Personnel	Role	Company	Nationality
Household Level Survey			
Mike Finlayson/ Danielle Martin/ Carmel Coyne	Technical Lead	ERIAS Group	Australian
Yvonne Hani	Team Lead	ERIAS Group	Papua New Guinean
Claire Gangai	Enumerator	ERIAS Group	Papua New Guinean
Charles Wakinau	Enumerator	ERIAS Group	Papua New Guinean
Auvita Kilori	Enumerator	ERIAS Group	Papua New Guinean
Joyleen Noki	Enumerator	ERIAS Group	Papua New Guinean
Gerard Gowae	Enumerator	ERIAS Group	Papua New Guinean
Alex Nava	Enumerator	ERIAS Group	Papua New Guinean
Levana Vanua	Enumerator	ERIAS Group	Papua New Guinean
Elai Soutai	Enumerator	ERIAS Group	Papua New Guinean

Photo 19: SBS community level survey team members, May 2016.

Source: ERIAS Group, 2016a.

Photo 20: SBS household survey team members with the Kaevaria community, August 2016

Source: ERIAS Group, 2016a.

9. Glossary and Abbreviations

9.1 Acronyms and Abbreviations

ADB	Asian Development Bank
ASPABAE	Asia South Pacific Association for Basic and Adult Education
AOI	Area of Influence
BSA	Benefit Sharing Agreement
CA	Community Affairs
CDI	Community Development Institute
CEO	Chief Executive Officer
CEPA	Conservation and Environmental Protection Agency
CIT	Community Investment Trust
COI	Commission of Inquiry
CPF	Central Processing Facility
CSO	Civil Society Organization
DLPP	Department of Lands and Physical Planning
DNPM	Department of National Planning and Monitoring
DPE	Department of Petroleum and Energy
DSIP	District Services Improvement Program
EDL	PNG Energy Developments Limited
EIC	Expenditure Implementation Committee
EIS	Environmental Impact Statement
EITI	Extractive Industries Transparency Initiative
FGD	Focus Group Discussion
FGT	Future Generation Trust
FMA	Forest Management Agreement
GDP	Gross Domestic Product
GITF	Gulf Investment Trust Fund
GNI	Gross National Income
GoPNG	Government of Papua New Guinea
HIES	Household Income and Expenditure Survey
IAIA	International Association for Impact Assessment
IFC	International Finance Corporation
ILG	Incorporated Land Group
ILO	International Labor Organization
IMF	International Monetary Fund
IPIECA	International Petroleum Industry Environment and Conservation Agency
ITU	International Telecommunications Union
KII	Key Informant Interview
KPHL	Kumul Petroleum Holdings Limited
LBBSA	Licensed Based Benefit Sharing Agreement
LLG	Local-level Government
LNG	Liquefied Natural Gas
MP	Member of Parliament
MRDC	Mineral Resource Development Company

MSF	Medecin Sans Frontieres
MTDP	Medium Term Development Plan
NEFC	National Economic and Fiscal Commission
NSO	National Statistics Office
NSRSD	National Strategy for Responsible Sustainable Development
ODI	Overseas Development Institute
PAOI	Project Area of Influence
PDL	Petroleum Development License
PGK	Papua New Guinea Kina
PL	Pipeline License
PNGFA	PNG Forest Authority
PPFL	Petroleum Processing Facility License
PRK	Petroleum Resources Kutubu
PRL	Petroleum Retention License
RPNGC	Royal PNG Constabulary
SBS	Social Baseline Study
SMLI	Social Mapping and Landowner Identification
SSG	Special Support Grant
SWF	Sovereign Wealth Fund
TB	Tuberculosis
TCS	Tax Credit Scheme
TEP PNG	Total Exploration & Production Papua New Guinea Limited
UBSA	Umbrella Benefit Sharing Agreement
UNDP	United Nations Development Program
USD	United States of America Dollar
WWF	World Wide Fund for Nature

9.2 Glossary

Term	Definition
Business Development Grant	A grant provided to landowners or landowner companies to help establish businesses that can participate in a petroleum project.
Benefit Sharing Agreement	An agreement between the State, relevant provincial and LLG authorities and project area landowners, and potentially the developer, outlining the conditions governing the project and obligations that are to be met by each party.
Clan	A group of families with a common ancestor or common lineage.
Development Agreement	Specifies the allocation and management of benefits relating to a specific petroleum project.
Development Forum	Convened by the Minister of Petroleum and Energy and involving all persons who fairly represent persons and organizations affected by the project, with the aim of reaching agreement on matters that are desirable to have agreement, including state equity entitlements and other project benefits. The agreements are reflected in the resulting BSA.
Development Levy	A tax currently set at 2% of the wellhead value of petroleum and paid to the affected provincial and/or LLGs in proportions determined during the development forum.
Disadvantage	In the SBS, the term “disadvantage” was used to describe individuals or households that were considered to be in a worse position than others. The SBS did not define the conditions that may have made people or household worse off than others, rather relied on community perception.

Term	Definition
District Development Authority	District Development Authorities have replaced the District Administration and Joint District Planning and Budget Priorities Committee. It covers all public servants in the district, including police, teachers and health workers, and is chaired by the Member of Parliament (MP). The District Administrator has become the CEO.
Dutch disease	As a result of a large increase in natural resource revenues, other sectors of the economy are adversely affected through higher inflation or exchange rate appreciation, or the shifting of labor and capital resources to the resource sector.
Equity	Free equity: Should the State take up its equity entitlement in a petroleum project (which is limited to 22.5%), 2% can be granted to the project area landowners and/or affected LLGs. The cost of acquiring that portion granted to landowners and/or LLGs is borne entirely by the State, up until commercial production commences. Paid equity: Some projects (such as the PNG LNG Project) have included an option for project area landowners and/or affected provincial governments to purchase additional equity in the project. This must be paid for in full by the landowners and/or provincial governments.
Expenditure Implementation Committee	A multi-agency committee comprising representatives from the departments of Petroleum and Energy, National Planning and Monitoring, Works, Provincial Affairs and Treasury, with a secretariat currently managed by MRDC. The aim of the EIC is to assist provinces and LLGs in the administration and management of their petroleum entitlements and any grants paid by the State.
Future Generation Trust	A common term for an investment fund that typically holds a proportion of payments received by landowners for use at a future point in time, and while subject to the trust conditions, usually once project production ends.
Gross Domestic Product	The monetary value of all the finished goods and services produced within a country's borders in a specific time period, such as a year.
Gross National Income	The sum of value added by all residents plus net receipts of primary income from abroad.
Incorporated Land Group	ILGs are legal entities incorporated in accordance with the Lands Group Incorporation Act. They usually consist of and represent all members of a clan or a sub-clan, and are required to maintain a register of all adult members. ILGs are the main vehicle in which petroleum benefits are distributed to landowners in Papua New Guinea.
Infrastructure Development Grant	Grants for infrastructure projects in the project area, either (i) funding for specific relatively large infrastructure projects, or (ii) funding levels for infrastructure projects to be identified at a later stage. The projects and/or funding levels are agreed during the development forum, with funding managed either by the national or provincial governments.
Landowner Association	While not required under the Oil and Gas Act, landowner associations are generally incorporated under the Associations Act and aim to represent project area landowners in matters pertaining to the project.
Landowner company	A company, established by or for landowners of a particular area or language group or other criteria, to facilitate business activities often linked to a specific resource project.
MRDC	MRDC is a PNG company – established as a wholly owned subsidiary of the State – which manages landowners' and provincial government equity in resource projects.
GDP per capita at Purchasing Power Parity	Measures obtained by using Purchasing Power Parity to convert the GDP into a common currency, and by valuing them at a uniform price level, and dividing by the mid-year population.
Project Area of Influence (PAOI)	The PAOI includes the communities located in the immediate vicinity of the Project's infrastructure and activities, along with any communities indirectly impacted by the Project as a result of in-migration, economic benefits, environmental, or other impacts.
Petroleum Development	A license extending for a period of 25 years which provides the licensee, subject

Term	Definition
License	to conditions specified in the Oil and Gas Act and the license, exclusive rights to explore for petroleum in the license area; carry on operations for the recovery of petroleum in the license area; and to sell or otherwise dispose of the petroleum so recovered.
Petroleum Processing Facility License	A license extending until cancelled by the Minister or surrendered by the licensee, subject to conditions specified in the Oil anf Gas Act and the license, which provides exclusive rights to construct and operate a petroleum processing facility at the site for which the petroleum processing facility license was granted.
Petroleum Retention License	A license extending for a period of 5 years that allows the licensee to explore, conduct field studies and extended production tests prior to applying for a Petroleum Development License.
Pipeline License	A license extending for a period of 25 years which provides the licensee, subject to conditions specified in the Oil and Gas Act and the license, to construct and operate a pipeline (including the pumping stations, tank stations and valve stations specified in the license) of the design, construction, size and capacity specified in the license, along the route specified in the license.
Royalty	A tax currently set at 2% of the wellhead value of petroleum and paid to the National Government, and subsequently transferred to project area landowners and/or affected provincial and LLGs in proportions determined during the development forum.
SMLI	A requirement under the Oil and Gas Act to help the Minister determine the rightful landowners, and to ensure their representation in the development forum. SMLI studies describe the history, population, organization and life styles of the people to understand their relationship with the land and to ensure they are the rightful landowners.
Special Support Grant	A grant paid by the State to the Provincial Government, usually equal to 0.5% of the wellhead value of petroleum, to fund development projects in the Province or more specifically, the project area.
Tax Credit Scheme	A scheme that allows the National Government, using the project operator as a contractor, to build or maintain public infrastructure without the need for an appropriation from Treasury. For petroleum operations, expenditure is limited to 0.75% of assessable income, from which TCS expenditure is deducted. TCS is administered by DNPM.
Village	A village is defined as a group of people who live in a groups of houses, with associated buildings, in near proximity to each other, in a rural area.
Vulnerability	An individual or group's diminished or lack of capacity to understand, anticipate, cope with, resist or recover from the consequences of a potential impact or other threat (TOTAL 2014, p.5).

9.3 Currency Equivalent

PGK 1.00 = US $ 0.32 = Euro 0.29 (28 October 2016)

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Attachment 1 List of People Consulted

Name	Position	Organization
Haivela Kavo	Governor	Gulf Provincial Government
Mark Avai	Provincial Administrator	Gulf Administration
James Hasu	Acting Provincial Administrator	Gulf Administration
Miro Ua'a	Infrastructure Planner	Gulf Administration
Ian Kavua	Director, Policy & Planning	Gulf Administration
Miai Larelake	Provincial Legal Officer	Gulf Administration
Avoa Kema	Government Liaison Officer	Gulf Administration
Elape Lovate	Director, Finance	Gulf Administration
Navai Kevari	Director, Local-level Government	Gulf Administration
Tony Baik	Acting Executive Officer to the Provincial Administrator	Gulf Administration
Mahega Morito	District Administrator, Kikori	Gulf Administration
Albert Kase	Director, Community Development	Gulf Administration
Ipai Haui	LLG Manager - Ihu	Gulf Administration
James Opa	Commerce	Gulf Administration
Ahovo Laepa	Deputy Administrator	Gulf Administration
Anne Haiai	Director, Human Resources	Gulf Administration
Baker Maeva	Director, Law & Justice (Village Court & Land Mediation)	Gulf Administration
Vetali Ivoa	Acting Treasurer	Department of Finance
Moses Koaire	LLG President	Provincial Assembly
Sailas Wayagure	Provincial Police Commander	Royal PNG Constabulary
Javen Evera	Provincial Forestry Officer	PNG Forest Authority – Gulf Province
Tavi Kauca	Education Planner	Gulf Administration
James Wauru	Director Chairman	Sakura Osura Resources Ltd Elk-Antelope Landowner Association
Albert Keret	Managing Director	Sakura Osura Resources Limited
Mika Akia	Managing Director	Gulf Economic Development Authority
Willie Simon	Manager	Gulf Investment Trust Fund

NB: People consulted in villages in the PAOI, and officers from TEP PNG, are not included in the above list.