









TOTAL E&P PNG LIMITED

PAPUA LNG

Upstream Environmental Impact Statement

Volume 2: Environmental and Social Baseline

Part 14
Upstream Community and Demographics Baseline Report

TOTAL
TOTAL E&P PNG LIMITED

Papua LNG Project

Total E&P PNG Limited

Upstream Community and Demographics Baseline Report

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Executive Summary

This Upstream Community and Demographics Baseline Report is one of several stand-alone reports that will be used to compile a Social Baseline Report 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 the Gulf Province, Papua New Guinea. Total E&P PNG Limited (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 Project will comprise:

- Upstream production well development within Petroleum Retention License Number 15 (PRL-15), including wellpads and gathering system;
- Construction of an upstream Central Processing Facility (CPF) and associated infrastructure within PRL-15;
- An LNG Plant at Caution Bay, 20 km northwest of Port Moresby; and
- Construction of gas and condensate pipelines between the CPF and LNG Plant (the export pipeline's), which comprises 70 km of onshore and 255 km of offshore pipelines.

Legislative and Regulative Framework

Petroleum projects are regulated by the *Oil & Gas Act 1998*. 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. However, there is little guidance on what constitutes or is required for a social baseline, or socio-economic impact assessment, in Papua New Guinea (PNG). 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).

TOTAL SA (TOTAL), the parent company of TEP PNG, has a Social Baseline Study 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 social baseline study 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 International Finance Corporation (IFC) and International Petroleum Industry Environment and Conservation Agency (IPIECA), both of which are referenced in TOTAL's Social Baseline Study general specification.

Study Area and Project Area of Influence

The Upstream Community and Demographics Baseline Report presents information, when available, for (i) Papua New Guinea, (ii) Gulf Province, (iii) Kikori District, (iv) Baimuru and Ihu Rural LLGs, and (v) the Project Area of Influence (PAOI). Information presented at national and sub-national levels provides context and allows comparisons with information presented for the PAOI.

The PAOI includes 39 villages and one government station with a combined population in mid-2016 of 12,763.

Objectives

The purpose of the community and demographics baseline characterization is to establish the demographic and community structure of communities in the direct PAOI. The study aims to:

- Map and understand the geographical distribution of potentially affected individuals and communities and any other sensitive receptors in the study area;
- Provide information on population, age, gender, clan or religious association, access to infrastructure, education attainment and type of housing for each village in the direct Project Area of Influence;
- Characterize the ethnographic landscape of the study area using secondary sources as well as primary quantitative and qualitative data collection methods;
- Meet the requirements of the relevant standards outlined in Section 2 Regulatory Framework and Standards.

Methodology

The key objective of the social baseline study 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 Community and Demographics Baseline Report provides information on the settlement history, language, population, demography, education, law and order, community infrastructure and household assets in the study area.

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.

The community level surveys included focus group discussions and key informant interviews to explore topics of village leadership, social organization, women's and youth issues and perceptions, land and natural resource use, education, health and the economy.

Fieldwork was scheduled in two parts:

- The initial community level surveys were conducted in May/June 2016. Thirty five communities were surveyed; and
- Five additional community level surveys were conducted in August/September 2016 (taking the total number of communities surveyed to 40). In addition, a total of 354 household surveys were conducted in 27 communities representing a sample of PAOI communities.

The community level data identified 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 important determinants of current lifestyles and social behavior, and used as the main criteria on which villages would be selected to conduct household surveys. The villages included in the household survey were therefore purposively selected to ensure, as far as possible, a stratified sample of villages from (i) each language group and (ii) each ecological zone.

The team conducting the community and household levels surveys included a mix of Papua New Guinea and international consultants, and eight PNG researchers (who were generally anthropology students or recent graduates from the University of Papua New Guinea).

Community Affairs officers from TEP PNG liaised with communities in the lead up to the surveys and accompanied the team while in the field.

Settlement History

Exploration along the south coast of Papua New Guinea occurred towards the end of the 19th Century. Bevan sailed into the Purari River in 1887, followed by Lawes, Chalmers and Wickham although the upper reaches of the Purari River were not mapped until the 1930s. Exploration along the Papuan Gulf was tempered by reports of hostile encounters, accentuated by the death of James Chalmers and 11 others at Goaribari Island, west of the Purari, in 1901.

There has been substantial movement of people within the PAOI before and since western contact. However, western contact with the Pawaians did not occur until the 1920s. At this time, the Pawaians lived north of the Purari River – in a relatively remote, mountainous area encompassing parts of Gulf, Simbu and Eastern Highland provinces – and were semi-nomadic. Two significant events occurred which had profound impact in the settlement patterns of the Pawaians:

- The first occurred when the colonial government and Christian denominations moved into the area in the 1960s. Both of these institutions encouraged Pawaian people to establish permanent settlements (for the provision of services and religious instruction respectively); and
- The second occurred in 1974 during the Purari River Dam project, which resulted in the establishment of Ura, Wabo and Poroi.

The residents of Evara speak a language known as Ahia. The people originate from the middle reaches of the Vailala River, to the southeast of Evara, and have generally been known as or referred to as the Kaura in the past. Limited information is available on the history of contact with the Ahia, although the Reverend J. H. Holmes, in his 1908 trip up the Purari River, reported making contact with “some men of the Kaura tribe”.

The Koriki, Iare, Maipua and Kaimare language groups indicated that they all originated from further up the Purari River and relocated southwards over time. It appears that villages were initially established within the Purari Delta between World War I and World War II, possibly to be closer to government services, with coastal villages being established after World War II, often in an attempt to grow coconuts and access coastal shipping services for the sale of copra.

The Orokolo speakers also believe they originate from the middle or upper reaches of the Purari River. They moved to a location known as Popo, from where they disbursed to their current locations both along Orokolo Bay and inland in the Muro area (that is the area surrounding Muro Mission). It is not known when people disbursed from, but it appears to be more than a century ago.

Language

More than 800 languages are spoken in Papua New Guinea. The official languages are English, Melanesian Pidgin and Motu. The PAOI includes seven languages:

- Pawaian is spoken by an estimated 4,000 people, including residents of the PAOI villages of Ura, Wabo, Subu, Subu 2 and Poroi 1, Poroi 2 and Poroi 3 (Suarido);
- Ahia is potentially a dialect of Keoru-Ahia and is spoken by less than 1,000 people, who, with the exception of Evara, are located in the middle reaches of the Vailala River;
- Iare is spoken by an estimated 2,200 people, including residents in the PAOI villages of Mapaio, Kaevaria, Aumu and Aivai;
- Koriki is spoken by an estimated 2,500 people, including residents in the PAOI villages of Ara’ava, Kaimare, Akoma, Kairu’u and Ikinu;
- Kaimare is spoken by an estimated 1,200 people, including residents in the PAOI villages of Upaia and Aiere;

- Maipua is potentially spoken by only 400 people, the majority of which reside in the POAI village of Apiope; and
- Orokolo is spoken by less than 10,000 residents of villages between the Purari and Vailala Rivers, including 19 villages or hamlets within the PAOI.

Iare, Koriki, Kaimare and Maipua are neighboring languages confined to the Purari Delta and have sufficient commonality to enable people to understand each other. They have previously been described as speaking a single language, known as Purari.

The local language (known in Pidgin as *tok ples*) is spoken by 83% of people in the PAOI when conversing at home. Knowledge of other languages varies: approximately 90% of males and 80% of females understand Melanesian Pidgin, and 38% of males and 31% of females understand Motu, compared with approximately 45% of males and 39% of females over 10 years of age from the PAOI who understand English.

Population and Demography

In mid-2016 the PAOI contained an estimated 12,763 people and 2069 households. The main populations lie along the coast, an area inland of Orokolo Bay, and an area across the Purari Delta that roughly conforms with the upper tidal reaches. All villages in the Purari Delta are located on the banks of the Purari's tributaries. The Pawaian villages are located along the banks of the Purari River, upstream of the delta. Other than the Orokolo area, population densities are low.

The Pawaian villages are small and scattered in comparison to other villages in the PAOI. Generally, the coastal villages are slightly larger than those inland, however there is substantial variation, particularly when including hamlets. Within the PAOI, village size varies from 962 residents at Kavava to 32 residents at Mapaio Fish Camp, with an average size of 317 residents.

Results of the household survey (involving 355 households) indicate that 3% of marriages are polygamous; there are 105 males per 100 females (compared to 108 for Papua New Guinea); 40% of people are less than 15 years of age (compared to 36% for Papua New Guinea); 7% are aged 55 years and above (compared to 7% for Papua New Guinea); and household size averages 6.7 (compared to 5.3 for Papua New Guinea). Survey results indicate that the PAOI has a relatively young population and relatively low life expectancy (only 7% of the population of the PAOI are 55 years or above, which is low given Papua New Guinea's life expectancy at birth of 61 years for males and 65 for females (WHO 2015)).

In total, it is estimated that the PAOI villages include 36 migrant families, which excludes migrants living on Wabo Station[1]. A large number of people have left the PAOI to live in other parts of Papua New Guinea: the majority (70%) of villages in the PAOI estimate that 'more than 100 people' from their village have moved away to live in other parts of Papua New Guinea. In the past, out-migration has greatly exceeded in-migration, although significant in-migration has occurred at Ura and the adjacent Wabo Station over the past decade.

Results from the household survey indicate that 51% of people were born in the village in which they reside; 36% were born in another village within the same local level government (LLG) area; 4% were born from a village in another LLG within Gulf Province; and 9% were born in another province.

Education

Education is not compulsory in Papua New Guinea, but the current education structure, introduced in 1995, is based on nine years of education, including three years of elementary school in the local language (*tok ples*), starting at age six, followed by six years of primary school. By the end of grade 8, school children are expected to have the skills to live happily and

[1] A community level survey was not undertaken at Wabo Station however the household survey indicated that five out of the seven families living at Wabo Station were born elsewhere.

productively, contribute to their traditional communities and use English to understand basic social, scientific, technological, and personal concepts (DoE, 2009, p. ii). The O'Neil Government introduced the 'tuition fee-free education' policy in 2012, which means that the National Government pays all tuition fees for students from elementary to grade 10.

The PAOI contains 23 elementary and 9 primary functioning schools. Of the 40 communities in the PAOI, 29 have either a functioning elementary school or relatively easy access to a functioning elementary school and 26 have a functioning primary school or relatively easy access to a functioning primary school. The elementary schools are often built of traditional materials and have limited furniture, teaching materials or basic supplies. Primary schools are usually better equipped, but only three primary schools in the PAOI cater for all six grades. Most teachers are concerned with the poor quality of infrastructure (classrooms, water supplies, toilets and teacher's houses), the shortage of teaching materials, limited community support and problems accessing their pays. There are no secondary or vocational schools in the PAOI.

Based on population data collected during the social baseline surveys, approximately 13% of children in the PAOI aged 6 to 8 years of age cannot access an elementary school, and 18% of children in the PAOI aged 9 to 14 years of age cannot access a primary school.

Approximately 10% of males and 21% of females in the PAOI aged 16 years and above have never attended school. This compares to an estimated 8% of males and 11% of females in Gulf Province. National comparisons are available from the 2006 Demographic and Health Survey (NSO 2009) for people aged five and above (the data are not disaggregated for people aged 16 and above). It shows that 39.6% of the population aged five and above had no education or had not completed Grade 1.

Approximately half of all males and females aged 16 years and above have completed between Grade 1 and Grade 6. Approximately 32% of males aged 16 years and above have completed between Grade 7 and Grade 10, compared to only 24% of females of the same aged category. Very few males or females from the PAOI have completed vocational or technical schools or attended university.

Results from the household survey indicate that only 29% of boys and 35% of girls in the PAOI aged from 6 to 15 years are attending school. The vast majority of school-aged children are not attending school, even in the Orokolo area, where the majority of children have relatively good access to schools. Teachers said that the main reason for children not attending school was that they had to help their parents at home with various subsistence activities. However, women interviewed during the social baseline surveys indicated that the distance to the nearest school, schools being closed, and poor teachers were the main reasons for low attendance.

An estimated 19% of males and 33% of females from the PAOI, aged 16 years and above, indicated that they could not read or write. This compares favorably with census data for Papua New Guinea and Gulf Province from 2000 (NSO 2013a). However, a detailed assessment of literacy levels in Gulf Province in 2009 revealed that the literacy levels stated by people (self-assessment) were much higher than results following a simple literacy test. Nevertheless, it is important to note that self-assessed literacy levels among males from Evara are particularly low, while literacy levels are particularly low for females from Pawaian and Kaimare villages as well as Evara.

Law and Order

In Papua New Guinea, police services are centralized under the Royal Papua New Guinea Constabulary (RPNGC). The police presence is generally limited to urban centers, major government stations and large private-sector developments. The police are often constrained by a lack of resources, including police accommodation, vehicles and operating expenses.

In Papua New Guinea the national judicial system includes the Supreme Court of Justice, the National Court of Justice and various other courts, including district courts and land courts. The more formal courts operate in urban areas and are not easily accessible to the majority of PNG's

population. As such, village courts, established in 1975, have the primary role of ensuring peace and harmony in the communities in which they operate.

The village courts place the administration of justice largely in the hands of people in the communities. Village Court members include village court magistrates, peace officers and a village court clerk. Village Courts are obliged to attempt the resolution of disputes first by way of mediation. The Village Courts often involve traditional and/or church leaders when resolving disputes.

The main law and order problems in the PAOI are typically stealing, fighting and domestic violence, the latter being widespread and almost expected in some villages. Alcohol is not consumed regularly, but some males (including teenagers) often drink on special occasions. Excess consumption can contribute to various social problems, including fighting, domestic violence, abusive language and general disruptions to the village. Marijuana consumption is common among boys and young men and some girls and young women in the PAOI. Marijuana is not generally smoked in public, but is also linked to a range of social problems.

Village leaders and women's groups from around 70% of the villages in the PAOI indicated that people generally felt safe. One of the main concerns, however, was the fear of sorcery, which can influence what some people do, and where some people go. The village leaders from around half of the villages indicated that the general level of security had improved since the strengthening of the village court system in 2012, whereas most of the women's groups thought there had been no significant change.

Community Infrastructure and Household Assets

In the PAOI, approximately 73% of houses are made of traditional materials (which compares to 67% for Papua New Guinea in 2009/10), with 25% of houses categorized as semi-improved and 2% as a modern design. The vast majority of houses (99.6%) were raised from the ground, and 97% of families live in their own house, with the remaining 3% staying with friends or relatives.

The most common source of power for lighting is solar (40% of households), torches (26% of households) and battery-powered lamps (17% of households), whereas 45% of households used kerosene lamps across Papua New Guinea in 2009/10.

All households in the PAOI use firewood as the main source of fuel for cooking, compared to 88% of households across Papua New Guinea in 2009/10.

In the PAOI the most common source of drinking water was from rainwater in rainwater containers (37% of households) and rainwater tanks (32% of households), rivers or streams, including the Purari River and its tributaries (16% of household) and shallow wells (8% of households). Rainwater catchments include any drums, pots or other containers that can be used to collect and store rainwater from a roof. Women from 34% of villages in the PAOI indicated that they were not satisfied with their drinking water, with the major concern being the fear of contamination. Both water quality and quantity are affected by seasonal and weather conditions.

The most common types of toilets in the PAOI were simple or improved pit latrines, however, 34% of households indicated that they did not use a toilet and relied on the bush, river or sea. Around 80% of villages in the PAOI indicated that they did not have designated areas for garbage disposal. Tins and batteries were generally thrown in the bush, sea or river, or buried; plastic and paper is generally burned; and food scraps are generally fed to chickens and pigs.

In the PAOI, 66% of the villages have mobile phone reception and 62% of households surveyed had mobile phones. Other than canoes, households possess a limited range of assets. The proportion of households with various assets includes:

- TV: 18%;
- Computer or iPad: 4%;

- Canoe: 67%;
- Dinghy: 15%;
- Outboard motor: 21%;
- Sewing machine: 25%;
- Chainsaw: 6%;
- Refrigerator or freezer: 2%.

No households in the PAOI owned any vehicles, compared to 4% across Papua New Guinea in 2009/10. Of the households surveyed, 34% indicated that they had used EFTPOS (electronic funds transfer at point of sale) facilities, and 25% had used the internet.

1. Introduction

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

This section of the report describes the Papua LNG Project and the objectives of the community and demographics 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 purpose of the community and demographics baseline characterization is to establish the demographic and community structure of communities in the direct Project Area of Influence (Section 3). Specifically, the study aims to:

- Map and understand the geographical distribution of potentially affected individuals and communities and any other sensitive receptors in the study area;
- Provide information on population, age, gender, clan or religious association, access to infrastructure, education attainment and type of housing for each village in the direct Project Area of Influence;
- Characterize the ethnographic landscape of the study area using secondary sources as well as primary quantitative and qualitative data collection methods;
- Provide a comparative local, district, provincial and national analysis as appropriate and where data is available;
- Characterize the tribal/cultural makeup of the study area and any migrant populations;
- Identify potentially affected vulnerable groups and indigenous peoples within the study areas; and
- Meet the requirements of the relevant standards outlined in Section 2 Regulatory Framework and Standards.

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 & 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 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 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 as a whole, 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 it is not 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 2016-17; 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;
- 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 Papua New Guinea 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 Papua New Guinea Development Strategic Plan has a strong economic focus and aims for a fivefold 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 2011-2015 is guided by the Papua New Guinea 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 & 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).

The MTDP 2016-2017 incorporates the objectives outlined in the National Strategy for Responsible Sustainable Development and is limited to two years so that the medium term, development, planning framework will in the future be aligned to the five-year parliamentary cycle.

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 authorities, 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 social baseline study 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 social baseline study is to describe the societal and human rights context of the potential project sites. More specifically, the aim of the social baseline study 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 social baseline study 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 social baseline study 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 social baseline study. 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).

Vulnerability is given particular attention by Total in the social baseline study 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. 75). The general specification clearly differentiates between the vulnerability of people or groups to the Project's impact, with that of people included in vulnerable (or disadvantaged) groups.

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.
- Work with all stakeholders to ensure the overall impact of the project is considered positive

The social baseline study 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 social baseline study 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

IFC Performance Standard 1, Assessment and Management of Environmental and Social Risks and Impacts (IFC PS1), requires proponents to define the 'project area of influence (PAOI)' by considering activities and facilities, predictable direct and indirect impacts and cumulative impacts. World Bank Operational Policy 4.01 also defines area of influence (AOI) as 'the area likely to be affected by the Project, ancillary aspects and unplanned developments induced by the Project'.

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);
- 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.

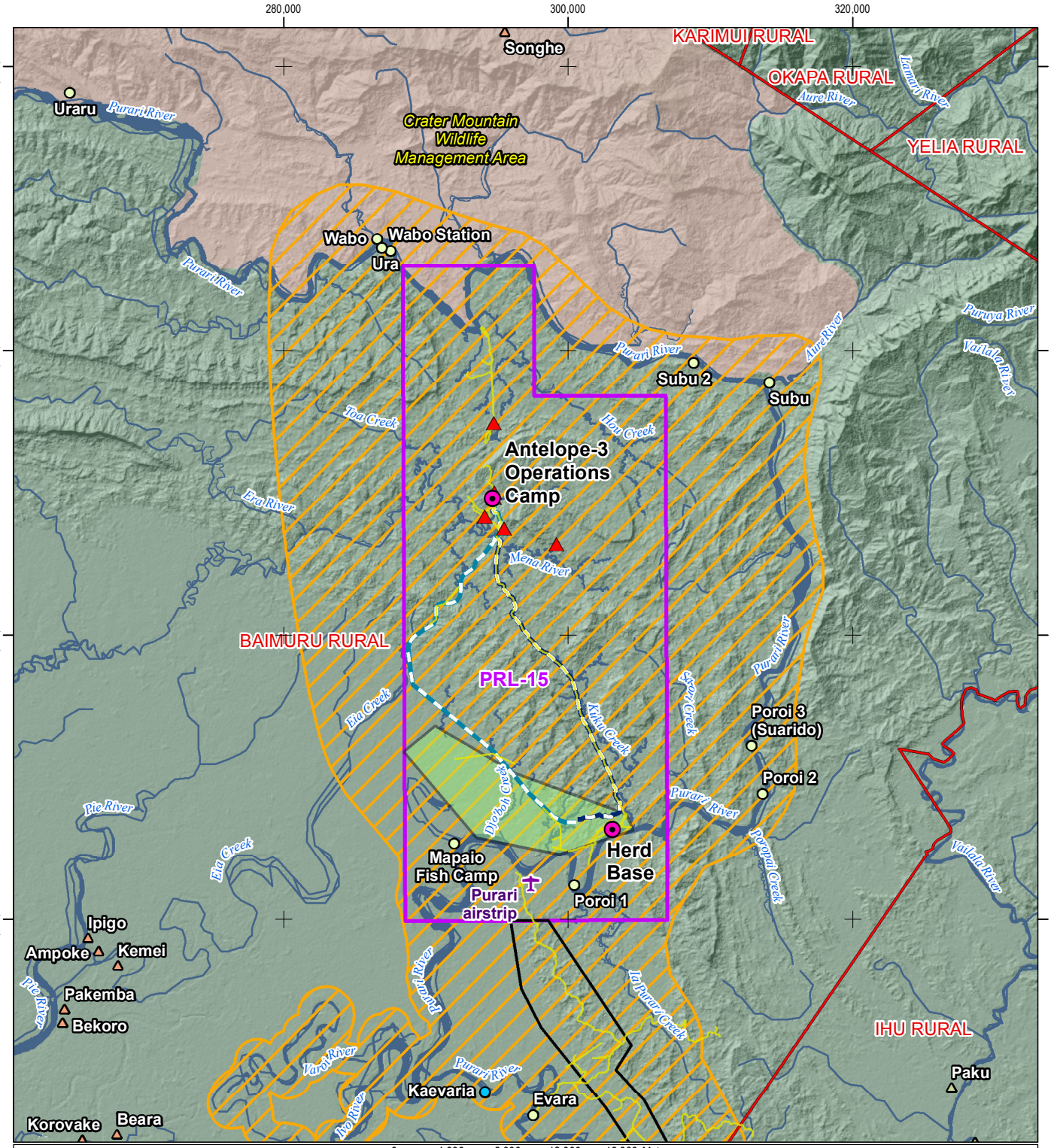
The communities and environment within the PAOI are shown in Map 1 and Map 2. As discussed further in Section 5.1.2, the PAOI includes 39 villages and one government station with a combined population of 12,763.

3.2 Study Area

The upstream study area for the social baseline study comprises local and regional study 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) (Map 3). For the upstream study area this includes:

- Gulf Province;
- Kikori District;
- Baimuru Rural and Ihu Rural LLGs.



SCALE: 1:400,000 @ A4

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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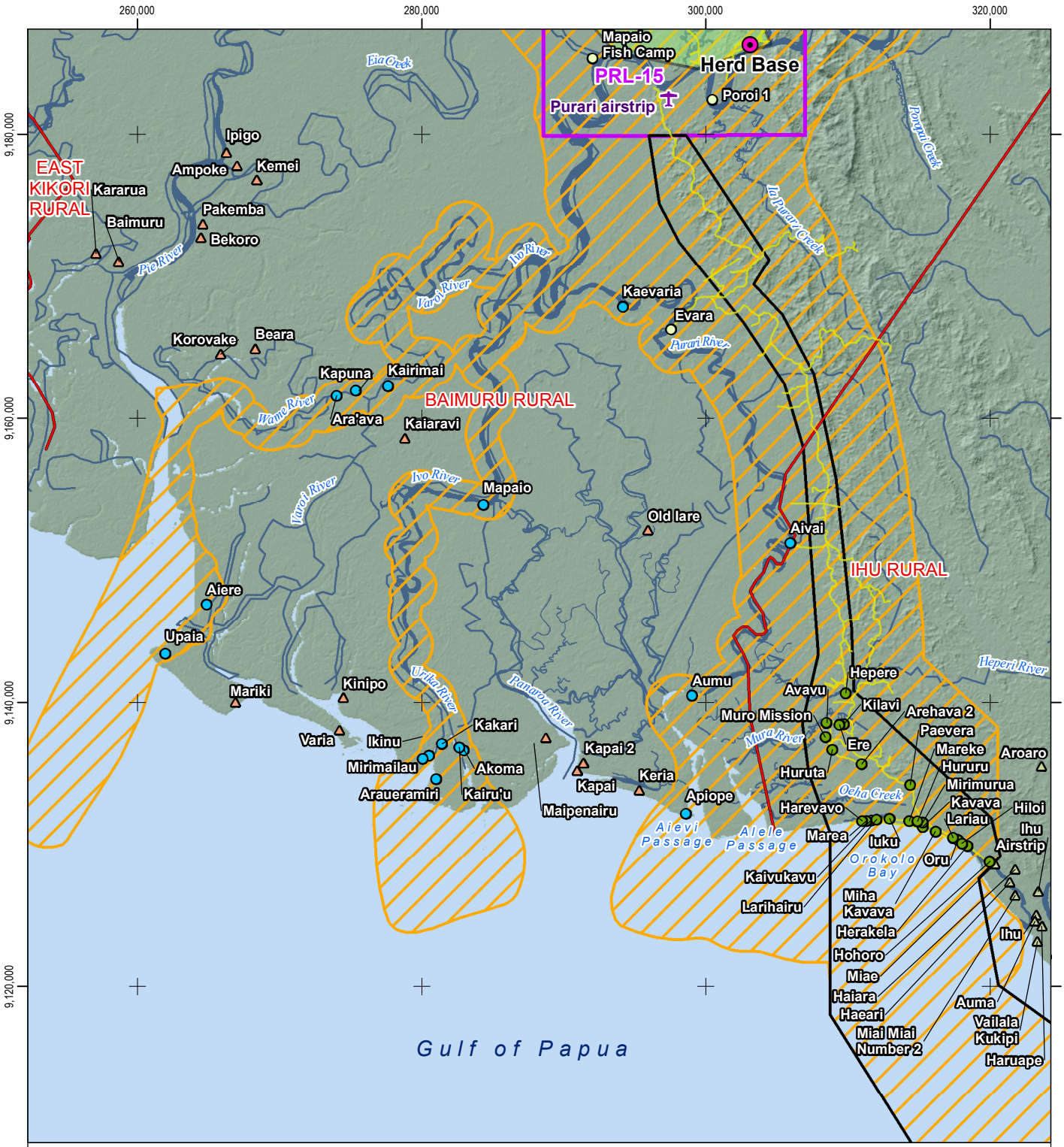
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SCALE: 1:400,000 @ A4

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

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

N

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

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 2011 National Population and Housing Census (NSO, 2013a) and 2009/10 National Income and Expenditure Survey (NSO, 2013b).

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 do not have effective systems for 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, two recent reports have included Gulf Province and provide good information, these being a detailed literacy assessment in 2009/10 (Asia South Pacific Association for Basic and Adult Education, 2011) and an analysis of labor resources, the latter based on data collected during the 2009/10 National Income and Expenditure Survey (Jones & McGavin, 2015).

Very 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 Delta 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 social baseline study, and are discussed in the following section.

5. Methods

This section of the report describes the methodology used for the Community and Demographics 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, TOTAL Group standards, TEP PNG requirements, and international best practice (Section 2) 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;
- Ensured proper community understanding of the survey's purposes and methods and generally gained acceptance of the surveys occurring;
- 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 PAOI includes villages in close proximity to PRL-15, the Export Pipeline Route (PER) 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 locations, and four additional villages/hamlets 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, particularly the Highlands, and who are not health, education or church workers. Rather, they have relocated in search of employment, initially with InterOil and subsequently with TEP PNG. It was therefore determined that the PAOI contained 39 villages and one government station (Wabo Station). The villages and station are shown in Map 1 and Map 2 and their population shown in Table 1.[2]

Table 1: Population of Villages/Station in the PAOI

Villages/Station	Project Area	Population
Kavava	PER	962
Mapaio	Riverways	859
Mareke	PER	808
Ara'ava	Riverways	751
Harevavo	PER	651
Kaivukavu	PER	640
Evara	Riverways	542
Wabo	PRL-15	542
Iuku	PER	514
Larihairu	PER	450
Marea	PER	435
Kairimai	Riverways	386
Herakela	PER	331
Kairu'u	Riverways	302
Apiope	Riverways	301

2 The Community Directory (Attachment 3) presents information on 43 villages as it includes the villages of Maipenairu, Mariki and Kapai 2 which are outside the direct Project Area of Influence but important culturally for the Iare language group.

Villages/Station	Project Area	Population
Poroi 2	PRL-15	301
Hepere	PER	297
Paevera	PER	294
Ikinu	Riverways	294
Avavu	PER	283
Upaia	Riverways	277
Akoma	Riverways	247
Huruta	PER	246
Aumu	Riverways	244
Ura	PRL-15	229
Lariau	PER	223
Kilavi	PER	221
Ere	PER	175
Oru	PER	144
Kaevaria	Riverways	113
Wabo Station	PRL-15	108
Aivai	Riverways	107
Subu 2	PRL-15	97
Arehava No. 2	PER	96
Hohoro	PER	70
Subu	PRL-15	62
Aiere	Riverways	50
Poroi 3 (Suarido)	PRL-15	45
Poroi 1	PRL-15	34
Mapaio Fish Camp	Riverways	32
TOTAL		**12,763**

Source: ERIAS Group, 2016a.

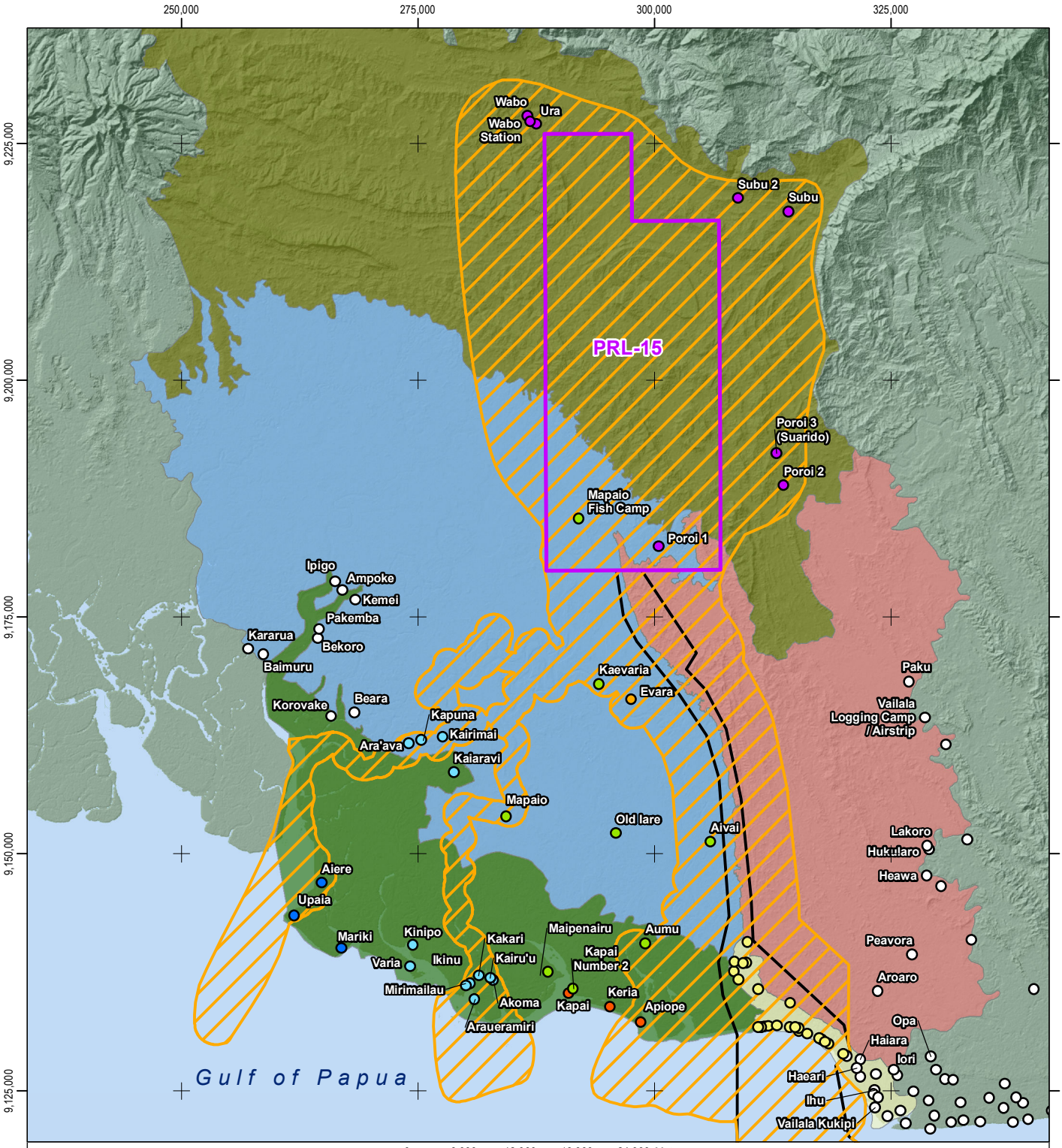
As shown in Table 1, the PAOI had a population of 12,763 in mid 2016.

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 deliberately selected to ensure a stratified sample of villages from (i) each language group and (ii) each ecological zone, as shown in. 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.



SCALE: 1:600,000 @ A4

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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: 4

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_097-81387 **REVISION:** D

DATE: 14/07/2017

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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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 40 communities, 27 communities (including Wabo Station and the villages of Mariki, Maipenairu and Kapai 2) were included in the household survey using the sampling methodology used above. The intention was to survey 20%-30% of the households in each community, with the proportion of households surveyed increasing in villages with fewer households. The households from each village were selected systematically (e.g. every third house) from a village map compiled 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 to 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 1.

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													
CA awareness campaign													
Fieldwork training													
Upstream community surveys													
CA awareness campaign													
Upstream household surveys													
Secondary data collection													
Data entry and analysis													
Report preparation													

Figure 1: Social Baseline Study Timeframe

5.1.5 Study Team

The study 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 (survey enumerators). 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 Melanesian Pidgin (*tok pisin*) and Motu.

All team members participated in detailed pre-survey training programs (Photo 1) that aimed to:

- Familiarize team members with the Project and the PAOI;
- 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 5.3.1, all study 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

5.1.6.1 Community Level Surveys

TEP PNG's 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 social baseline study. A sample of awareness materials used is provided at Attachment 1.

Following arrival in each village, a meeting with village members was held and a *tok save* (explanation) provided by TEP PNG and the study team (Photo 2). 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 Social Baseline Study.

The study team:

- Introduced individual team members;
- Outlined the need for TEP PNG to prepare an EIS as requested by National regulation;
- 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 from the villages 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.



Photo 2: Introduction and *Tok Save* at Mapaio

Source: ERIAS Group, 2016a.

Following the *tok save* the study 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.

5.1.6.2 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 social baseline study team (reiterating the information presented on the previous occasion, as outlined above). The selected households were then identified, 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, and 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 Pawaian people); and
- Sakuro Osura Resources Limited (a company established by Pawaian people).

A list of people consulted during the course of the Upstream Community and Demographics Study is presented as Attachment 2.

5.1.8 Study Challenges

The main study challenges included:

- Obtaining political support to proceed with the surveys;
- 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 social baseline surveys following discussions between the National Government, the Governor and TEP PNG, and reconfirmed his support specifically for the Project in a meeting in Kerema 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 identity, they were also careful to confirm an alliance or link with the village they came from.

Several villages in the Orokolo Bay and Purari delta 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 constrained timeframe was only possible because of the awareness work undertaken by TEP PNG's CA team in the lead up to, and during the surveys. The study team was able to undertake the *tok save* and commence surveys without any undue delay.

In addition to the above challenges, some of the limitations described in Section 5.4 should be observed.

5.2 Data Sources

An overview of the main sources of information used in this report is presented below.

5.2.1 Literature Review

The literature review for the Community and Demographic Technical Baseline Report included:

- PNG legislation and international guidelines, policies and standards relevant to the study (Section 2);
- Project reports prepared for InterOil or TEP PNG (e.g., PRL-15 Social Mapping and Landowner Identification Study)
- PNG development strategies, including Vision 2050, the PNG Development Strategic Plan, the Medium Term Development Plan and National Strategy for Responsible Sustainable Development (Section 2);
- PNG sectoral plans and strategies, including for example, the Universal Basic Education Plan (2010-2019);
- The Gulf Provincial Development Plan (Gulf Vision 2020) and Education Plan (2007-2016);
- Statistical reports, including results from the 2000 and 2011 National Population and Household Censuses, and 2009-10 Household Income and Expenditure Survey, all prepared by the National Statistics Office (NSO);
- Other studies, including a literacy assessment for Gulf Province, by the Asia South Pacific Association for Basic and Adult Education (2011), and labor assessment that included data for Gulf Province, by Jones and McGavin (2015); 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 Delta more than 90 years ago, which provides an insight to some of the social and cultural practices exhibited today.

5.2.2 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;
- Education statistics from the Division of Education and Gulf Provincial Administration;
- Crime statistics for Kerema from the Royal PNG Constabulary (RPNGC); and
- Statistics presented in the Human Development Report for PNG (UNDP, 2014) and other reports prepared by donors.

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

5.2.3 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 and key informant interviews:

- Village Leaders[3] FGD;
- Social Organization FGD;
- Women's FGD;
- Youth FGD;
- Land and Natural Resource Use KII;
- Education KII;
- Health KII;
- Store KII;
- 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.

5.3 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 2.

Table 2: Villages/Stations Covered in the Social Baseline Surveys

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. Community level surveys were not completed at Mapaio Fish Camp as the village was mourning the death of a resident at the time of the survey. Key community information was however collected during the household survey.

[3] Village leaders also known as elders, that is, those people in communities who provide leadership.

Once factoring in the villages that were surveyed together, 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.

5.3.1 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 5.2.3, members of the community survey team prepared brief written summaries describing key aspects of each village. These summaries were combined with maps of each village, into a Community Directory (Attachment 3). 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. It is intended that a copy of each community's profile from the Community Directory will be returned to that village for their information and use in prioritizing any community development initiatives.

5.3.2 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 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. 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.

5.4 Limitations

Consistent records are not uniformly kept for villages in the PAOI, and education and literacy levels are low. 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 (e.g same question asked of both the village leaders and women groups), or can be compared with previous information available, some information has only been collected from one source and its accuracy has not been verified. Survey results should therefore be treated with caution and the following limitations observed:

- Population data for the PAOI does not include those people residing in other locations, although an estimate of the number of people living in other locations has been made;
- The exact date of birth of many of the older people will not be known, so some ages have been estimated;
- Literacy levels are commonly over-stated;

- The quality of drinking water has not been verified;
- The quality of school infrastructure and resources reflects the responses provided; and
- Crime rates have been reported for Kerema, although as discussed in Section 6.2.6, many crimes are not reported.

Discussions in the PAOI indicate clearly that many people have limited ability to estimate the time taken to perform a task or reach a certain destination. Most people do not wear a watch, and while mobile phones are becoming relatively common, they are not used as a timepiece as they are in the west. Walking times will vary substantially depending on such factors as the walking pace of the person, the load being carried, and the difficulty of the terrain. Travel times using canoes will vary according to such factors as the weather, water flow, tide, who is paddling and the load being carried, while travel times using motorized canoes or dinghies will vary according to the size of the outboard motor and load in the canoe or dinghy. Any estimates included in the report must therefore be treated with caution.

In addition, the settlement history and recent migration, described in Section 6.2.1, has for several language groups been derived from relatively limited consultation with a few individuals from one or more villages. It is important to realize that oral stories tie clans to the land and define their history and culture. Not everyone has the right to tell these stories, and there is often a reluctance to share these stories in the presence of outsiders, or if they may be documented for all to see. Any information regarding settlement histories and access to resources should therefore be treated as preliminary and unverified.

6. Baseline Characterization

6.1 National, Provincial and District Context

6.1.1 Settlement History

European explorers first sighted New Guinea in the 16th Century, however, it was not until the 1880s that Germany and Britain assumed administrative control of the northern and southern coastal areas, respectively. At the time these areas were known as German New Guinea and British New Guinea. Following the First World War Australian managed both New Guinea and what, in 1905, had been renamed the Territory of Papua. Separate administrations continued – Australia governed New Guinea under a mandate from the League of Nations, while Papua was administered by Australia as an External Territory – until the Japanese invasion in 1941. Following World War Two the two administrations were combined to form Papua New Guinea. The *Papua and New Guinea Act 1949* confirmed the administrative union under the title of The Territory of Papua and New Guinea and provided for Legislative Council, a judicial organization, a public service, and a system of local government. In 1972 the name of the territory was changed to Papua New Guinea, and in 1975, the nation gained its independence with the passing of the *Papua New Guinea Independence Act 1975* by the Parliament of Australia.

Traditional leadership, religion, and government administration of Papua New Guinea are described in the Upstream Governance and Economics Baseline Report (Finlayson, 2017; Part15 of ESBS Dossier).

Exploration along the south coast of Papua New Guinea occurred towards the end of the 19th Century. Bevan sailed into the Purari River in 1887, followed by Lawes, Chalmers and Wickham (Sullivan, 2012, p.16), although the upper reaches of the Purari River were not mapped until the 1930s.

Exploration along the Papuan Gulf was tempered by reports of aggressive people, accentuated by the death of James Chalmers and 11 others at Goaribari Island, west of the Purari, in 1901. The anthropologist FE Williams (1924) spent 8 months in the Purari Delta in 1923 and documented lifestyles prior to any considerable outside influence.

Kerema was reportedly established as a mission base in 1806. Land was acquired for a government station in 1906, and became the provincial capital in the late 1950s following a decision to relocate from Kikori, which was deemed as being too wet.

6.1.2 Language

The number of individual languages listed for Papua New Guinea is 852, however 12 of these languages are classified as extinct (Lewis, Simons & Fennig, 2016, p. 6). Papua New Guinea is the most linguistically diverse area in the world and 89% of the languages are spoken by 10,000 people or less.

The national languages are Melanesian Pidgin (*tok pisin*), Motu and English. Local languages (*tok ples*) are used in elementary schools, with English used in primary and secondary schools.

In Kerema and many of the more accessible villages in Gulf Province, there is some understanding of English, Pidgin and Motu. Relatively few people in more remote villages understand English, while Pidgin and Motu may not be widely understood among women and the elderly. Further discussion on literacy levels is presented in Section 6.1.4.5.

6.1.3 Population and Demography

Results from the 2011 National Population and Household Census indicated that Papua New Guinea had a population of 7.2 million. Between 2000 and 2011 Papua New Guinea's population grew at an average of 3.1% per annum. If this rate of growth has continued, the current

population is approaching 8.5 million, and with continued growth, could reach 10 million by 2022.

Papua New Guinea's population growth is significantly greater than other countries from the Pacific and Southeast Asia. As shown in Figure 2, population growth was 3.1% for Papua New Guinea, compared with just 0.2% for Tonga (lowest of the regional countries) and 2.4% for Vanuatu (second highest).

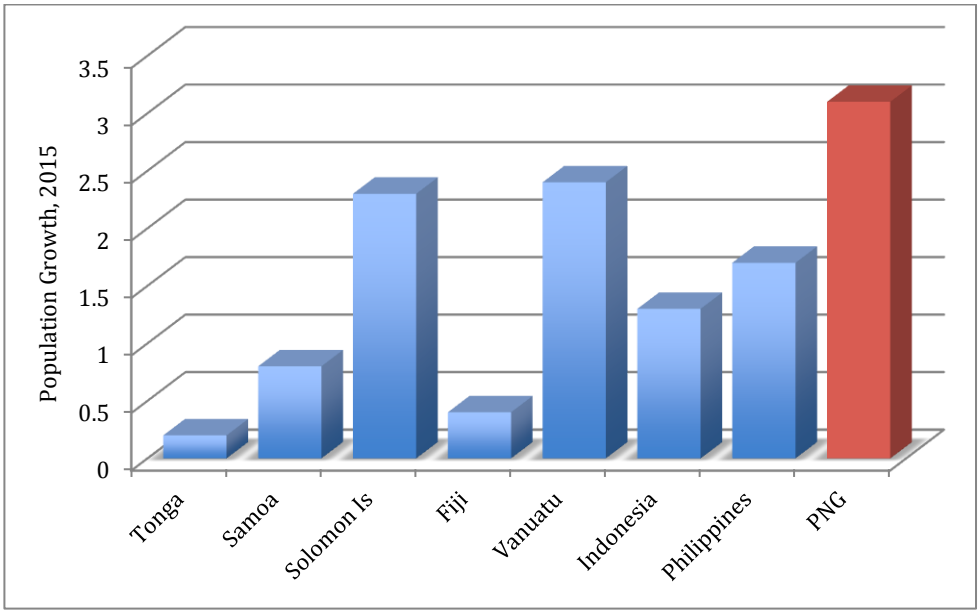


Figure 2: Population Growth for PNG and Other Selected Countries, 2015

Source: ADB 2016

The population and basic demographic indicators for Papua New Guinea, Gulf Province, Kikori District and the Baimuru and Ihu Rural LLGs are presented in Table 3.

Table 3: Population and Demographic Indicators, 2011

Location	Population	Sex Ratio	Average Household Size	Annual Growth Rate	Population Density (people/km²)
Papua New Guinea	7,275,324	108	5.3	3.1%	15.7
Gulf Province	158,197	107	6.1	3.6%	4.6
Kikori District	50,966	103	6.5	1.9%	1.9
Baimuru Rural LLG	12,059	104	6.8	1.3%	1.5
Ihu Rural LLG	18,360	104	6.3	2.1%	6.0

Source: NSO, 2013a; Gulf Provincial Government, 2011.

Gulf Province has the second lowest population of any province in Papua New Guinea (ahead of only Manus) but has the third highest growth rate between 2000 and 2011 (behind only New Ireland and Jiwaka). However, the population growth rate in Kikori District and the Baimuru and Ihu Rural LLGs between 2000 and 2011 was well below the national average.

As shown in Table 3, Gulf Province, Kikori District and the Baimuru and Ihu Rural LLGs have more males than females but a sex ratio below the national average, and average household size above the national average.

Life expectancy in Papua New Guinea is estimated at 63 years and is increasing as high fertility rates (4.6 children per women) outweigh high mortality rates (UNDP, 2014, p. 41). As a result, the population is very young, and in 2000, the median age was estimated at 19-years (UNDP, 2014, p. 41).

The average population density across Papua New Guinea is 15.7 people per square kilometer. The average population density is much lower in Gulf Province (4.6 people per square kilometer) and lower again in Kikori District (1.9 people per square kilometer). For Kikori District, the low population density reflects the relatively large area of land that is isolated and poorly suited to human habitation, particularly in terms of subsistence food production. The population density for Ihu Rural LLG (6.0 people per square kilometer) is substantially higher than for Gulf Province and for Baimuru Rural LLG (1.5 people per square kilometer). Ihu Rural LLG supports a relatively densely settled population along the Papuan coast, whereas the Baimuru Rural LLG population is sparsely settled, much of it along the Purari River and its tributaries.

A population pyramid for Papua New Guinea, derived from the 2011 National Population and Household Census, is shown in Figure 3. The population pyramid illustrates the higher number of males (108 males per 100 females), the high proportion of relatively young people (36% aged less than 15 years of age), and relatively low proportion of elderly (7% aged 55 years and above).

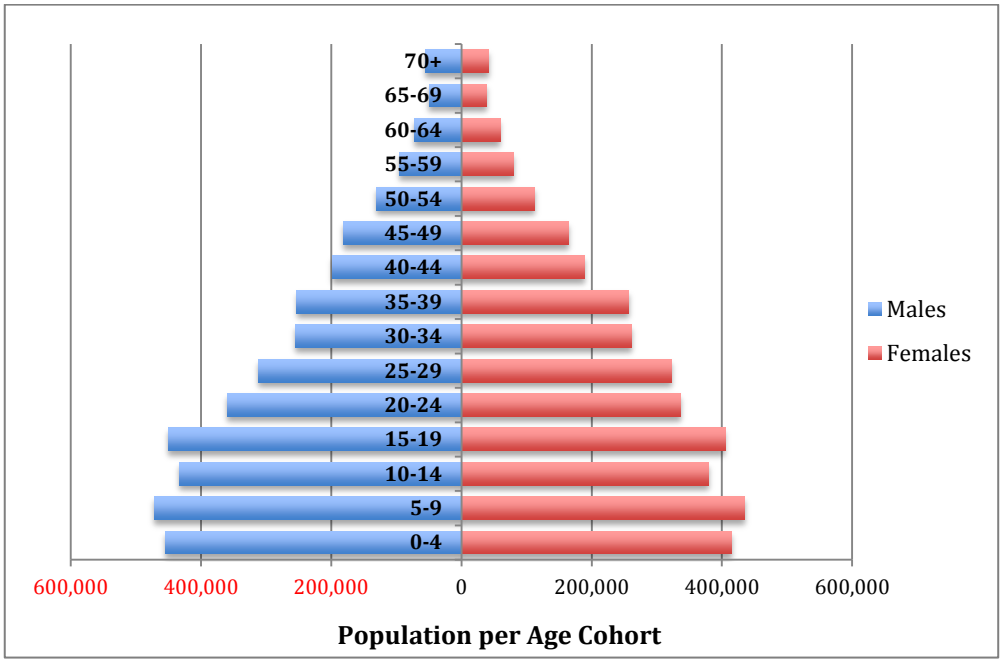


Figure 3: Population Pyramid for Papua New Guinea, 2011

Source: www.nso.*gov.pg* (accessed 1 June 2016)

Of the total population in Papua New Guinea, 88% live in rural areas (NSO, 2013a), which makes Papua New Guinea the fifth least urbanized country in the world (UNDP, 2014, p. 41). In Gulf Province, Kerema is the only urban area, and in 2011 contained 5,885 people or 3.7% of the provincial population. This is an increase in the number of people living in Kerema in 2000, when the census recorded 5,124 people, but a decrease in the proportion of the provincial population living in Kerema (which in 2000 was 4.8%).

6.1.4 Education

6.1.4.1 Education Policies and Strategies

Education is afforded a high priority in Papua New Guinea: integral human development is the first of five national goals articulated in PNG's Constitution, and human development is the basis for the first of seven pillars underpinning Vision 2050. In September 2015 Papua New Guinea adopted the United Nation's Sustainable Development Agenda, which includes Goal 4: ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Basic education in Papua New Guinea is guided by The Universal Basic Education Plan 2010-2019, which aims to provide all citizens with equal access to quality basic education, which provides them with lifelong skills to contribute to the long-term sustainable development of Papua New Guinea (DoE, 2009, p. 24). The Plan includes the following key objectives:

- Improve access;
- Enhance retention;
- Improve education quality;
- Enhance basic education management; and
- Enhance equity.

As part of the Universal Basic Education Plan, the O'Neil Government introduced the 'tuition fee-free education' policy in 2012. This means that the National Government pays all tuition fees for all students from elementary to grade 10.

Education reforms were introduced in 1995. The previous education system, shown in Figure 4, aimed to provide a minimum of eight years of education for every child. However, many school-aged children did not have access to community schools, and there were concerns that the system did not meet Papua New Guinea's specific educational requirements.

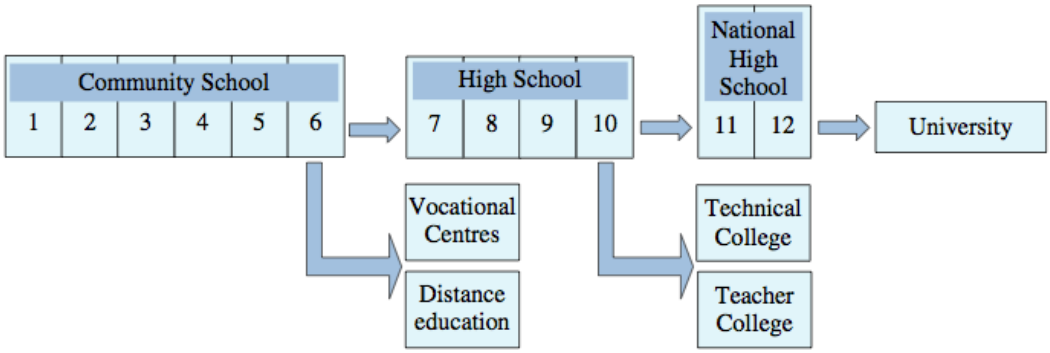


Figure 4: Papua New Guinea's Education Structure Pre-1995

Source: DoE, 2009, p. 7.

The new education structure, illustrated in Figure 5, is based on nine years of basic education, including three years of elementary school in the local language (tok ples), starting at age six, followed by six years of primary school, taught in English. By the end of Grade 8, school children are expected to have the skills to live happily and productively, contribute to their traditional communities and use English to understand basic social, scientific, technological, and personal concepts.

The education reforms required several changes including:

- Shifting Grades 1 and 2 from primary schools to elementary schools and greatly increasing the number of elementary schools and elementary school teachers; and
- Shifting Grades 7 and 8 from secondary schools to primary schools and greatly increasing the number of primary schools and primary school teachers.

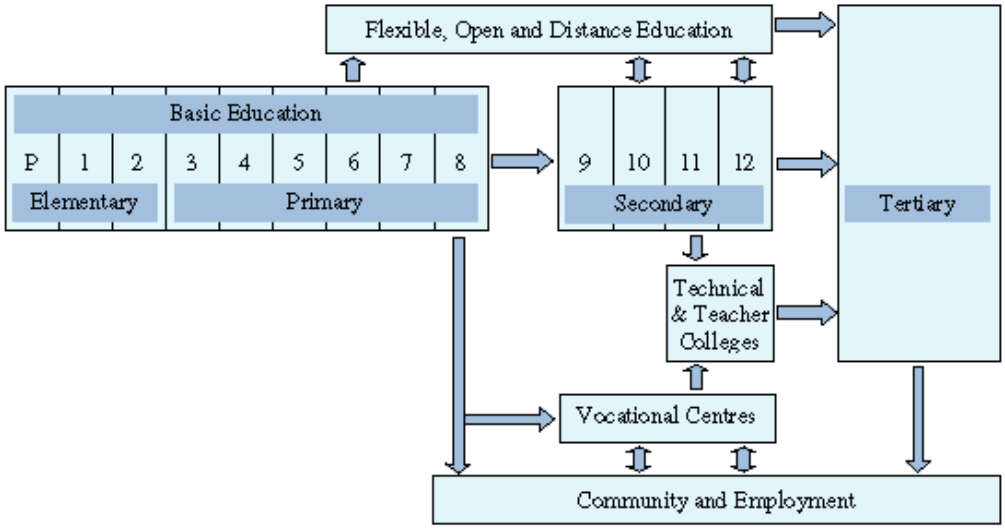


Figure 5: Papua New Guinea's New Education Structure

Source: DoE, 2009, p. 7.

In addition:

- Vocational training is skills-orientated, offered primarily to students completing Grade 8 and the community at large, is limited to one year and provides greater emphasis on short courses designed for the community;
- Technical education aims to provide skills training for students in technical areas at post-secondary level and to provide further opportunities for those already in the work force; and
- Opportunities for distance education have been enhanced to provide alternative and comparable pathways for students and adults who wish to complete their education but do not have access to education institutions.

The reforms have been accompanied by a changing curriculum that recognizes the need to orientate the formal education system towards the specific needs of Papua New Guinea.

The National Government intended to introduce compulsory education in 2015 but this has not happened to date.

6.1.4.2 Roles and Responsibilities

The Department of Education (DoE) is responsible for determining national policies, coordinating national policy implementation, maintaining national standards, and providing professional support and advisory services for planning, research, training and staff development. It is also responsible for operating the national institutions including teachers' colleges, technical colleges, national high schools, special education resource centers, the College of Distance Education and all schools in the National Capital District.

The DoE is also responsible for:

- Curriculum development;
- Initial supply of textbooks and curriculum materials;
- Teacher education;
- National examinations; and
- Supervision and appraisal of teachers.

Under the Organic Law, general education refers to pre-school, elementary, primary, high, secondary and vocational education. The roles and responsibilities of different levels of government in providing general education are summarized in Figure 6. Tertiary education is the responsibility of the Department of Higher Education.

ACTIVITY	NATIONAL GOVERNMENT	PROVINCIAL GOVERNMENT	LLG
Policy and planning	• National Education Board and Teaching Services Commission • Develop curriculum	• Develop provincial education plan	• Identify local priorities
Elementary education	• Set maximum school fee limits • Pay school fees subsidy in 1st and 3rd quarter • Curriculum development (some locally based curriculum developed at community/school level) • Deliver new curriculum materials to Provincial Government head quarters (HQ) • Pre-service teacher training and registration	• Decide to recognize new schools • Provide support through the Education Function Grant • Distribute curriculum and acquire additional education materials • Assist with logistics of teacher training (e.g. Venues, transport)	• Assist in securing land for new schools and community with construction • Maintain schools; inspect buildings that are LLG funded
Primary education	• Curriculum development and delivery to Provincial Government HQ • Pay school fees subsidy in 1st and 3rd quarter • Provide Grade 8 exams to Provincial Government and collate results across Papua New Guinea • Teacher training and in-service training • Inspect schools	• Store, then distribute curriculum throughout province • Provide support through the Education Function Grant • Administer Grade 8 exams and send results to DoE • Compile district monthly reports and submit quarterly to DoE • Logistical support for school inspections • Payroll administration (in some provinces)	• Construction and maintenance of primary schools • Maintain schools: inspect buildings that are LLG funded
Secondary and vocational	• Run the National High Schools • Grade 9 and 11 selection criteria • Grade 10 and 12 exams prepared and delivered to Provincial headquarters; marking exams • Granting of school certificate and higher school certificate • Develop curriculum and deliver to Provincial headquarters • Teacher training (vocational), admission and registration • Inspections	• Run and maintain Provincial High Schools • Distribution of grade 10 and 12 exams and supervision • Compile district monthly reports and submit quarterly • Prepare storage plan and distribute curriculum to schools • Determine applications for in-service training, organize venues and logistics (also District involvement) • Payroll administration • Some school inspections and logistic support for National inspections	

Figure 6: Education Roles and Responsibilities

Source: Department of Education 2009, p. 20.

The legislative framework clearly makes provincial and local level governments responsible for developing and operating most schools in the province. At provincial level, the sector is guided by:

- A Provincial Education Board, which is responsible for proposing policy and plans to the Provincial Administration, and for supervising implementation of education plans in Gulf Province;
- District Education Boards, which perform similar functions at a district level; and

- School Boards (including Boards of Governors for secondary schools, and Boards of Management for elementary and primary schools), which are responsible for the formulation and implementation of policies at the school level, and for the care and maintenance of school facilities, equipment and materials; disciplinary processes, including expulsion; fund raising and expenditure of school funds; and proposing development plans to the LLG.

A ten-year education plan was prepared for Gulf Province in 2006. The plan encompasses the education reforms and reflects the National Government's education priorities.

6.1.4.3 Education Levels

DoE aims to provide universal basic education, which is broadly defined as:

- **Access** – All children should enter elementary prep at 6 years of age;
- **Retention** – All children should complete the elementary and primary cycles of education that constitute a basic education: 9 years of basic education in total; and
- **Quality** – All children should reach a required standard of literacy and numeracy at the end of their 9 years of education.

The key indicators used by the DoE to measure education performance are:

- **Net Admission Ratio**: Number of 6-year olds enrolled in Elementary Prep as a percentage of the total population of 6-year olds;
- **Gross Admission Ratio**: Total number of new entrants in Elementary Prep, regardless of age, expressed as a percentage of the population at the official elementary school-entrance age;
- **Cohort Completion Ratio**: Percentage of Cohort that enrolled in Elementary Prep completing Primary Grade 8;
- **Net Enrolment Ratio**: Enrolment of the official age-group for a given level of education expressed as a percentage of the corresponding population;
- **Gross Enrolment Ratio**: Total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school-year; and
- **Quality of Learning**: The primary Grade 8 exam results have been used in the analysis for measuring the quality of learning in schools, although the Curriculum Standard Monitoring Test will be used in future years for this purpose.

In 2007, the Gross Admission Rate across Papua New Guinea was estimated at 80%. However, only 15% of the students enrolled in elementary prep were six years of age. As a consequence, the Net Admission Rate in 2007 was just 12%. The reason for such a low Net Admission Rate is the varied age at which students commence school, as depicted in Figure 7.

The main reasons for the low admission rates in 2007, according to the DoE, included:

- No elementary school available within a reasonable distance;
- Inadequate capacity within existing schools to enroll all students; and
- Financial reasons, particularly school fees (DoE, 2009, p. 12).

Papua New Guinea compares poorly against countries from the Pacific and Southeast Asia in terms of the proportion of the population that completed primary education. As shown in Figure 8, the estimated 79% of the proportion of the population who completed primary education is well below all other countries.

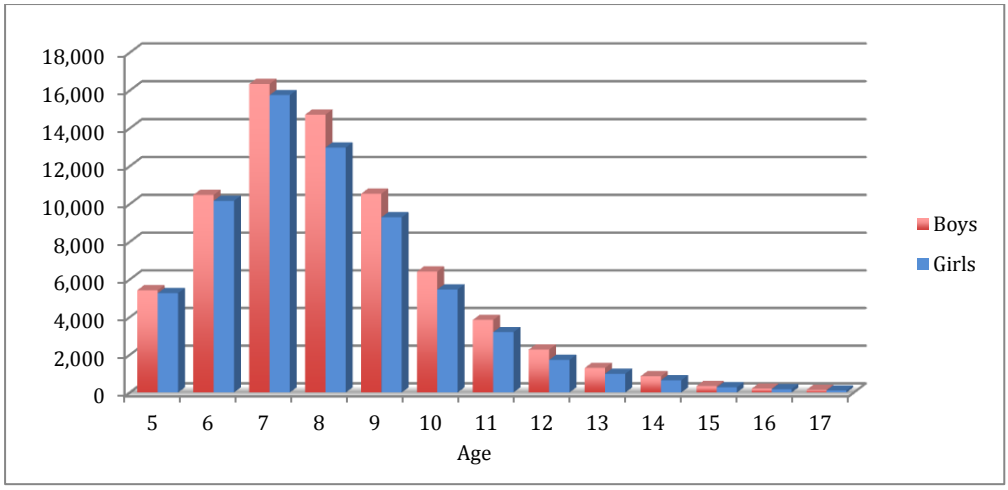


Figure 7: Age Students Commenced School, 2007

Source: Department of Education 2009, p. 11.

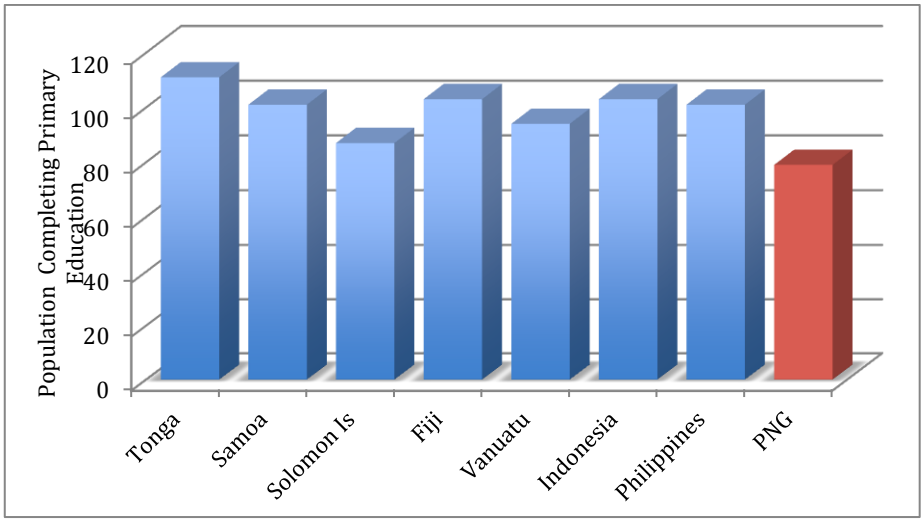


Figure 8: Population Completing Primary Education for PNG and Other Selected Countries, 2015[4]

Source: ADB 2016

The Net Admission Ratio in Gulf Province in 2007 was 5.5% (males 5.6%, females 5.3%) compared to the National Net Admission Ration, which was 11.5%. This was the third lowest in Papua New Guinea behind only East Sepik and Northern Province.

The retention rate, based on 2007 data and limited to the proportion of students enrolled in Grade 1 who complete Grade 6, was estimated at 62% nationwide. The estimate for Gulf Province was 71% (males 76%, females 66%). Substantial variability in data between provinces was attributed to errors in data collection (DoE, 2009, p. 14). Nevertheless, many students did not complete six years of study. This was attributed to:

- School fees;
- Lack of education materials;
- Lack of adequate school infrastructure, including teacher's houses;
- Poor teacher attitude and attendance;
- Remoteness;

[4] The totals do not necessarily equal 100% because the total number of new entrants in the last grade of primary education, irrespective of age, expressed as a percentage of the total population of the theoretical entrance age to the last grade of primary education.

- Negative pupil behavior;
- Lack of parental support and community responsibility;
- The relevance of schooling; and
- Tribal fights, in highland provinces (DoE, 2009, pp. 14-15).

The Gross Enrolment Rate in 2007 was estimated at 70%, across Papua New Guinea, while the Net Enrolment Rate was estimated at 53%. In Gulf Province the Gross Enrolment Rate in 2007 was estimated at 58% (second lowest in Papua New Guinea), while the Net Enrolment Rate was estimated at 42% (third lowest in Papua New Guinea). Further analysis by the DoE revealed that in 2007, approximately 14,140 children between the age of 6 and 14 were enrolled in school, and an estimated 18,114 children of similar age were not enrolled in school. Thus, in Gulf Province, 55% of school-aged boys and 58% of school-aged girls were not attending school (DoE, 2009, p. 17).

In 2010 AusAID commented that the Government has made strong strides in basic education in recent years: net enrolment increased from 53% in 2007 to 64% in 2009 and the proportion of students completing Grade 9 increased from 42% in 2006 to 57% in 2009 (Australian Government, 2010, p. 8). Nevertheless, Papua New Guinea compares poorly against countries from the Pacific and Southeast Asia in terms of the proportion of the population that are literate. As shown in Figure 9, the estimated 63% of the adult population who are literate is well below all other countries.

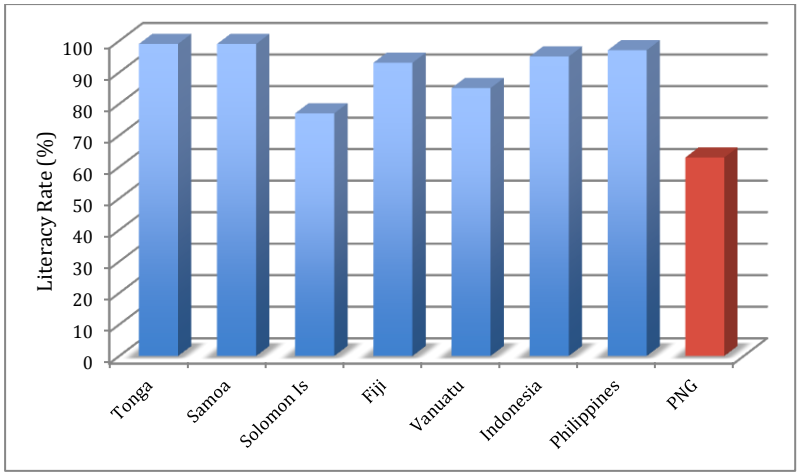


Figure 9: Adult Literacy Rates for PNG and Other Selected Countries, 2015

Source: ADB 2016; Fiji Government 2017; UNESCO 2017.

Several commentators have also stated that the quality of Papua New Guinea's education and technical training facilities has been declining for at least 20 years, and this has resulted in a decline in the quality of the workforce (Jones & McGavin, 2015, p. 57).

Grade 8 examination results for 2006 (DoE, 2007) revealed low average marks across Papua New Guinea in numeracy (39%), literacy (39%) and general skills (40%), with a higher performance in written expression (68%). The results led the DoE to query the effectiveness of teaching, and to question the results of the written expression results, which were at odds with the literacy assessment.

Results for Gulf Province in 2006 in all assessment categories were the lowest in Papua New Guinea: numeracy (24%), literacy (30%), general skills (27%) and written expression (46%). Factors contributing to the poor quality of learning include:

- Availability of textbooks and supplementary reading materials;
- Teacher quality; and
- Instructional time and the work demand placed on pupils (DoE, 2009, p.18).

More recent education data for Gulf Province, based on surveys conducted by Asia South Pacific Association for Basic and Adult Education (ASPABAE) in 2009 and 2010, indicate that 9% of people aged from 15 to 60 years of age had never attended school, and only 20% had attended secondary or tertiary schools. As shown in Figure 10, the majority of people aged from 15 to 60 years of age have only attended primary school.

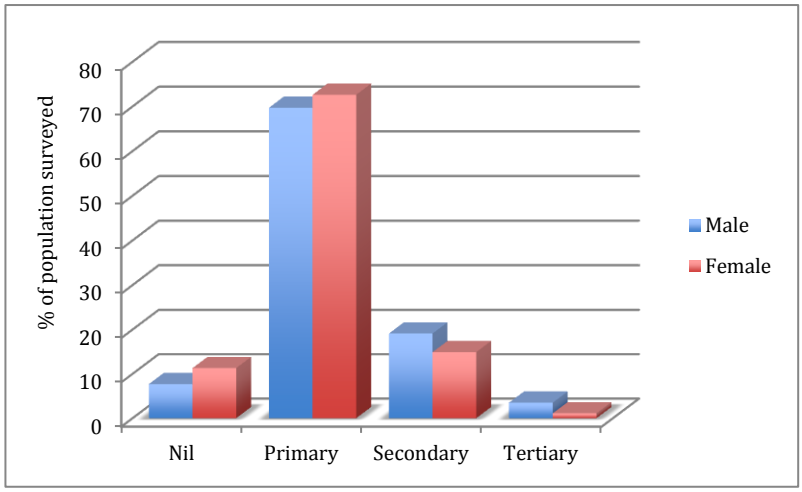


Figure 10: Highest Level of Education Attended, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 56

Further analysis of the data for Gulf Province indicate that fewer younger people have never attended school (refer Figure 11), which indicates some progress towards increasing the proportion of people attending school over time.

Although Figure 11 indicates some progress in increasing the proportion of people attending school, many people in Gulf Province, from all age groups, have not attended any school. The reasons for not enrolling or not completing school are shown in Figure 12.

As shown in Figure 12, the most common reason for people not attending school, or not continuing in school, is the high cost of school fees. It is important to note that the survey was conducted in 2009 and 2010, just prior to the introduction of the tuition fee-free policy in 2012. Other reasons for people not attending school, or not continuing in school, included helping parents at home (particularly for girls), seeking paid employment, and the absence of nearby schools.

6.1.4.4 Language Preference

Information from the ASPABAE survey in 2009/10 indicates that *tok ples* and Tok Pisin are the most commonly spoken languages in Gulf Province (Figure 13).

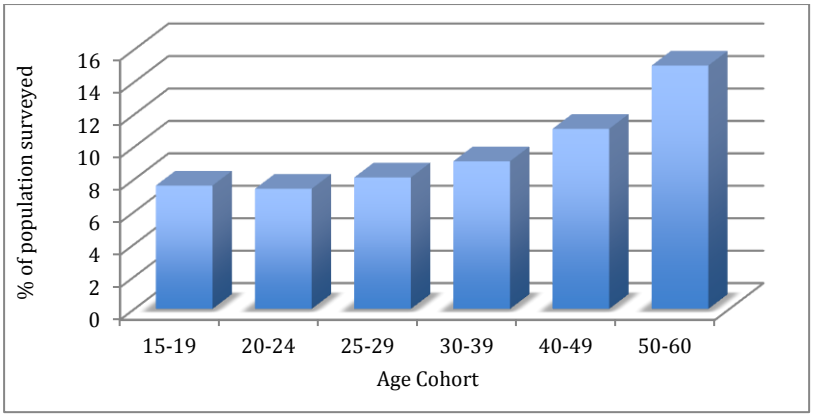


Figure 11: People Not Attending School by Age Cohort, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 56

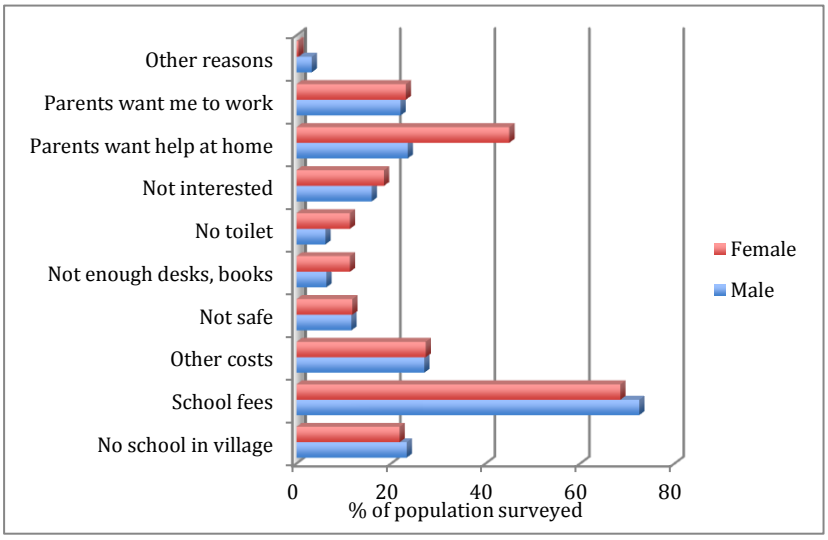


Figure 12: Reasons for Not Enrolling in or Completing School, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 57

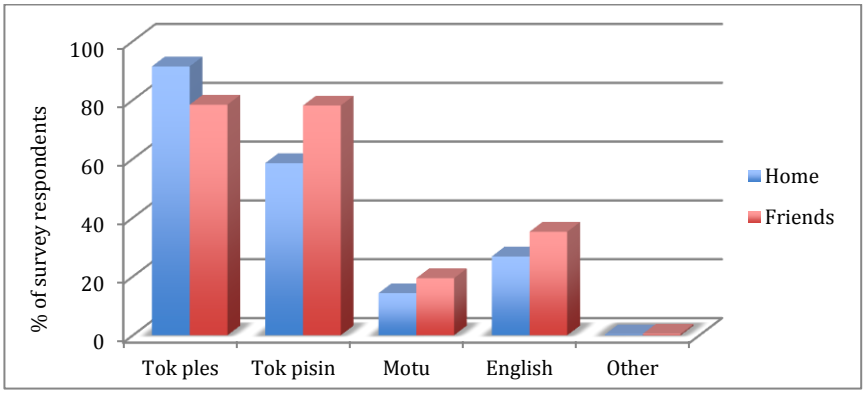


Figure 13: Languages Spoken at Home and with Friends, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 60

As mentioned in Section 6.1.4.1, elementary school is taught in *tok ples* while primary school is taught in English. However, when asked about their preference for the official language, the most common response was English, followed by Tok Pisin (refer Figure 14).

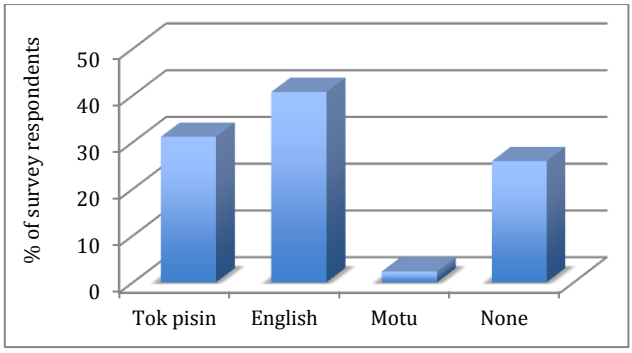


Figure 14: Preferred Official Language, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 64

6.1.4.5 Literacy Levels

The 2000 National Population and Housing Census reported that 61% of males and 51% of females aged 10 years and above, were literate in at least one language. These results are based on self-assessment in response to the question 'are you able to both read and write with understanding a short simple statement in your day to day life?' A similar question was asked to people aged 15 to 60 years in Gulf Province in 2009/10. As shown in Figure 15, 67% of males and 60% of females indicated that they could read easily in Tok Pisin, English or Motu.

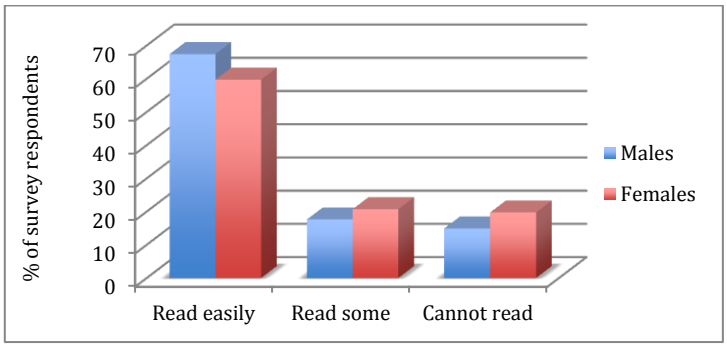


Figure 15: Reading Confidence in Tok Pisin, English or Motu, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 64

The survey also indicated that 15% of males and 20% of females, aged 15 to 60, could not read in Tok Pisin, English or Motu. As shown in Figure 16, the proportion of people who cannot read increases with age.

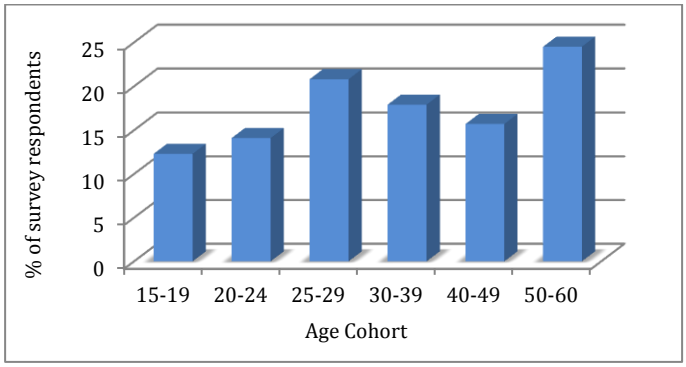


Figure 16: Population who can not Read by Age, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 64

As discussed below, the accuracy of the self-assessment method of estimating literacy levels is questionable. To help clarify literacy levels, ASPABAE conducted literacy assessments in Gulf,

Sandaun, Chimbu and New Ireland provinces and the National Capital District (NCD) between 2006 and 2010. The methodology for the assessment is described in Figure 17 below.

The literacy assessment focused on reading, writing and numeracy, as well as comprehension evidenced by the ability to apply these skills in familiar contexts in everyday life. The assessment tool contains a graduated series of questions in each skill area:

- Reading skills were tested by asking respondents to match three pictures with three corresponding names; to read two sentences aloud; and to read a simple story (of six sentences) and give oral answers to two written questions;
- Writing skills were tested by asking respondents to write the names corresponding to two pictures; and to write two short sentences about the pictures;
- Numeracy skills were tested by asking respondents to count the number of objects in a picture; to name the missing number in a sequence; and to make two simple calculations in everyday scenarios; and
- Comprehension and the ability to apply literacy skills were tested by asking respondents to read the time on a clock face; to interpret dates on a calendar; and to describe the message of a poster.

Each response was scored depending on the accuracy of the answer given. A composite score, based on the assessment results in each skill area, was calculated and used as the basis for classifying each survey respondent as either non-literate, semi-literate or literate.

Figure 17: Literacy Assessment Method

Source: ASPABAE, 2011, p. 2.

The methodology for the literacy assessment was prepared by literacy specialists and was considered as not difficult to pass (ASPABAE, 2011, p. 4). The results of the literacy assessment indicate that the self-assessment method is a very inaccurate measurement of actual literacy attainment, and literacy levels in the provinces surveyed are substantially lower than those reported in Papua New Guinea.

Results of the assessment for Gulf Province are shown in Figure 18 and indicate that just 4% of people between 15 and 60 years of age are literate, with 37% semi-literate.

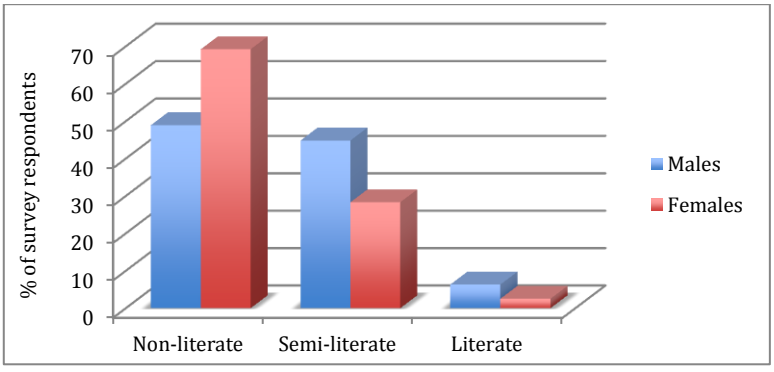


Figure 18: Literacy Assessment, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 65

The results for Gulf Province were vastly different to the National Population and Housing Census in 2000, in which 52% of the population, aged 10 years and above, indicated they were

literate. Results for Gulf Province are also substantially lower than the results for the other provinces and NCD, as shown in Figure 19.

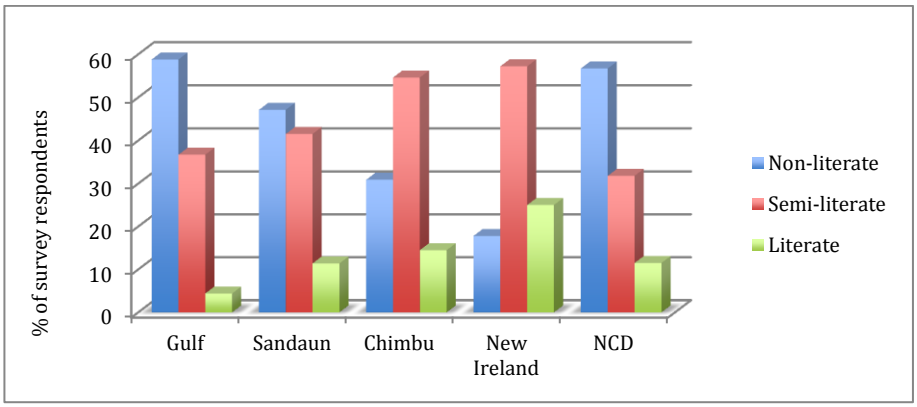


Figure 19: Literacy Assessment by Province

Source: ASPABAE, 2011, p. 4

As shown in Figure 19, Gulf Province has by far the lowest level of literacy among the provinces surveyed. Further examination of the results indicates that literacy levels are also relatively low for students attending school at the time of the survey. As shown in Figure 20, approximately 5% of school students were assessed as literate, and 72% assessed as semi-literate. This is a poor result given the methodology for the assessment, which is described as not difficult to pass. The quality of education provided in Gulf Province is likely to be the cause.

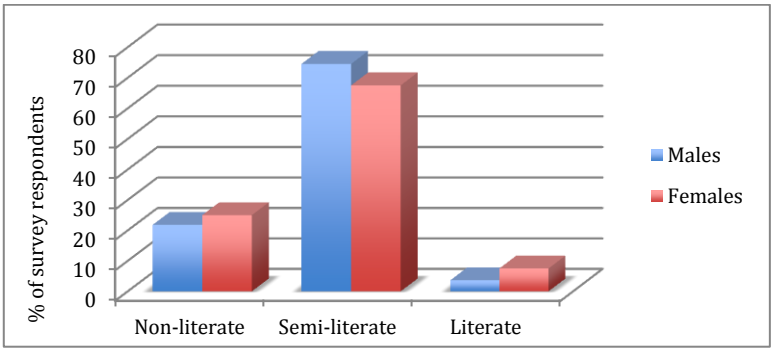


Figure 20: Literacy Assessment for Students Attending School, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 66

Despite the results presented in Figure 20, there is a positive correlation between education and literacy levels. As shown in Figure 21, literacy levels clearly improve when people attend school and attend higher levels of education. However, of concern is that 9% of students who have attended some secondary school are illiterate, and 74% are only semi-literate. Again, this raises concerns over the quality of education provided in Gulf Province.

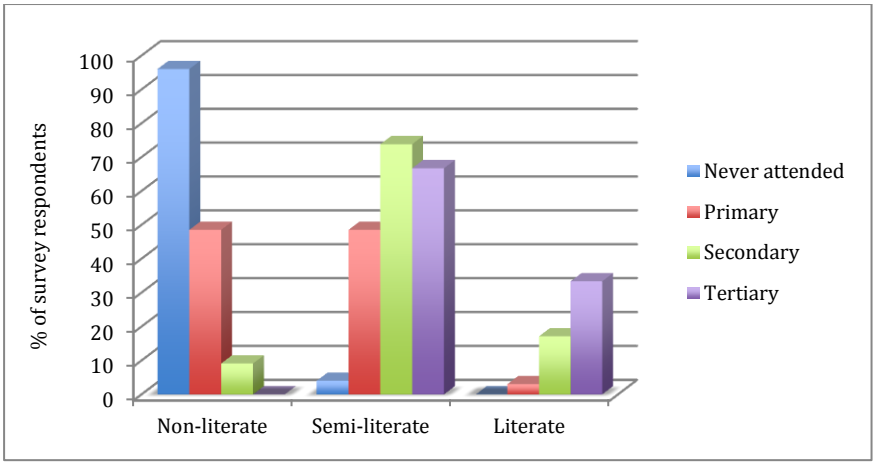


Figure 21: Literacy Assessment by Education Level Attended, Gulf Province 2009/10

Source: ASPABAE, 2011, p. 67

6.1.4.6 Provincial Education Overview

The education facilities in Gulf Province in 2010 are summarized in Table 4.

Table 4: Education Facilities in Gulf Province, 2010

Facility	Number of Schools	Per Cent Operating (%)	Church Run Facilities
Elementary	196	64	86
Primary	114	81	46
International primary	2	100	2
Vocational	4	50	
High	4	75	2
Secondary	2	100	1
University college	1	100	
Flexible Open Distance Education (FODE) facilities	3	100	
Literacy schools	29	100	29

Source: Gulf Provincial Government, 2011, pp. 24, 52.

As shown in Table 4, approximately 30% of basic education facilities in the province were closed in 2010. The church agencies play a major role in the provision of education services in Papua New Guinea: in 2006, church agencies managed 49% of the elementary and primary schools in Papua New Guinea, and these schools contained 49% of total elementary and primary school students.

As shown in Table 4, Gulf Province had a college of the University of Papua New Guinea operating in Kerema. This closed in 2015 reportedly as a result of unpaid lecturer salaries. Also shown in Table 4, Gulf Province contained four high schools and two secondary schools in 2010. Kerema High School is in the process of changing to a secondary school, with Grade 11 offered in 2016 and Grade 12 to be offered in 2017. However, this means that the province still contains three high schools and the reforms, introduced 20 years ago, have not still been fully implemented in Gulf Province.

Also shown in Table 4, Gulf Province contains an estimated 29 literacy schools, all managed by church agencies. There is no specific definition of a literacy school in Papua New Guinea. Literacy schools can cater for children, adults or both; they generally don't follow a specific

curriculum, but use the local *Tok Ples* language and are tailored to the proficiency and needs of the students. The DoE has a National Literacy and Awareness Secretariat, which aims to support adult literacy in Papua New Guinea, for example, by preparing a literacy teaching manual. UNESCO provided support to prepare a National Literacy Plan (undated). It is unclear if any funding is available to the activities outlined in the Plan.

The number of schools, students and teachers in the Baimuru and Ihu Rural LLG areas is shown in Table 5 and Table 6, respectively.

Table 5: Schools, Student and Teachers in Baimuru Rural LLG, 2015

Facility	Schools	Students	Teachers	Student: Teacher Ratio	Female Students
Elementary	22	1,584	39	41	48%
Primary	13	1,552	43	36	46%
Vocational	1	86	6	14	15%

Source: Education Division, Gulf Provincial Government, 2016.

Table 6: Schools, Student and Teachers in Ihu Rural LLG, 2015

Facility	Schools	Students	Teachers	Student: Teacher Ratio	Female Students
Elementary	29	1,962	50	39	48%
Primary	17	2,295	70	33	45%
High	1	231	6	39	42%
Technical secondary	1	334	15	22	35%

Source: Education Division, Gulf Provincial Government, 2016.

The Ihu Vocational School is closed and has not been included in Table 6. The technical secondary school, at Araimiri, is operated by Don Bosco, and does not conform to the government's school classification system described in Section 6.1.4.2.

As shown in both Table 5 and Table 6, class sizes are high and female enrolment is relatively low, particularly in vocational and technical schools. The Baimuru Vocational School offers metal, electrical, agricultural and other courses. The Don Bosco Secondary Technical School at Araimiri offers computing, textile, home economic, food, motor vehicle machinery, electrical and other courses.

The province had 15 FODE centers in 2015 (providing distant education from Grade 7 to Grade 10, although FODE can also accommodate Grade 11 and 12 students), with the headquarters in Kerema. This includes four centers within the Baimuru Rural LLG: Baimuru Primary School, Baimuru Vocational School, Akoma Primary School and Evara Primary School; and one center within the Ihu Rural LLG, which is at Ihu High School.

The Division of Education knows of 17 literacy schools in the province in 2015 and acknowledges that other schools may be operating without their knowledge. Of the 17 literacy schools, two are located within the Baimuru Rural LLG: Akoma Kindergarten and Kaialavi Literacy School; and four are located within the Ihu Rural LLG: Akapiri Kindergarten, Herehere Kindergarten, Ova'a Kindergarten and Aravila Adult Literacy and Kindergarten. The majority of literacy classes focus on young children and are managed by church agencies. The Division of Education are aware that the Digicel Foundation has provided literacy teacher training and may have established literacy schools. The Division is also aware that Gulf Christian Services is using

an alternative method to teach people to read and write (referred to as the uni-script method), but the Division of Education has little more information.

National Grade 8 examination results for Gulf Province confirm the below-average education standards. The pass mark is 65 out of 150. According to the Division of Education, only 44% of the 978 students sitting the 2014 examinations achieved a pass mark and were accepted into Grade 9, while in 2015, 35% of the 1,171 students were accepted into Grade 9. However, to ensure the schools accepting Grade 9 students were full, approximately 200 more students were accepted (generally those with the better reading and writing skills).

Another indication of the level of performance in the Grade 8 examinations is the Mean Rating Index. The MRI is a score out of 50 and is a composite score for English, Maths, Science and Social Science across all of Papua New Guinea. The average score is 25. Gulf Province scored an average of 14.6 in 2014 and 14.8 in 2015, which is well below average. Although results for other provinces are not available for 2014 and 2015, Gulf Province was ranked last of all provinces in the 2007 Grade 10 examination results (DoE, 2007, p. 42).

6.1.4.7 External Support for Education

Donors play an important support role in the provision of education services in Papua New Guinea. The major donors include Australia, the European Union, Japan, New Zealand, UNICEF and the World Bank, who together, planned to provide $524 million in support to basic and secondary education between 2010 and 2015. Australia's contribution to this was $410 million, of which 60% was to be allocated to educational materials, school infrastructure and grants (Australian Government 2010, p. 8). Much of the Australian assistance to the education sector is channeled through the National DoE and provincial education divisions, focusing on capacity building at the national level, supporting teachers to improve the quality of teaching and learning, and primary school infrastructure.

In Gulf Province, the education sector has not received any recent support from donors, other than the national education programs mentioned above. However, as discussed above, several church agencies along with Digicel Foundation and Community Development Initiative (CDI) have provided assistance to the sector in the past, although with limited coordination with the provincial Division of Education. CDI previously administered FODE distance education in Kikori District for a number of years, organizing course documentation, examinations, and engaging local high school teachers as part-time tutors and markers for the FODE program. It is not known if this support has been continued since CDI closed its Kikori office.

Since taking over operatorship of PRL-15, TEP PNG has provided support for building materials for the construction of a double classroom with solar panels, water tank, teacher's office space and furniture at Poroi 2 Primary School (in conjunction with the Poroi community and Digicel Foundation). It has provided stationary and reading books for all schools operating in the vicinity of PRL-15 (in conjunction with Buk Bilong Pikinini, a not-for-profit organization providing books for children).

6.1.5 Law and Order

6.1.5.1 Roles and Responsibilities

In Papua New Guinea police services are centralized under the RPNGC. The police presence is generally limited to urban centers, major government stations and large private-sector developments. Often, the police will only venture outside these areas when they are required to investigate a serious crime. The police are often constrained by a lack of resources, including police accommodation, vehicles and operating expenses.

In Papua New Guinea the national judicial system includes the Supreme Court of Justice, the National Court of Justice and various other courts, including district courts and land courts. The Chief Justice has administrative responsibility over the Supreme and National courts. The National Court is responsible for protection of fundamental rights to life, freedom from

inhuman treatment, liberty of the person or property, and has exclusive jurisdiction over human rights. District Courts are the front-line of the formal justice system for addressing legal rights, providing a mechanism for the administration of justice and the resolution of disputes. Further information about the political system and situation in Papua New Guinea is found in Finlayson (2017).

As the national and district courts operate predominantly in urban areas and are not easily accessible to the majority of Papua New Guinea's population, village courts, established in 1975, have the primary role of ensuring peace and harmony in the communities in which they operate.

The village courts place the administration of justice largely in the hands of people in the communities in which the disputes arise. Village courts comprise 11 members, including village court magistrates, peace officers and a village court clerk. Village courts are obliged to attempt the resolution of disputes first by way of mediation. The village court magistrates are legally untrained but are paid a small stipend for their work (PGK300 to PGK400 per month). They have both a civil jurisdiction in matters arising from custom, and a criminal jurisdiction designed to help keep the peace at the local level. Typically, the village courts are dealing with disputes relating to stealing garden produce, disputes over gardens, general bad behavior (arguments, noise, gossip, etc.) and disputes between husband and wife. Village court magistrates are supported by peace officers (sometimes referred to as police officers) and village court clerks, and are administered by the Department of Justice and Law and Justice Division at provincial level. Village magistrates may impose a fine of up to PGK300 (which is paid to the Department of Justice) and require compensation to a value of PGK1,000 (which is paid to the complainant). The complainant however, is required to pay a court summons fee of PGK20 (which is kept by the village court to fund their operating costs).

Although the Department of Justice appointed village court officials several years ago, many have not been trained due to funding constraints. However, the village courts are operating and cases are heard as and when required, under the guidance of a chairman for each village court jurisdiction (who is one of the magistrates). In the PAOI, village courts appear to meet every three or four weeks to hear cases (although this varies and is dependent on what cases come before the courts). Gulf Province does not keep a record of village court cases. The Director of the Law and Justice Division in Kerema acknowledge the need to count the number of cases and summarize the type of case heard, but at this stage, all village court records are simply sent on to the Department of Justice in Port Moresby.

Other approaches for dealing with minor criminal activities are also common in many parts of Papua New Guinea, with traditional and/or church leaders often playing a direct role in conflict resolution and/or determining compensation.

Each LLG in the province also contains four land mediators. Their role is to try and mediate and land disputes between conflicting parties (and they are also involved in any government land purchase). If land disputes cannot be resolved then the parties may take their dispute to a local land court hearing (which will include a magistrate and at least two land mediators), and if the dispute can still not be resolved, it could go to the provincial or national land courts. The land court operates within the *Land Disputes Settlement Act* (1975) specifically for the purpose of settling disputes relating to customary land. Local land courts comprise a local land court magistrate and not more than four land mediators. They make decisions by majority and sit as necessary. The Provincial Land Court comprises one Provincial Land Court Magistrate who may seek assistance from land mediators. It also sits as necessary. The land court process is as follows (MSPNG 2011):

- The complainant files a complaint with the Local Land Court;
- The clerk creates a file for the matter;
- The complainant serves all parties in the matter;
- The mediator presides over land mediation;

- If mediation is unsuccessful, the Magistrate in the Local Land Court may hear the matter;
- When parties are not satisfied with the Magistrates decisions, they may appeal to the Provincial Land Court;
- The Provincial Land Court hears matter;
- The Provincial Land Court Decisions may be appealed to the National Court.

Most land disputes in Gulf Province reportedly involve logging benefits, although statistics on the number or type of cases reported by land mediators have not been prepared. Several land disputes in Gulf Province by-pass the local land dispute resolution process, and go direct to the National Court. The major difference between this approach and the local process is that, unlike the local process, mediation is not a desired outcome (there is only a winner and a loser), and the parties have legal representation.

Kerema has a district court house and one resident judge. The workload is offset by visiting judges, but district courts are only held in Kerema, not Kikori or Malalaua. Gulf Province also has 792 village court officials and 44 land mediators. The majority of village court officials and land mediators are on the payroll, the others are in the process of being added to the payroll.

Support for village courts has previously been provided through the Papua New Guinea-Australia Law and Justice Support Program (2013-2015). A second phase of the project is reportedly about to commence and will target seven provinces, including Gulf Province. The provincial Director for Law and Justice has indicated that this program will allow the training of village court officials and land mediators, and the disbursement of village court and land mediation manuals that have already been prepared under the first phase of the project.

6.1.5.2 Crime Rates

The general level of law and order in Papua New Guinea has declined since independence (Jones & McGavin, 2015, p. 57), which has diverted resources to security services and increased investment risks.

The 2009/10 Household Income and Expenditure Survey (HIES) included a sample size of 4,191 households across Papua New Guinea. Information is generally presented by region (Southern, Highlands, Momase and Islands) and by rural and urban populations. The Southern Region includes Western, Gulf, Central, Milne Bay and Northern Province and the National Capital District.

Results of the 2009/10 HIES indicate that the most common crimes reported in Papua New Guinea, and in rural areas of Southern Region, are stealing, then what is described as alcohol and drug related offences (refer Figure 22).

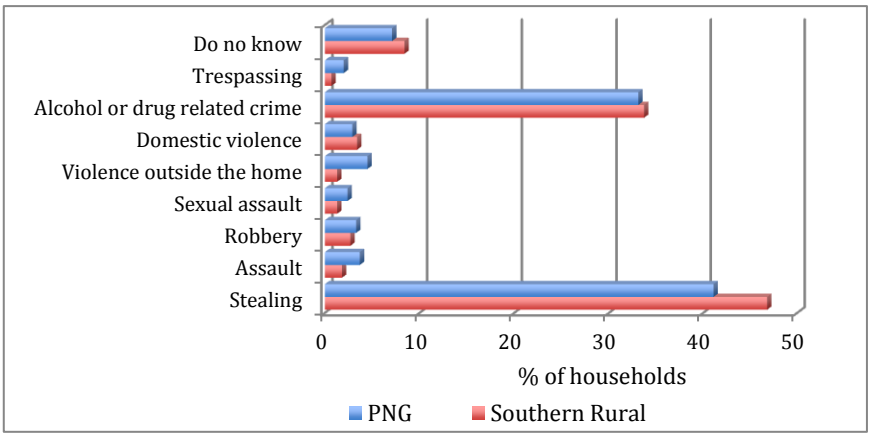


Figure 22: Most Common Crime Reported, 2009/10

Source: NSO, 2013b, p. 140.

Results of the 2009/10 HIES also indicate that crimes do not prevent around 50% of survey respondents from changing their daily behavior (refer Figure 23), however, between 10% and 15% of survey respondents indicated that they were not willing to undertake basic daily activities, such as using public transport (13%), walking to gardens (13%), walking to shops or markets (13%), or children walking to school (10%).

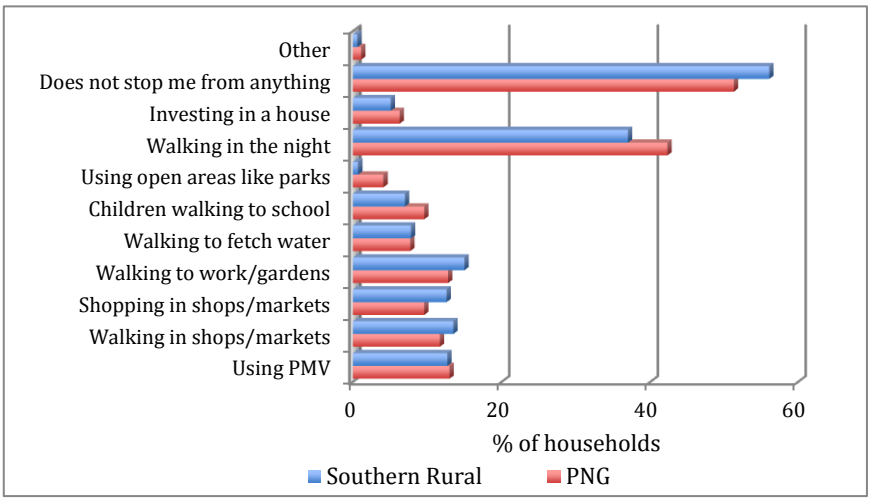


Figure 23: Effect of Crimes on Willingness to Undertake Activities, 2009/10

Source: NSO, 2013b, p. 140.

To make broader regional comparisons, the ADB (2016) compares rates of homicides per 100,000 people. Papua New Guinea has the greatest number of homicides per 100,000 than another country from the Pacific and Southeast Asia. As shown in Figure 24, there are almost 11 homicides per 100,000 in Papua New Guinea compared with Indonesia, the lowest in the region, at 0.5 and the Philippines, the second highest, at 9.9.

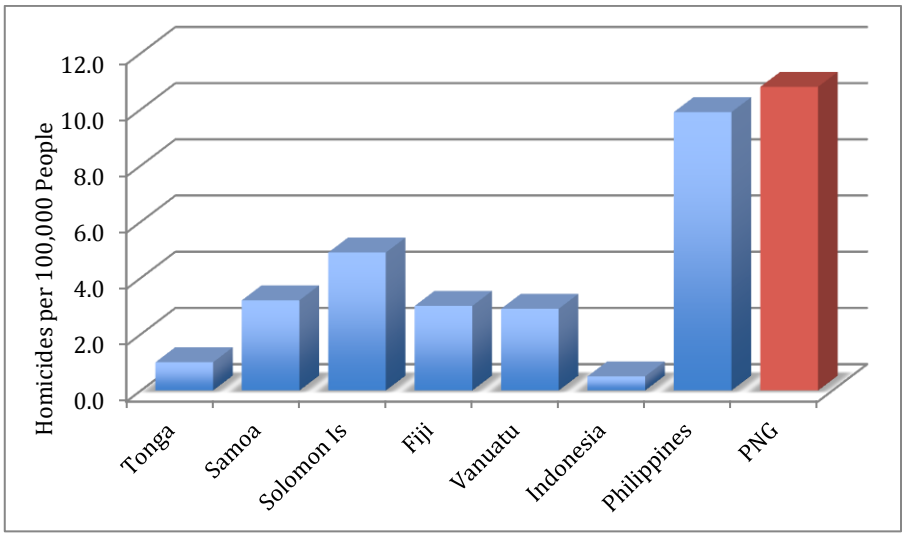


Figure 24: Homicides per 100,000 people for PNG and Other Selected Countries, 2012

Source: ADB 2016

6.1.5.3 Gulf Province

The Provincial police headquarters is at Kerema and includes a criminal investigation unit, traffic unit, prosecution unit and public safety unit. The Province is headed by the Provincial Police Commander (PPC) and has 48 regular police officers and approximately 500 auxiliary officers and community based constables (CBCs). Auxiliary officers provide a link between the police and the community, while CBCs are responsible for reporting crimes to the police. The

RPNGC is responsible for the provision of regular police and their equipment, while the province is responsible for their accommodation. The LLGs are responsible for paying auxiliary officers and CBCs, but both report to the police.

The PPC has identified the need for more housing for police officers in Gulf Province (including Kerema, Baimuru and Ihu) and has plans to establish a police post with an officer at Wabo. The PPC is in the process of increasing the number of regular police, but the new recruits will need to be trained and gain experience in Kerema before being posted to Kikori and other centers. The PPC has also identified the need for additional training for both auxiliary officers and CBCs in Gulf Province, and most CBCs also need to be included on the payroll.

The police acknowledge that crime statistics are under-reported due to (i) the limited police presence in rural areas and (ii) a reluctance to report many crimes, including for example, domestic violence. However, over a five-month period from March to July 2016, a total of 514 crimes were recorded in Kerema, resulting in 248 arrests. As shown in Figure 25, the most common crimes reported included assault (34% of all cases recorded), insults (15%), property damage (12%) and drunk and disorderly and threatening behavior (9% each).

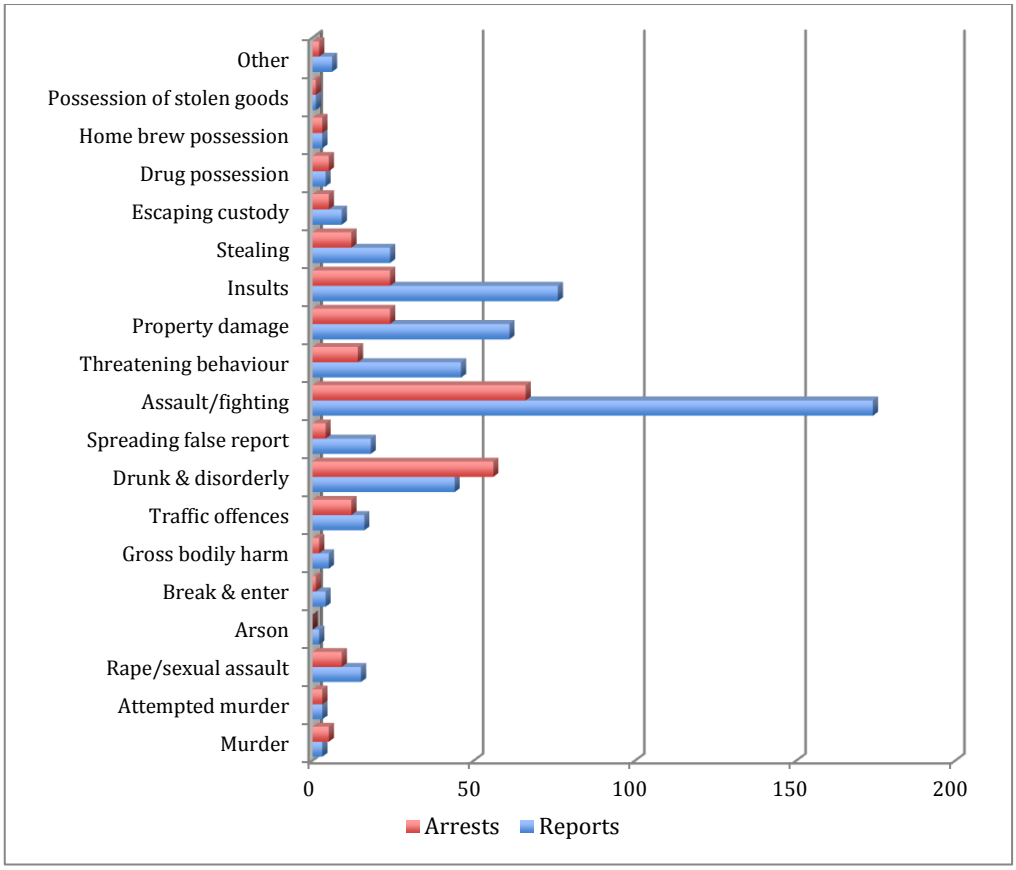


Figure 25: Incidence of Crime Reported in Kerema, March-July 2016

Source: Monthly Police Reports, Kerema.

Serious crimes represented a relatively minor proportion of the crimes reported, however, during the five-month period there were three reports of murder, three reports of attempted murder and 15 reports of rape or sexual offences.

The police are seriously constrained by a shortage of officers, particularly experienced officers, and the need for additional vehicles, dinghies, accommodation and improved communications.

6.1.6 Community Infrastructure and Household Assets

A summary of the type of houses in Papua New Guinea and rural areas of Southern Region is shown in Figure 26. This shows that 67% of households lived in a traditional dwelling in 2009/10, compared to 58% of rural households in Southern Region.

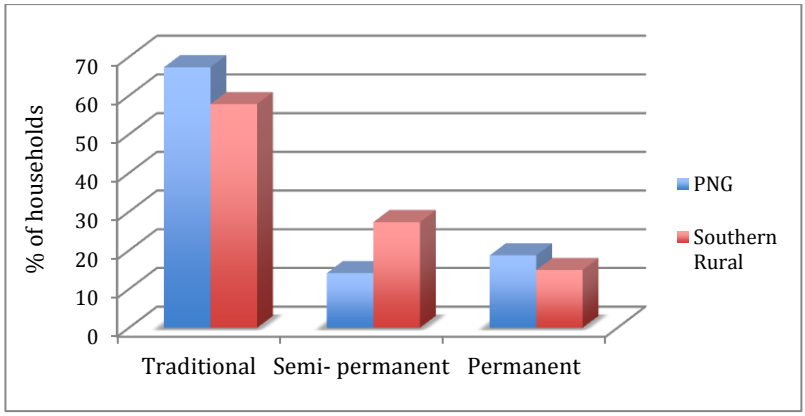


Figure 26: Housing Types, 2009/10

Source: NSO, 2013b, p. 58.

The main source of household lighting is shown in Figure 27, indicating the limited use of electricity for the main source of lighting (16% of rural households in Southern Region) and heavy reliance on 'spirit lamps' (59% of rural households in Southern Region). Spirit lamps are those that typically use kerosene and provide limited light in comparison to pressure lamps.

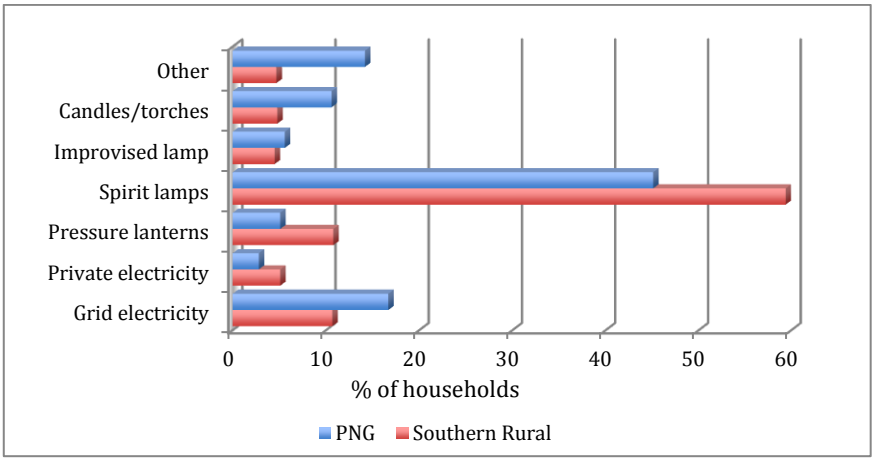


Figure 27: Main Source of Lighting, 2009/10

Source: NSO, 2013b, p. 67.

The main source of fuel used for cooking is shown in Figure 28, indicating the heavy reliance on firewood across Papua New Guinea (88%) and in rural areas of Southern Region (92%).

In rural villages in Papua New Guinea, community infrastructure is often limited to elementary and primary schools, aid posts or health centers, and one or more churches. Elementary schools and churches, particularly in rural areas, are often made of traditional materials. Access to electricity in Papua New Guinea is low by international standards, with less than 10% of households connected to the electrical grid in 2009 (International Bank for Reconstruction and Development, 2011, p. 134).

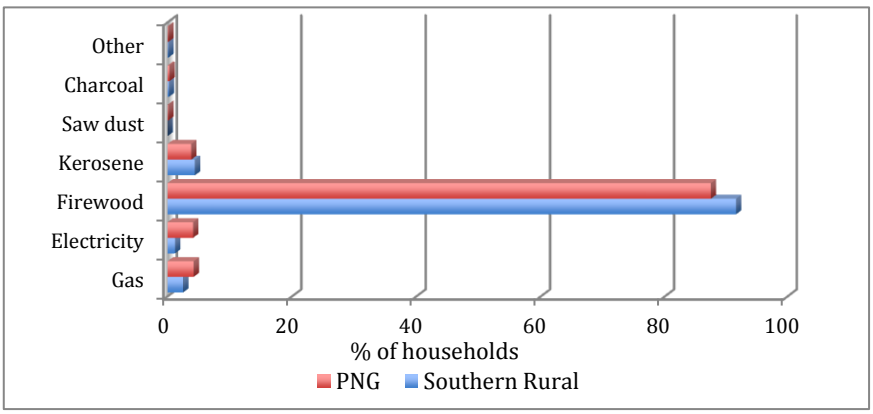


Figure 28: Main Fuel Used for Cooking, 2009/10

Source: NSO, 2013b, p. 68.

Papua New Guinea also compares poorly against countries from the Pacific and Southeast Asia in terms of access to electricity. As shown in Figure 29, the estimated 18% of the population who has access to electricity is well below all other countries.

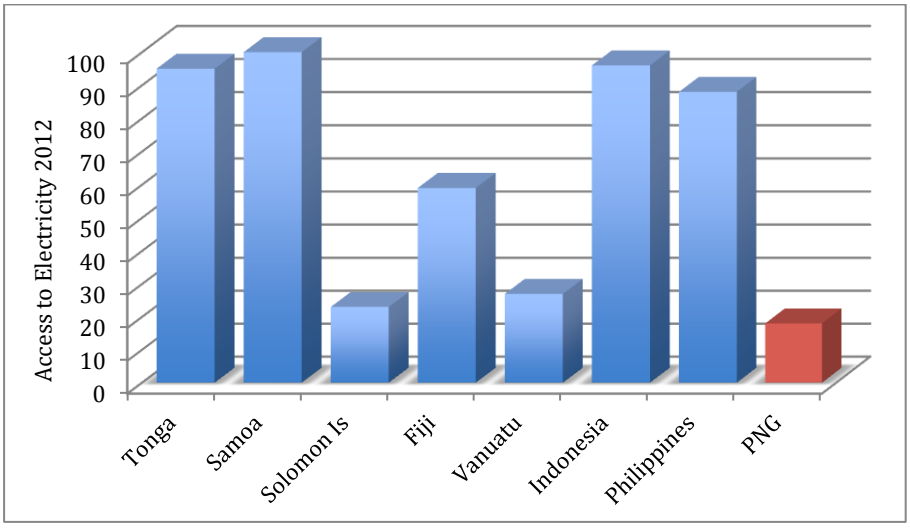


Figure 29: Access to Electricity for PNG and Other Selected Countries, 2012

Source: ADB 2016

Some villages have a community hall, and most will have areas for playing rugby/soccer, basketball and volleyball. Few villages have communal waste disposal areas or systems. Rubbish may therefore be buried, burned or thrown away, either into the bush, garden areas, rivers or sea.

Papua New Guinea compares poorly against countries from the Pacific and Southeast Asia in access to safe drinking water and adequate sanitation also. As shown in Figure 30 and Figure 31, only 10% and 19% of the population has access to safe drinking water and adequate sanitation respectively, well below all other countries in the region.

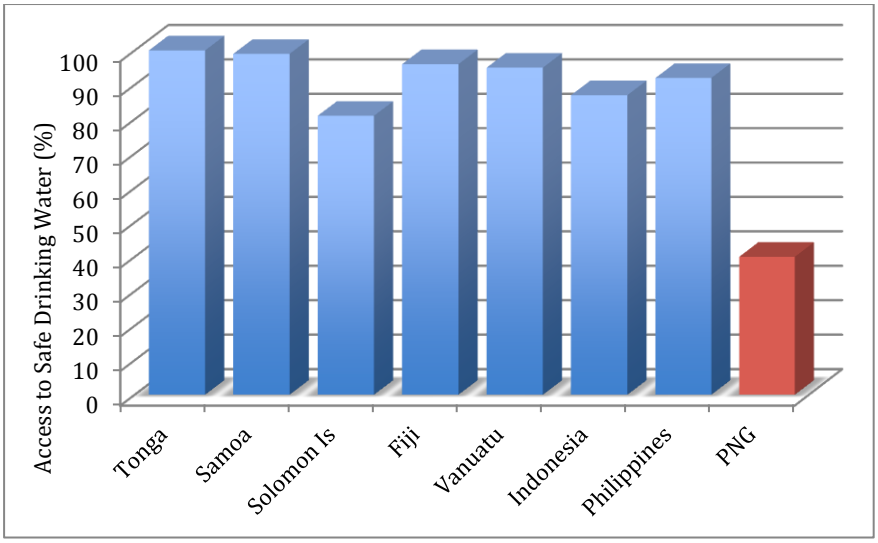


Figure 30: Access to Safe Drinking Water for PNG and Other Selected Countries, 2015

Source: ADB 2016

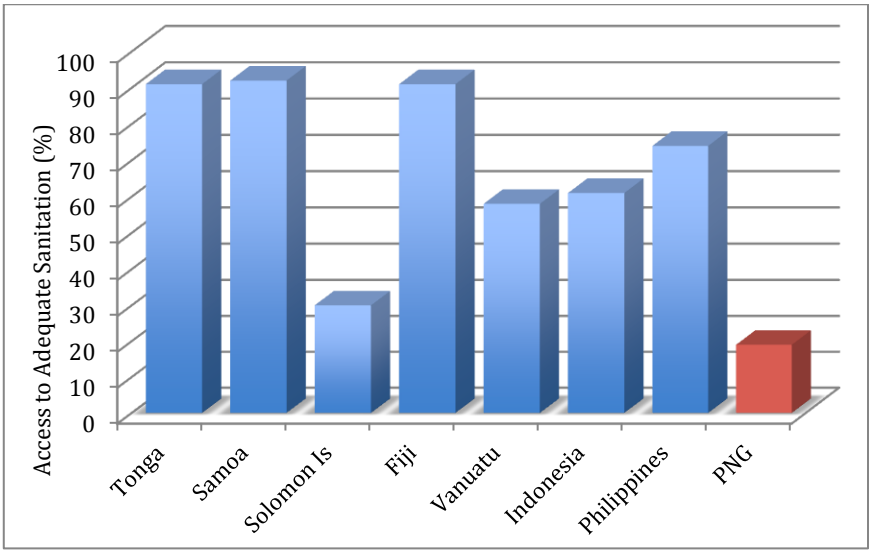


Figure 31: Access to Adequate Sanitation for PNG and Other Selected Countries, 2015

Source: ADB 2016

Many villages dedicate one day each week to community work (*wok bung*), that may involve, for example, building or maintaining public infrastructure (including elementary schools or churches), roadside clearing, or cleaning areas of the village. Community work was a government initiative and was common practice years ago. Weak government, or dissatisfaction with government, has led to the demise of community work activities in many parts of Papua New Guinea. Community work continues within the PAOI and is organized by the community leaders. The activities performed depend on the needs of the community at any point in time. Participation is not compulsory, however, broad participation is encouraged.

The ownership of durable goods is low, as shown by the results of the 2009/10 HIES, refer Figure 32. The ownership of vehicles, and items usually operated using electricity (TVs, refrigerators), is low, while almost 50% of households owned a mobile phone. Ownership of personal computers is very low, at less than 5%.

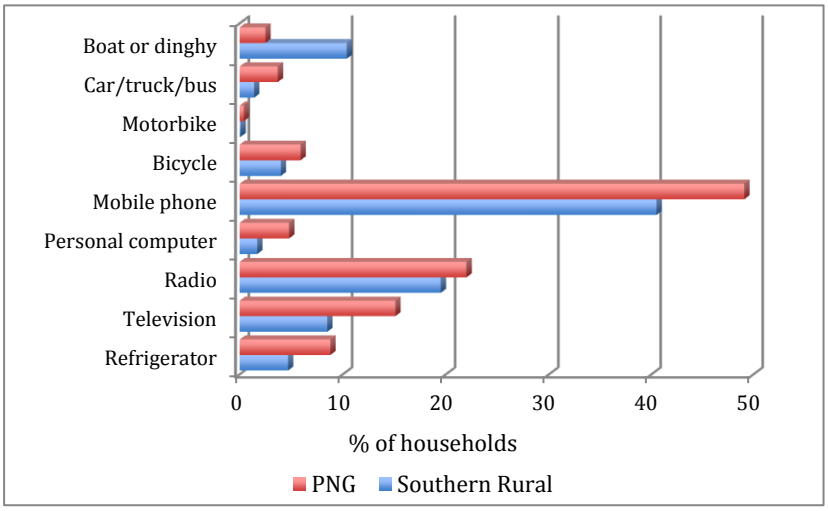


Figure 32: Ownership of Durable Goods, 2009/10

Source: NSO, 2013b, p. 74.

Information on community infrastructure and household assets, specific to Gulf Province or Kikori District, is not available.

6.2 Project Area of Influence

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 not and may vest leadership at a clan level. A clan is a group of families with a common ancestor. A clan will identify themselves and their customary-owned land through histories, beliefs, customs and practices told orally. Clans may split over time, forming sub-clans, or may become recognized as separate clans over time. There are no hard and fast rules to define tribes or clans in Papua New Guinea and some anthropologists argue that they are western concepts applied in an attempt to help define social relationship and social organization in societies that are not homogenous and change over time.

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. Language groups within the PAOI are shown in Map 4. 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:

- 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;
- 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 villages of Maipenairu, Kapai 2 and Mariki were also included in the baseline characterization, as they were considered important for the comprehensive characterization of the Iare and Kaimare language groups. These three villages, whilst not within the PAOI, are included in any subsequent discussion of the PAOI.

6.2.1 Settlement History

There has been substantial movement of people within the PAOI before and since western contact. An overview of this movement is presented below for each of the seven language groups present in the PAOI.

6.2.1.1 Pawaian

Frequent Western contact with the Pawaians did not occur until the Leahy and Dwyer patrol in 1930 (Sullivan, 2012, p.17). At this time, the Pawaians lived north of the Purari River – in a relatively remote, mountainous area encompassing parts of Gulf, Simbu and Eastern Highland provinces – and were semi-nomadic.

Two significant events occurred that had profound impact on the settlement patterns of the Pawaians:

- The first occurred when the colonial government and Christian denominations moved into the area in the 1960s and encouraged permanent settlements; and
- The second occurred in 1974 during the Purari River Dam project, which resulted in the establishment of Ura, Wabo, Subu and Poroi (Kinkin & Kewibu, 2008, p. 10).

Discussions with village leaders during the social baseline study confirmed the establishment of Ura and Wabo as a result of the Purari River Dam project in the early 1970s. However, this is not to say that the Pawaians did not establish temporary fishing or hunting camps in this area much earlier. Poroi 1 was established in the 1950s (evident by the aged coconuts growing in the village), but later abandoned due to the absence of government services, and re-established in 2007. Poroi 1 has a mix of Pawaian and Iare heritage, with some of the descendants coming from Maipenairu. Poroi 2 was established in the early 1970s, relocating from an area downstream of the current site, known as Old Poroi. Poroi 3 (Suarido) was reportedly established in or soon after 2010, although it was apparently also occupied at some earlier time, possibly as a bush camp used for hunting and fishing. Subu was established in 1996, and Subu 2 established in 2003 (Sullivan, 2012, p. 47), with the majority of residents relocating to Subu 2 as a result of flooding that damaged parts of Subu in 2014.

6.2.1.2 Ahia

The residents of Evara speak a language known as Ahia. The people originate from the middle reaches of the Vailala River, to the southeast of Evara, and have generally be known as or referred to as the Kaura in the past. This is a name used by their neighbors to describe them, rather than their own name or identity.

Residents of Evara are predominantly from the Uhe tribe, which is a separate tribe to those Ahia speakers remaining in the Vailala area, which includes villages such as Heawa, Lakoro, Paku, Kukora and Hepea.

People from Evara are reluctant to discuss their history, possibly because they are involved in court cases connected to land ownership and logging benefits. However, some people from Aivai suggested they arrived on the Purari River quite recently when compared to the Iare, who established Aivai in 1952. The Catholic priest at Evara indicated that residents tried to settle further upstream in 2008, near Poroi 1, but the police intervened and told them to return downstream.

6.2.1.3 Iare

The Iare indicated that they originate from further up the Purari River and settled in several places, including Kaumeia (near Purari airstrip), Kairi Pairi Vaivere (near Evara) and then Old

Iare. As a result of internal conflict, family groups disbursed from Old Iare to established villages including Aumu (potentially in the 1920s) and Mapaio (potentially in the 1940s).

Following World War II, an Iare man returned from fighting with the Australian Navy and encouraged the Iare and others to abandon their traditional practices and take up western practices. The return of Tom Kabu (immediately after the war, possibly in 1946) was seen as a miracle as he was assumed to have died in the war. As the first Iare to be educated and travel abroad, he had substantial following and convinced people to destroy the traditional men's houses and the majority of the tangible artefacts. However, he also encouraged education and possibly influenced the establishment of Maipenairu. Several residents of Old Iare established Maipenairu in 1947 to be near the London Missionary Society mission at Urika, which had a boarding school, health center, coconut plantation and cattle farm. Only the mission's health and education facilities remain.

Some people from Aumu relocated and established Aivai in the 1950s, and Kapai 2 was established in 1967. Some people from Mapaio were encouraged by the Department of Primary Industries to relocate to Kaevaria in the 1970s, specifically to grow cash crops.

The Iare speakers therefore moved south to Old Iare and then spread north, south, east and west from Old Iare to other parts of the Purari delta over the past century.

Residents of Maipenairu also indicated that many generations ago two brothers had a fight and this led to the separation of the Koriki tribe from the Iare tribe. The Iare and Koriki remained enemies until a peace ceremony was orchestrated by the London Missionary Society, which involved an exchange of babies between the tribes. F.E. Williams also referred to this story (Williams, 1924, p. 100).

6.2.1.4 Koriki

The Koriki speakers indicated that they originate from further up the Purari River and established villages including Ara'ava, Kairimai, Akoma and Kairu'u in the 1930s and 1940s. Reasons for relocation are said to be land and food shortages and internal conflict resulting from sexual promiscuity. The residents of Ikinu indicated that they lived near Ara'ava until 1919 when they commenced a series of moves downstream, finally relocating to Ikinu and the nearby hamlet of Mirimailau in 1964. Another nearby hamlet, named Araueramiri, was established in 2012.

6.2.1.5 Kaimare

The original location of the Kaimare speakers is upstream in the vicinity of Bekoro, which is one of five Kaimare villages. The other four villages (Upaia, Aiere, Mariki and Varia) are all downstream on or near the coast. Mariki was reportedly established in 1947, and following a dispute there, some residents relocated to what is now Upaia, in 2007.

6.2.1.6 Maipua

The residents of Apiope indicated that they originate from a place further upstream now called Old Iare, then moved to a location near Subu, then south to Apura (near the current location of Muro Mission), and then moved to Kereva and Aivai. Residents of Aivai relocated to what is now Apiope in 1947. The eastern arm of the Purari River is named Aivai, presumably after the name of the village at the mouth of the river. No one lives permanently at Aivai, but it is a fish camp for people from Apiope. Tom Kabu was responsible for the residents relocating to Apiope, as he encouraged them to relocate to plant coconuts and make copra. Copra remained the main source of income until 1984 when the coastal ships stopped trading along the south coast.

6.2.1.7 Orokolo

The Orokolo speakers also believe they originate from the middle or upper reaches of the Purari River. They moved to a location known as Popo, from where they disbursed to their current locations both along Orokolo Bay and inland in the Muro area. It is not known when people

disbursed from Popo, but it appears to be more than a century ago. Muro Mission is located approximately 10 km inland from Orokolo Bay. The mission continues to operate a school and aid post, but it was once a large mission, operated by Gulf Christian Services, with a boarding school, health facilities and coconut plantation, and a road to Ihu Station that could be reached by tractor. The road is no longer in use.

6.2.2 Language

The Pawaians occupy the northern part of the PAOI and the mountainous areas to the north, which overlaps with Simbu and the Eastern Highlands.

Williams noted that the Purari people did not have a name for themselves or their language, but the language had been called Namau before 'Purari' became more common (1924, pp. vii, 4). Williams also referred to the Purari as comprising several tribes, these being Ukiravi (or Koriki), Iari (or Iare), Kaimare, Maipua and Baroi (1924, pp. 4, 81, 102, 106). The Koriki, Iare, Kaimare and Maipua are all residents in the PAOI and have been identified as separate languages, although they could similarly be described as dialects of a common language.

To the east of the Purari delta is the Erema language group, which includes the Orokolo and Ahia. The location of the villages that speak Pawaian, Ahia, Koriki, Iare, Kaimare, Maipua and Orokolo is shown on Map 4.

A language map of Gulf Province, prepared by SIL International and presented in Kinkin & Kewibu (2008) identifies the Pawaian and Orokolo languages but has few other similarities with work undertaken in the PAOI during the social baseline study.

Pawaian speakers reside in some 13 or 14 villages in Gulf, Simbu and Eastern Highlands provinces. It is estimated that approximately 4,000 people speak the Pawaian language (Lewis, Simons & Fennig, 2016, p. 199). It should be noted that Pawaia is a linguistic reference to a group of people who speak the same language and reside in a defined geographical territory rather than a tribe (Kinkin & Kewibu, 2008, p. 11).

The Ahia speakers reside in the village of Evara and originate from the Vailala area to the east. The 'Ethnologue: Papua New Guinea' classifies Ahia as a dialect of the Keoru-Ahia language (Lewis, Simons & Fennig, 2016, p. 59). While it is estimated that some 6,000 people speak Keoru-Ahia, only 700 speak the Ahia dialect (Lewis, Simons & Fennig, 2016, p. 59).

The Koriki, Iare, Kaimare and Maipua languages are spoken by people from the Purari delta and as noted above, have in the past been combined and referred to generally as Purari (Lewis, Simons & Fennig, 2016, p. 101). People from these language groups indicated that there is some commonality in the languages and ability, therefore, for people to have some understanding of each other's language. However, they differentiated between the languages. The number of people living in the villages in which these languages are spoken is relatively small:[5]

- Koriki – 2,500;
- Iare – 2,200;
- Kaimare – 1,200;
- Maipua – 400.

The Orokolo are located along the coast between the mouth of the Vailala and Purari rivers. This is a heavily populated area and extends inland, with several villages in the vicinity of Muro Mission. Some Orokolo villages are located outside the PAOI, however, the number of people living in all Orokolo villages is tentatively estimated at less than 10,000. As discussed in Section 6.2.1.7, many other Orokolo speakers may live in other parts of Papua New Guinea.

[5] Based on population estimates collected during the social baseline surveys and 2011 National Census data for villages outside the PAOI.

In addition to the *tok ples* language, all villages with the exception of Subu, Evara and Avavu indicated that some people also spoke Pidgin, Motu and English. The most common language spoken by people surveyed during the household survey is shown in Table 7.

Table 7: Most Common Language Spoken (aged 10 years & above) (%)

Language Group	*Tok ples*	Pidgin	Motu	English	Other
Pawaia – males	71	11	2	0	16
Pawaia – females	81	8	3	0	8
Ahia – males	55	0	0	0	45
Ahia – females	43	10	0	0	47
Koriki – males	74	1	0	0	25
Koriki – females	72	2	1	0	27
Iare – males	84	1	0	2	13
Iare – females	80	1	0	7	13
Kaimare – males	86	0	2	0	11
Kaimare – females	91	0	0	0	9
Maipua – males	98	0	0	0	2
Maipua – females	98	0	0	0	2
Orokolo – males	92	7	<1	0	1
Orokolo – females	95	4	0	0	2
TOTAL	**83**	**4**	**1**	**1**	**11**

Source: ERIAS Group, 2016b.

As shown in Table7, 83% of people in the PAOI commonly speak *tok ples* when conversing at home, with 4% speaking Melanesian Pidgin, 1% speaking Motu, 1% speaking English and 11% speaking another language. The 83% of people speaking *tok ples* only includes the *tok ples* for that village. The 11% of other languages includes speaking a language from the PAOI that is not the *tok ples* for that village. Thus, someone from Mapaio (where *tok ples* is Iare) who commonly speaks Orokolo or Koriki would be considered as speaking another language. As there is very limited in-migration to the PAOI at this point in time (refer Section 6.2.4.3), this occurs primarily as a result of intermarriage between language groups.

The ability to speak Pidgin, Motu and English in the PAOI is shown in Table 8. Although caution is needed when considering the results, as no attempt to verify the response was undertaken during the survey, 85% of the population aged 10 years and above claimed to be able to speak Pidgin, 35% claimed to speak Motu and 42% claimed to speak English.

As shown in Table 8, the Pawaian and Ahia language groups appear to have the highest proportion of Pidgin speakers, possibly reflecting their experience with large-scale resource projects (petroleum exploration and logging) over the past decade. However, the Pawaian and Ahia language groups appear to have the lowest proportion of English speakers, while the proportion of Motu speakers is surprisingly low among Orokolo and Maipua villages, given their coastal location and previous involvement in the Hiri trade (the exchange of goods between Papuan villages near Port Moresby and villages along the Papuan Gulf, including the Orokolo and those of the Purari delta, which continued into the 1950s).

Table 8: Languages Spoken (age 10 years & above) (%)

Language Group	Pidgin	Motu	English
Pawaia – males	97	41	23
Pawaia – females	90	30	12
Ahia – males	100	52	23
Ahia – females	97	43	10
Koriki – males	89	54	56
Koriki – females	82	45	44
Iare – males	90	35	61
Iare – females	73	31	50
Kaimare – males	80	69	41
Kaimare – females	67	53	44
Maipua – males	87	29	62
Maipua – females	84	32	64
Orokolo – males	87	27	47
Orokolo – females	77	20	44
Total – males	**90**	**38**	**45**
Total – females	**80**	**31**	**39**

Source: ERIAS Group, 2016b.

A higher proportion of males from all language groups speak Pidgin, Motu and English than females, with the exception of Kaimare (where more women speak English) and Maipua (where more women speak Motu and English).

The proficiency of the languages spoken is discussed further in Section 6.2.5.7.

6.2.3 Clan Affiliation

Table 9 provides a preliminary list of clans from each village in the PAOI, and when available, a list of other villages in which clan members reside. The list of clans is based on the recall of a small number of village leaders, and completed in a relatively short timeframe. The information should therefore be treated as only indicative of the number of clans in each village, their names, and their relationship to clans in other villages.

Table 9: Clans Identified in PAOI Villages

Language Group	Village	No Clans	Clan Names	Other Villages
Pawaian	Poroi 2	10	Nemina, Sopusa, Waboa, Hourua, Piuwa, Soru, Sisoru, Hatu, Pipijupe, Waho	Suarido
Pawaian	Wabo	23	Use'e, Sepea, Elia, Pelijupe, Ope, Uwa, Taira, Pokea, Pulijana, Pupisanoa, Kaploa, Onatoua, Nemina, So'olua, Topukenipe, Wa'ajupe, Jajupe, Soaujupe, Se'ejupe, Se'etoua, Su'u, Soaruroa, Ao	Uraru, Ura, Punjano
Pawaian	Ura	16	Jaoho, Peiho, Meli, Ope, Kouo, Soipe, Ho, Tejupe, Soru, Suarua, Mamunea, Tyla, Nemina, Sa'aju, Pokapoloa, Subura	Wabo, Uraru, Subu, Poroi
Pawaian	Subu 2	3	Oa, Supura, Peiho	Nil
Ahia	Evara	16	Miaro, Kuparevilo, Ihoripe Pouhari, Ihoripo No. 2, Oeopeo, Laiuhe No. 2,	Nil

Language Group	Village	No Clans	Clan Names	Other Villages
			Moreo, Louro No. 2, Louro No. 3, Moeuro, Ihu Loura, Laiuhe No. 1, Oru Uhe, Ouko, Ihoripo No. 3, Ihoripo No. 4	
Koriki	Ara'ava	8	Mari Kari, Ukunukua, Eavake, Kairu Kari, Kaialavi Kari, Aelavi, Vapunairu, orukunukua, Evara	Akoma, Kinipo, Ikinu, Kairimai, Kaialavi
Koriki	Kairimai	11	Ukunukuva Evale, Uki Laui Mako, Ukia Lauiorru, Maui Kari, Ariava Nairuu, Kaia Lavi Kari, Kairuu Kari, Ape Laui, Oru Ikiki, Muriki Nairu, Uame Nairu	Akoma, Kinipo, Ikinu, Ara'ava, Kaialavi
Koriki	Akoma and Kairu'u	12	Kairu'u Mako, Kairu'u Ukunukua, Kairu'u Ukia Lavi Kari, Kairu'u Kapa Iveve Nairu, Ove nairu, Vaii Nairu, Vapu Nairu, Kairu'u Kari, Kaia Lavi Kari, Ukunukua No. 2, Ukia Lavi Kari No. 2, Oru	NA
Iare	Mapaio	12	Mauao Pekonairu	Maipenairu
			Auari Aiaronairu	Kapai
			Iki Aiaronairu	Kapai, Maipenairu
			Mailau Kairilavi	Kapai, Aumu, Maipenairu
			Aua Nairu	Kaevaria
			Kaia Ouru Mako	Kaevaria, Maipenairu
			Kae Vaiionanairu	Aumu
			Kirive Vaiionanairu	Aumu
			Kaika Nairu	Maipenairu
			Iai Kaunama	Aumu
			Laivana	Nil
			Aumari Morere	Old Iare
Iare	Kaevaria	4	Avanairu, Kairi Lavi, Iki Aiaronairu, Ipikuia Aiaronairu	Mapaio, Aumu, Baimuru, Kapai, Kapuna, Ara'ava
Iare	Aumu	4	Oka Nairu	Maipenairu, Kapai
			Vaione Nairu	Old Iare, Mapaio
			Kairi Lavi	Aivai, Kaevaria
			Ama Nairu	Nil
Iare	Aivai	4	Vaiona Nairu, Ama Nairu, Kairi Lavi, Oka Nairu	Aumu, Apiope, Kapai, Maipenairu, Mapaio, Akoma
Kaimare	Upaia	3	Api Lavi	Mariki
			Koi Lavi	Bekoro, Aiere, Mariki
			Kau'u Lavi	Bekoro, Pivara, Koporo, Mariki
Maipua	Apiope	14	Kairi Omane No. 1, Kairi Omane No. 2, Kama Lavi No. 1, Kama Lavi No. 2, Kauei U'u, Ere Kauri Nairu, Avari Kauri Nairu, Avari Koai Lavi, Pirika Aniru, Aia Nairu, Kamai Nairu, Pakemanea 3, Evara Pakemanea, Ainaka Pakemanea	Maipenairu, Evara, Kapai, Ne'ea, Aumu, Old Iare, Mapaio
Orokolo	Hepere	4	Harupi, Haura, Oropo Uku, Haru Meahu	NA
Orokolo	Ere and Kilavi	13	Milamaitahu, Maitahumiki, Heimeahu, Kairimeahu Ere, Laura Meahu, Ahevavo Laurameaju, Hulaipi Harupi, Ipi Harupi, Kilavi Kairimeahu, Aruharupi, Miai Kururu, Kao Harupi 1, Kao Harupi 2	NA
Orokolo	Avavu	5	Ure Navai Meahu, Mevea Meahu, Paila Meahu, Epemeahu, Houa	NA

Language Group	Village	No Clans	Clan Names	Other Villages
Orokolo	Huruta	5	Hevarahu, Miritameahu, Uravaire, Ukurumeahu, Kakameahu	Nil
Orokolo	Paevera	5	Oaevavo 1, Oaevavo 2, Paravavo 1, Parevavo 2, Ajevavo	Arehava, Leokoro, Loku, Lareao, Haiari
Orokolo	Harevavo	6	Mirihilahiru, Lavaipi, Hoilahiru, Hailaura, Halahiru, Milahiru	Nil
Orokolo	Kaivakavu	6	Kauava, Pakevara, Huruvu, Akihihi, Akiheaha, Harevavo Ita Hahaea	Muro, Kavava, Lori, Vailala East, Apiope, Epea, Arevavo, Marea, Iuku, Lairiharu
Orokolo	Larihairu	6	Kairi Popo, Lairihairu, Marapavula, Hairi Ita, Lore Mahirol, Haroakore Mahiro 2	Orokolo, Keuru, Vailala, East Kerema
Orokolo	Marea	4	Hekoa Laepa, Ula Mela, Maila, Arehava	Arevavu, Kaivukavu, Luku, Kavava, Orokolo, Vailala
Orokolo	Iuku	7	Hairi, Mea Piku, Hururu Aheavavo, Maipi Pakemana, Dakemana Maipi, Mila Piku, Oriapa Maipi	NA
Orokolo	Mareke	10	Avavu Lavi, Avavu Akai, Aripi Akai, Marepavula, Hehehaela, Lama Akai, Emavavo Akai, Haiavahaela, Vilahiru, Itaidi	Popo coast, Inland Popo, Oru, Herekeva, etc.
Orokolo	Kavava	9	Evavo, Akai, Mirahiru, Aripi, Pakevara, Haihava, Kuruvu, Hairi, Mareapavura	Nil
Orokolo	Oru, Lariau and Herakela	11	Evavo, Miau Evavo, Hee Miki, Akai Hihi, Avavo Akai, Haive Akai, Haihava, Mila Hairu, Mare Povula, Kurumu Miki, Maiu Evavo	Miha, Hilai, Hohoro, Aravila

Source: ERIAS Group, 2016a.

As shown in Table 9, most villages have between four and 12 clans. However, the Pawaian villages and Evara appear to have a higher number of clans. The clans are often located in other villages of the same language group. However, village leaders in Apiope indicated that other members of their clans resided in several Iare villages, possibly indicating very close relationships between them and the Iare.

A list of clans was not collected from several of the smaller villages in the PAOI (Poroi 1, Poroi 3, Aiere and Mapaio Fish Camp) and the interviewees were reluctant to provide this information in Subu and Ikinu. This reluctance may be due to sensitivities about clan boundaries, or a desire to protect their identity, their history and their relationship with the land, all of which are inextricably linked to clans.

6.2.4 Population and Demography

6.2.4.3 Population

The PAOI includes 39 villages and one government station with a combined population, in mid-2016, of 12,763. This excludes residents of Kapuna and Muro missions, and the population of Mariki, Kapai 2 and Maipenairu, which lie outside the PAOI. The location of communities in the PAOI is shown in Map 1 and Map 2.

The population of each community in the PAOI (along with Mariki, Kapai 2 and Maipenairu) is shown in Figure 33, with the Orokolo and Pawaian villages shown separately from the remaining languages, which are all located in the Purari Riverways.

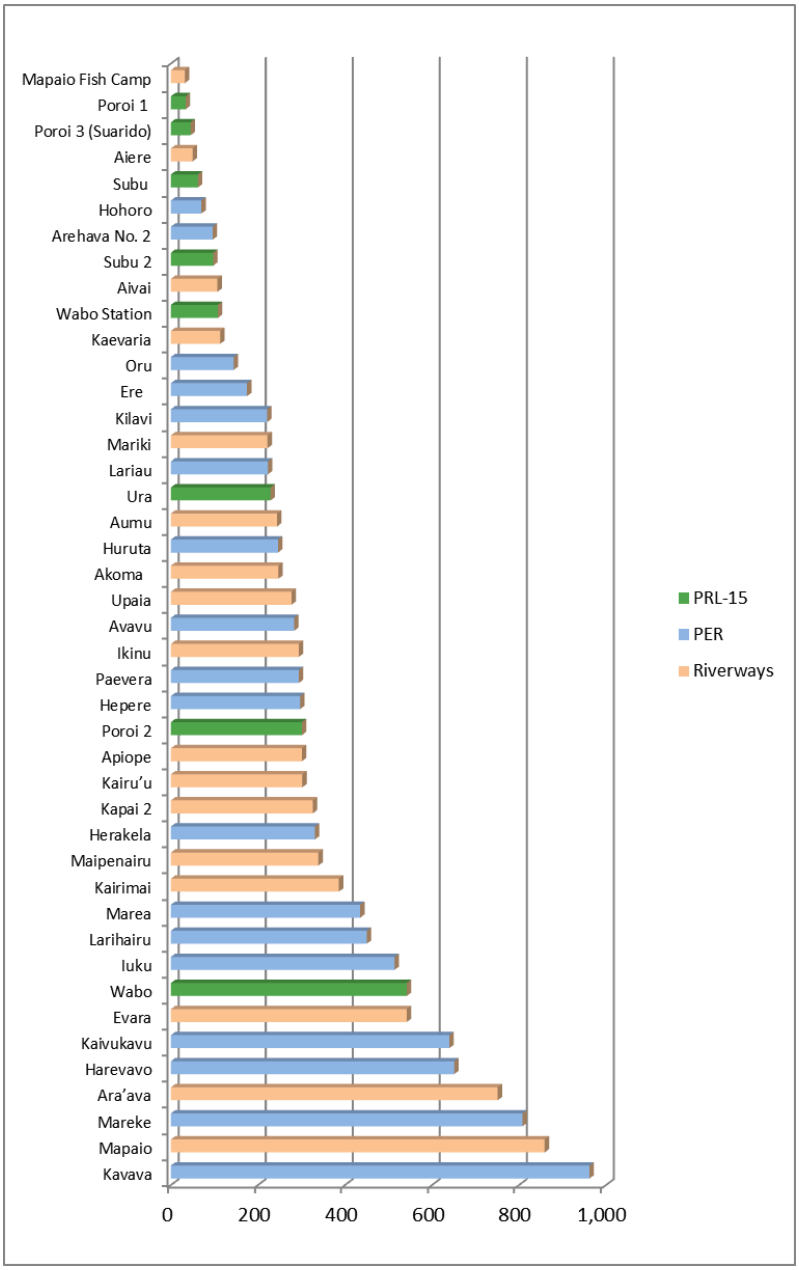


Figure 33: Population of Villages in the PAOI

Source: ERIAS Group, 2016a

The villages shown in Figure 33 have an average population of 317. However, village size varies substantially from Kavava, with 962 residents, to Mapaio Fish Camp, with 32 residents.

The population of Orokolo villages averages 380, in comparison to 317 in the Purari delta, and 177 for Pawaian villages. The PAOI includes 19 coastal villages, with an average size of 397, and 24 inland villages, with an average size of 218. The coastal villages are larger on average, than inland villages, however both coastal and inland areas contain villages with relatively high and relatively low population.

As shown in Map 2, the coastal villages, along the Purari delta and in particularly, the Orokolo coastline, are located in close proximity to one another. The population density in the coastal areas is clearly much higher than in inland areas, and in particularly, areas in the vicinity of PRL-15. Interestingly, the majority of villages in the Purari delta are either located on or adjacent to the coastline, or located in the vicinity of the upper reaches of the tidal influence. Both locations are quite likely related to the availability of resources:

- Those on or near the coast will have access to both marine and estuarine resources; and
- Those located upstream, near the upper reaches of the tidal influence, may have greater access to land suitable for gardening, and drinking water sources, while benefiting from both freshwater and estuarine resources.

Furthermore, it is interesting to note that the Koriki and Iare, the two dominant language groups in the Purari delta area, include villages along both the coast and inland. This may help increase and diversify resource access, particularly during floods, droughts or other natural calamities. Williams noted that each tribe in the Purari delta is affiliated with one of the main arms of the river (1924, p. 90). It makes sense that people living inland would have paddled towards the coast to fish, catch crabs and collect shellfish, and having established this as their clan land, relocated there when choosing to move from the original village.

6.2.4.2 Demography

The average age of people in the PAOI, based on results of the household survey, is 19 years, which is the same as for Papua New Guinea. A population pyramid for the PAOI is presented in Figure 34.

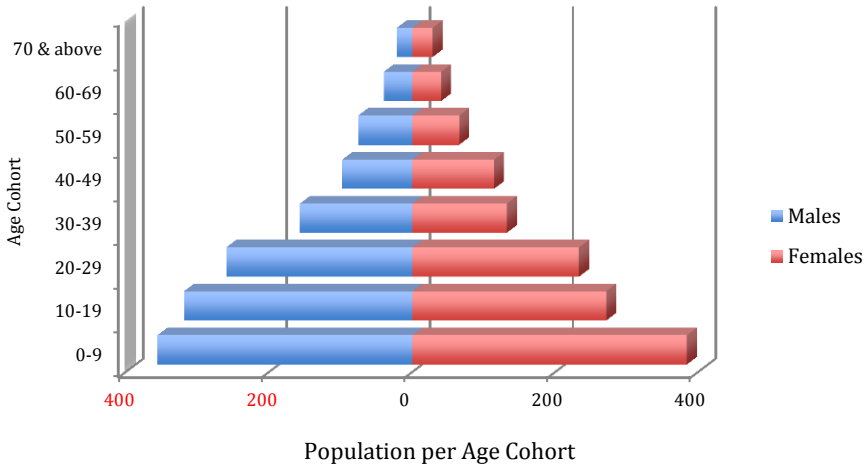


Figure 34: Population Pyramid for PAOI, 2016

Source: ERIAS Group, 2016b

Results of the household survey indicate a sex ratio of 105 (compared to 108 for Papua New Guinea), 40% of people aged less than 15 years of age (compared to 36% for Papua New Guinea) and 7% aged 55 years and above (the same as Papua New Guinea). The average household size for the PAOI is 6.7, compared to 5.3 for Papua New Guinea. The dependency ratio – the number of people aged less than 15 and those aged more than 55 years as a proportion of the number aged between 15 and 55 – is 89, compared to 75 for Papua New Guinea.

Although several key demographic indicators for the PAOI are similar to those for Papua New Guinea in 2011, the PAOI is characterized by a very young population, relatively low life expectancy given the few people reaching 50 years of age, and large household size.

Variations in demographic information for different language groups within the PAOI are presented in Table 10.

Table 10: Population and Demographic Indicators by Language Group

Language Group	Sex Ratio	Average Household Size	Population <15 Years of Age (%)	Population 55 Years of Age & Above (%)	Dependency Ratio
Pawaia	123	7.9	45	5	100
Ahia	106	7.0	55	2	133
Koriki	92	9.2	39	10	96
Iare	102	7.6	33	7	67
Kaimare	95	3.8	43	7	100
Maipua	98	7.7	38	5	75
Orokolo	121	7.4	39	9	92
TOTAL	**105**	**6.7**	**40**	**7**	**89**

Source: ERIAS Group, 2016b.

Information in Table 10 indicates substantial differences in key demographic indicators between language groups:

- There is a much higher proportion of males in both the Pawaian and Orokolo villages;
- Household size is relatively low among the Kaimare villages; and
- Ahia has by far the largest proportion of people aged below 15 years of age, and the fewest aged 55 years and above, resulting in an exceptionally high dependency ratio.

Williams included population estimates for the Koriki, Iare and Kaimare tribes, reportedly derived from 1917 census data. This information, and current estimates for the same tribes, is shown in Table 11.

Table 11: Tribal Population Estimates: 1917 and 2016

Tribe or Language Group	1917	2016	Increase
Koriki	1,568	2,100	34%
Iare	1,736	2,200	27%
Kaimare	1,450	1,600	10%

Source: Williams, 1924; NSO, 2013; ERIAS Group, 2016a.

As shown in Table 11, there has been only a modest increase in population of each of the three tribes over a period of 99 years. Although the accuracy of the data cannot be verified, the limited growth in population could be the result of low health indicators, high out-migration, or both. Williams observed that polygamous marriages were quite common among the Koriki (1924, p. 55). This has largely changed, as there were no polygamous marriages recorded among 40 Koriki households that were surveyed during the household survey. Results from the household survey indicated the following proportion of polygamous marriages in the PAOI:

- Pawaian: 8% of households;
- Iare: 5% of households;
- Maipua: 6% of households;
- Orokolo: 2% of households;

There were no polygamous marriages recorded during the household survey for the Koriki or Kaimare villages or Evara. Combining all households in the PAOI, 3% of marriages were polygamous.

Williams also described adoption as quite common among the Koriki in 1923 (1924, p. 59), and generally occurred when a couple with several children would give a newborn to a couple without children. Results from the household survey indicate that 50 children were adopted from the 355 households surveyed. As this equates to one adopted child in seven households, it must be concluded that adoption remains quite common.

Within the PAOI, divorce and separation is not common. While divorce is relatively uncommon, it has been said among some Pawaians that divorce could lead to repercussions, including sorcery. Divorce may also involve negotiations between the families in regard to the bride price, and possible reimbursement, providing another disincentive for divorce among Pawaians and other language groups. The marital status of males and females aged 20 years and above, is shown in Table 12.

Table 12: Marital Status by Language Group (20 years & above) (%)

Language Group	Never Married	Married	Divorced	Separated	Widow
Pawaia – males	41	57	1	1	1
Pawaia – females	9	79	1	2	9
Ahia – males	20	80	0	0	0
Ahia – females	0	87	0	7	7
Koriki – males	31	67	0	0	2
Koriki – females	16	75	2	1	6
Iare – males	45	53	0	0	2
Iare – females	21	62	2	0	13
Kaimare – males	14	86	0	0	0
Kaimare – females	22	74	0	0	4
Maipua – males	22	74	0	0	4
Maipua – females	13	77	0	7	3
Orokolo – males	37	59	1	1	3
Orokolo – females	20	62	2	6	11
TOTAL – males	**36**	**61**	**0.3**	**0.5**	**2.1**
TOTAL – females	**17**	**69**	**1.5**	**3.3**	**9.2**

Source: ERIAS Group, 2016b.

As shown in Table 12, considerably more females aged 20 years and above are married in comparison to males, and the proportion of females who were married and have been divorced, separated or widowed is similarly much higher. The proportion of females who have separated is relatively high among Ahia, Maipua and Orokolo villages. The proportion of females who are widows is relatively high among the Pawaian, Iare and Orokolo villages. This may be due to the relatively low life expectancy among males in the PAOI but requires more detailed analysis to verify.

Within the PAOI, the parents traditionally arranged marriages. This tradition has now ended, although quite recently among the Pawaians. Williams noted that among the Koriki, young men and young women were already initiating marriages in 1923 (1924, p. 53).

The marital status of males and females aged (i) 15 to 19, and (ii) 20 and above, is shown in Table 13.

Table 13: Marital Status by Age Category (%)

Marital Status	Males		Females	
	15-19 Years	20 & Above	15-19 Years	20 & Above
Never married	100	36	90	17
Married	0	61	8	69
Divorced	0	<1	1	2
Separated	0	1	0	3
Widowed	0	2	1	9

Source: ERIAS Group, 2016b.

Results shown in Table 13 indicate that while no males under 20 years of age were married, 10% of females under 20 years of age had been married. Additional information on the age that women typically get married, provided by women's groups, is summarized is Table 14.

Table 14: Age Women Marry

Language Group	Minimum	Maximum	Average Starting Age	Average Ending Age
Pawaia	10	30	12	22
Ahia	12	20	12	20
Koriki	15	40	17	28
Iare	14	40	17	25
Kaimare	15	25	16	23
Maipua	15	18	15	18
Orokolo	14	25	16	21

Source: ERIAS Group, 2016a.

Results from Table 14 confirm the very young age that women are typically married within the PAOI, particularly among the Pawaian and Ahia villages. The *Marriage Act 1963* has a minimum age of marriage of 18 years for men and 16 years for women, with judges able to allow marriages involving boys aged 16 years and girls aged 14, but is not applicable to customary marriages. Customary marriages are not performed by Ministers of Religion, District Officers or Registrars, but follow the custom of the prevailing tribe or group to which the parties of the marriage belong. However, proposed amendments to the Act include a definition of marriage applicable to both customary and non-customary marriages, with a requirement for consent, and a minimum age of 18 years for both males and females (Buchanan, 2016, p. 1). Although not submitted to parliament, this would substantially delay the age that women are legally married in the PAOI.

6.2.4.3 Migration

Excluding people who migrate in to marry, relatively few people have migrated into villages in the PAOI. As shown in Table 15, 12 villages (39% of villages surveyed) contained people who have migrated into the PAOI. Of these, 9 villages contained pastors, health workers or teachers (and their families) who have migrated specifically for employment purposes, while only 3 villages (Ura, Evara and Apiope) contain other migrants.

Table 15: Number of Villages Containing Families from Other Villages

Language Group	Villages Surveyed	Govt or Church Workers	Villages Responding Govt or Church Workers	Other Families	Villages Responding Other Families	None	Villages Responding None
Pawaia	5	2	Poroi 2, Ura	1	Ura	3	Subu, Subu 2, Wabo
Ahia	1	0	N/a	1	Evara	0	N/a
Koriki	4	0	N/a	0	N/a	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	5	2	Aumu, Maipenairu	0	N/a	3	Aivai, Kaevaria, Mapaio
Kaimare	2	0	N/a	0	N/a	1	Upaia
Maipua	1	0	N/a	1	Apiope	0	N/a
Orokolo	13	5	Ere-Kilavi, Iuku, Kavava, Mareke, Oru-Lariau-Herekela	0	N/a	8	Avavu, Harevavo, Hepere, Huruta, Kaivukavu, Larihairu, Marea, Paevera
TOTAL	**31**	**9**		**3**		**19**	

Source: ERIAS Group, 2016a.

The total number of families from other villages that reside in the PAOI is shown in Table 16.

Table 16: Total Number of Families from Other Villages

Language Group	Villages Surveyed	Govt or Church Workers	Other Families
Pawaia	5	4	15
Ahia	1	0	3
Koriki	4	0	0
Iare	5	3	0
Kaimare	2	0	0
Maipua	1	0	1
Orokolo	13	10	0
TOTAL	**31**	**17**	**19**

Source: ERIAS Group, 2016a.

The only villages that have experienced in-migration, excluding families that have migrated specifically as pastors, health workers or teachers, are:

- Ura, where 15 families have migrated from Karimui and other locations in the Highlands, all in search of employment with InterOil or TEP PNG;

- Evara, where 3 families migrated from the Orokolo area to escape conflict in their previous village; and
- Apiope, where an in-law had followed someone else who had married locally.

In total, it is estimated that the PAOI villages include 36 migrant families, which represents less than 2% of the households in the PAOI.

The above information does not include residents of Wabo Station, Muro Mission or Kapuna, all of which contain a high proportion of people from outside the PAOI. A population count during the social baseline survey indicated that Wabo Station had 108 residents. The number of residents of Kapuna and Muro Mission were not recorded during the surveys as these people were there temporarily or primarily for the purposes of employment as opposed to forming a 'village' or 'community', the 2011 census recorded 200 people living at Kapuna and 15 at Muro Mission.

During the social baseline surveys, village leaders were asked whether families from other villages would be allowed to relocate, on a permanent basis, in their village. Results are presented in Table 17.

Table 17: Villages Allowing Families to Relocate to their Village

Language Group	Yes	Villages Responding Yes	No	Villages Responding No	Unsure	Villages Responding Unsure
Pawaia	2	Poroi 3, Ura	4	Poroi 2, Subu, Subu 2, Wabo	1	Poroi 1
Ahia	0	N/a	1	Evara	0	N/a
Koriki	1	Ara'ava	3	Akoma-Kairu'u, Ikinu, Kairimai	0	N/a
Iare	2	Aivai, Aumu	3	Kaevaria, Mapaio, Maipenairu	0	N/a
Kaimare	0	N/a	3	Aiere, Upaia, Mariki	0	N/a
Maipua	0	N/a	1	Apiope	0	N/a
Orokolo	1	Paevera	8	Oru-Lariau-Herekela, Larihairu, Kavava, Kaivukavu, Iuku, Huruta, Harevavo, Ere-Kilavi	3	Avavu, Marea, Mareke
TOTAL	**6**		**23**		**4**	

Source: ERIAS Group, 2016a.

As shown in Table 17, around 17% of the village leader groups indicated that they would allow unrelated families to relocate to their village on a permanent basis. The vast majority stated that outsiders could not come and live on their land unless they had a good reason, such as being pastors, health workers or teachers.

Village leaders were asked to estimate the number of families who had migrated to other parts of Papua New Guinea. Results are summarized in Table 18.

Table 18: Outmigration Estimates

Language Group	None	Villages Responding None	< 20	Villages Responding <20	20 - 100	Villages Responding 20-100	> 100	Villages Responding >100
Pawaia	1	Ura	3	Subu, Subu 2, Wabo	0	N/a	1	Poroi 2
Ahia	0	N/a	1	Evara	0	N/a	0	N/a
Koriki	0	N/a	0	N/a	0	N/a	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	0	N/a	0	N/a	2	Aivai, Kaevaria	3	Aumu, Mapaio, Maipenairu
Kaimare	0	N/a	1	Mariki	1	Upaia	0	N/a
Maipua	0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo							12	Avavu, Ere-Kilavi, Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera
TOTAL	**1**		**5**		**3**		**21**	

Source: ERIAS Group, 2016a.

As shown in Table 18, 70% of the villages providing an estimate of the number of people migrating to other parts of Papua New Guinea indicated that more than 100 people had migrated in the past. Given the average village size of 317, out-migration has been substantial. Other than the relatively small Pawaian villages of Subu and Subu 2, the only villages indicating that no or less than 20 people had migrated to other parts of Papua New Guinea were Ura, Wabo, Evara and Mariki. For Ura, Wabo and Evara, this may reflect the limited period of interaction these villages have had with the rest of Papua New Guinea. It is unclear why relatively few people may have relocated from Mariki, given its coastal location and extended interaction with the rest of Papua New Guinea. Only the village leaders from Ura indicated that no-one had migrated from their village. The response from Ura is possibly erroneous reflecting a possible misinterpretation at the time of the survey.

Discussion with village leaders indicated that many people from the PAOI villages reside in Port Moresby and other parts of Papua New Guinea, including Kerema, Lae, other provincial centers and various mining camps. Generally, out-migration was associated with the search for employment opportunities.

Results of the household survey indicate that 51% of people were born in the village in which they now reside. Results are summarized in Table 19.

Table 19: Location at Birth (%)

Language Group	Same Village	Other Village in LLG	Other Village in Province	Village in Other Province
Pawaia - males	55	26	4	16
Pawaia – females	54	32	2	12
Ahia – males	65	15	13	7
Ahia – females	52	25	14	9
Koriki – males	50	44	1	5
Koriki – females	48	44	2	6
Iare – males	26	63	4	7
Iare – females	30	62	4	4
Kaimare – males	25	63	3	9
Kaimare – females	25	72	0	3
Maipua – males	65	22	8	5
Maipua – females	54	25	11	10
Orokolo – males	66	21	3	10
Orokolo – females	60	26	6	8
TOTAL – males	**53**	**34**	**4**	**10**
TOTAL – females	**49**	**38**	**5**	**8**

Source: ERIAS Group, 2016a.

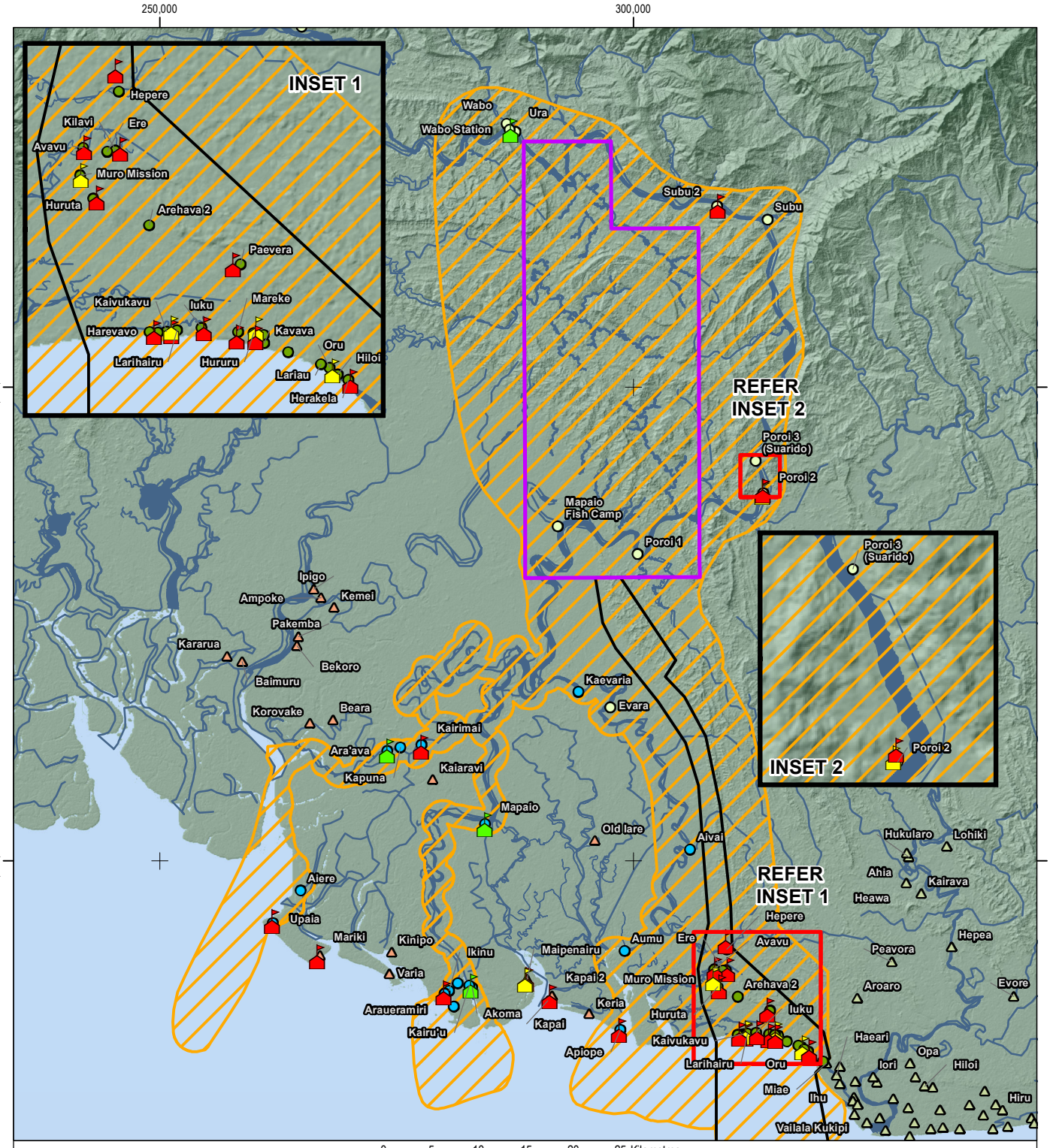
As shown in Table 19, there was relatively little difference between males and females in terms of where they were born. However, relatively few people were born in other LLGs within Gulf Province (4%) or in other provinces (9%).

Williams also noted that matrilocal marriages (where the husband would leave the land of his family and reside with the family of his wife) were not numerous (1924, p. 60). Despite having implications on land access, there appears to be some flexibility in where newlyweds decide to live: it does not necessarily have to be where the husband is from.

6.2.5 Education

6.2.5.1 Schools and Students in the PAOI

In 2016 the PAOI contained 32 functioning schools (23 elementary and 9 primary schools). The location of schools is shown in Map 5 and Table 20.



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
- Ihu Rural

Schools
- Elementary
- Elementary and Primary
- Primary

- Waterways
- Waterbodies
- Upstream project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Educational Facilities in the Project Area of Influence

MAP: 5

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_104-81388 **REVISION:** H

DATE: 14/07/2017

DATA SOURCES:
Towns and villages, schools, export pipeline corridor supplied by ERIAS Group (2015-2016). PRL-15, waterways, hillshade supplied by TOTAL (2015). Upstream project area of influence digitised by Mipela GeoSolutions based on data provided by ERIAS (2017).

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Mipela GeoSolutions does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. Mipela GeoSolutions is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.

Table 20: Number and Location of Schools in the PAOI

Project Component	Village	Language group	Elementary Schools*	Primary Schools (Administration)
PRL-15	Poroi 2	Pawaian	✓	✓ Poroi Primary School (Lutheran Church Agency)
	Poroi 1	Pawaian	-	-
	Poroi 3	Pawaian	-	-
	Wabo	Pawaian	-	-
	Ura/Wabo Station	Pawaian	✓ Wabo Elementary School	✓ Wabo Primary School (Government)
	Subu	Pawaian	-	-
	Subu 2	Pawaian	✓	-
	Mapaio Fish Camp	Iare	-	-
Riverways	Mapaio	Iare	✓✓ Mapaio Aikavalavi Elementary School and Mapaio Elementary School	✓ Mapaio Primary School (Church, not specified)
	Kaevaria	Iare	-	-
	Aumu	Iare	-	-
	Aivai	Iare	-	-
	Ara'ava	Koriki	✓	✓Ara'ava Primary School (United Church Missions)
	Kairimai	Koriki	✓	
	Akoma and Kairu'u	Koriki	✓	✓ Akoma Primary (Government)
	Ikinu	Koriki	✓	
	Upaia	Kaimare	✓	-
	Apiope	Maipua	✓	Primary school under construction due for completion 2017
	Evara	Ahia	-	-
Export Pipeline Corridor	Hepere	Orokolo	✓	-
	Ere and Kilavi	Orokolo	✓	-
	Muro Mission	Orokolo	-	✓ Muro Primary School (Catholic Agency)
	Avavu	Orokolo	✓	-
	Huruta	Orokolo	✓	-
	Paevera	Orokolo	✓ Paevara Elementary School	-
	Harevavo	Orokolo	✓ Harevavo Marea Elementary School	-
	Kaivakavu	Orokolo	✓ Kaivakavu Larihairu Elementary school	✓ Arehava-Harevavo Primary School (Government)
	Larihairu	Orokolo	*see Kaivakavu*	-

Project Component	Village	Language group	Elementary Schools*	Primary Schools (Administration)
	Marea	Orokolo	*see Harevavo*	-
	Iuku	Orokolo	✓ Iuku Elementary School	-
	Mareke	Orokolo	✓ Mareke Elementary School	-
	Kavava	Orokolo	✓ Miri-Muru Elementary School	✓ Orokolo Primary School (United Church Agency)
	Oru, Lariau and Herakela	Orokolo	✓✓ Oru-Lariau Elementary School, Herekela Elementary School	✓ St Anne Primary School (Catholic Church)
			23	**9**

* All of the elementary schools in the PAOI are government-run.

Based on information available from schools in the PAOI, the average school in the PAOI contains 87 students and 2.6 teachers, with an average of 33 students per teacher, with 24% of teacher positions vacant. However, there is considerable difference between elementary and primary schools that needs to be articulated.

For 20 elementary schools in the PAOI for which data was available, the average school contained:

- 57 students;
- 1.9 teachers;
- 38 students per teacher;
- 2.4 classes;
- 1.3 classes per teacher; and
- 0.6 teacher vacancies.

The government runs the majority of elementary schools in the PAOI. In addition, 40% of the elementary schools had only one teacher, and 60% of schools taught more classes than they had teachers. While 60% of elementary schools had all three classes (prep, grade 1 and grade 2), only three or 15% of schools provided all three grades and had three teachers.

For 8 primary schools in the PAOI for which data was available, the average school contained:

- 155 students;
- 4.6 teachers;
- 37 students per teacher;
- 5.3 classes;
- 1.1 classes per teacher; and
- 1.3 teacher vacancies.

Church agencies run the majority of primary schools in the PAOI. The three largest schools in the PAOI are all in the Orokolo area, and include Orokolo Primary (located at Kavava), Arehava-Harevavo Primary and Muro Primary. Orokolo Primary, Arehava-Harevavo Primary and St Anne Primary, at Oru, are the only primary schools to cater for all six grades. The smallest primary schools are Poroi Community School at Poroi 2 and Ura Community School at Wabo. Ura Community School has only two teachers, the lowest number of any primary or community school in the PAOI, and currently has four grades (3, 4, 5 and 6).

None of the elementary or primary schools in the PAOI had any boarding facilities, which meant that access to school often relied on students staying with relatives in the village containing a school.

Of the 39 villages in the PAOI, 29 (74%) of villages had either a functioning elementary school or relatively easy access to a functioning elementary school (including Wabo, where school children paddle across the river to attend elementary school at Wabo Station). Examples of functioning elementary classrooms are shown in Photo 3 and Photo 4. Given the age of most elementary school students, adequate access to elementary school is considered to be a walk or paddle of no more than 30 minutes. The villages/hamlets without access to a functioning elementary school includes Kaevaria, Aivai, Aumu, Subu, Evara, Poroi 1, Poroi 3 (Suarido), Mapaio Fish Camp, Arehava 2 and Aiere. It should be noted that Aivai, Aumu, Apiope, Evara and Arehava 2 have elementary schools that were not operational (that is, classrooms exist, schools are registered and teachers have been appointed, but for various reasons, classes do not occur. Reasons are discussed in Section 6.2.5.6, and usually include lack of teaching materials, poor conditions (of the schools and living conditions) and problems with the payment of wages). Based on the population of PAOI villages, approximately 10% of children in the PAOI aged 6 to 8 years of age are not located within a 30-minute walk or paddle of the nearest elementary school, and are therefore unlikely to attend.

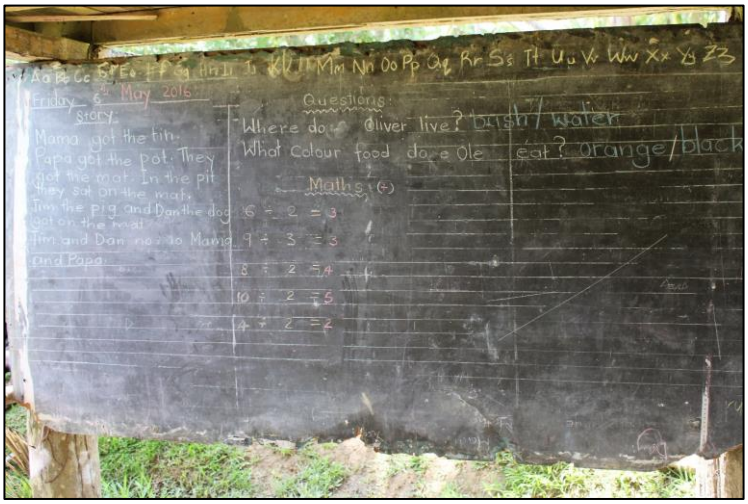


Photo 3: Blackboard showing daily lessons, Ara'ava, August 2016

Source: ERIAS Group, 2016a.



Photo 4: Elementary classroom, Subu 2, August 2016

Source: ERIAS Group, 2016a.

Of the 39 villages in the PAOI, 26 (67%) of villages either had a functioning primary school or relatively easy access to a functioning primary school. Given the age of most primary school students, adequate access to primary school is considered to be a walk or paddle of no more than 90 minutes. The villages/hamlets without access to a functioning primary school includes Kaevaria, Aivai, Aumu, Subu, Subu 2, Evara, Poroi 1, Poroi 3 (Suarido), Mapaio Fish Camp, Aiere, Upaia, Apiope and Paevera. The primary schools at Evara and Mariki are not operational (although students from Mariki can attend primary school at Varia). Based on the population of PAOI villages, approximately 13% of children in the PAOI aged 9 to 14 years of age are not located within a one hour walk or paddle of the nearest primary school, and are therefore unlikely to attend.

The total number of students in the schools surveyed in the PAOI is shown in Table 21.

Table 21: Total Students in the PAOI

Grade	Male	Female	Total
Prep	194	193	387
G1	191	167	358
G2	253	186	439
G3	138	112	250
G4	148	136	284
G5	119	112	231
G6	118	76	194
G7	83	84	167
G8	56	59	115
TOTAL	**1,300**	**1,125**	**2,425**

Source: ERIAS Group, 2016a.

Based on an extrapolation of demographic data from the household survey, the PAOI should contain approximately 1,500 boys and 1,300 girls aged between 6 and 14. Using data presented in Table 21, the Gross Enrolment Ratio is estimated at 87% for both boys and girls. While this indicates relatively equal participation rates by boys and girls, it highlights that at least 13% of the school-aged population is not attending school. Furthermore, given the late age that many children commence their education in the PAOI, and the relatively high age of students relative to the grade they are attending, the Net Enrolment Ratio is likely to be far lower, and indicate that far more than 13% of the school-aged population do not attend school.

As discussed further in Section 6.2.5.5, results from the household survey indicate that just 31% of boys and girls aged from six to 15 years attend school. Many children attending school are older than the age recommended by the DoE. A Net Enrolment Ratio of 31% compares poorly with DoE estimates for Papua New Guinea (53%) and Gulf Province (42%) for 2007.

The PAOI does not contain any secondary or vocational schools. The nearest secondary schools are at Ihu, Araimiri, Kerema and Kikori. Some students from Pawaian villages also attend school in Kundiawa and Goroka.

The nearest vocational schools are at Baimuru and Araimiri (which is officially a technical secondary school, run by Don Bosco, which has a focus on practical courses). A vocational school at Ihu has been closed for many years and is in a state of disrepair.

Many schools in the PAOI did not operate throughout 2015. A summary, based predominantly on interviews with teachers, is presented in Figure 35.

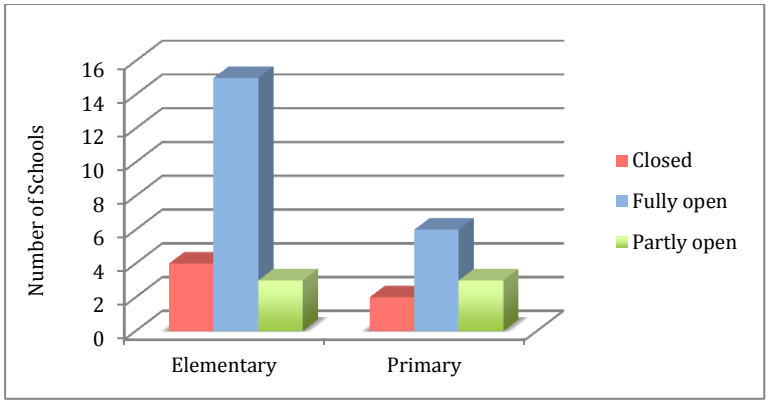


Figure 35: Status of School in the PAOI, 2016

Source: ERIAS Group, 2016a

As shown in Figure 35, approximately 64% of the schools in the PAOI were fully open in 2015, with another 18% partially open[6]. Women groups provided similar information: 64% of schools were open year-round, 27% were open part of the time, and 9% were closed.

The teachers interviewed provided very few responses as to why schools were not open all year, although flooding was blamed for three schools not operating for the full year. The women's groups identified absent teachers as the overwhelming reason for schools either not operating year-round or being closed, with flooding identified only by one group.

6.2.5.2 Management, Supervision and External Assistance

All schools appeared to have a school board, and as shown in Figure 36, 67% of elementary school boards and 70% of primary school boards are reported to meet on a regular basis.

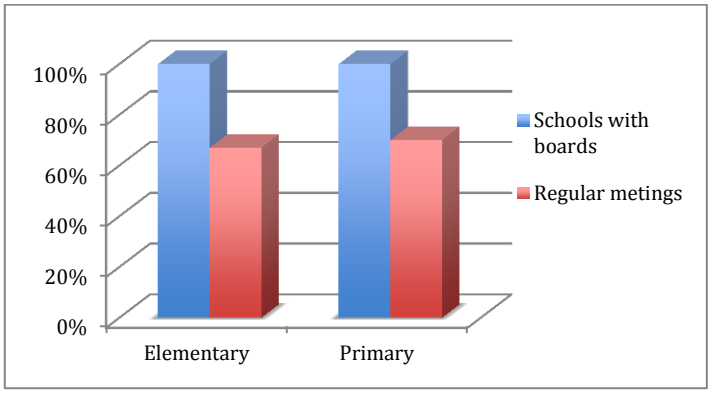


Figure 36: School Boards and Board Meetings in the PAOI

Source: ERIAS Group, 2016a

It is the responsibility of the provincial education authorities to inspect schools on a regular basis. The frequency with which schools in the PAOI have been inspected is summarized in Figure 37. While 80% of primary schools have been inspected in the previous 18 months, only 50% of elementary schools had been inspected in 2015 or 2016, and 22% claimed they had never seen a school inspector.

[6] Partially open means that classes occurred for some, but not all, of the school year.

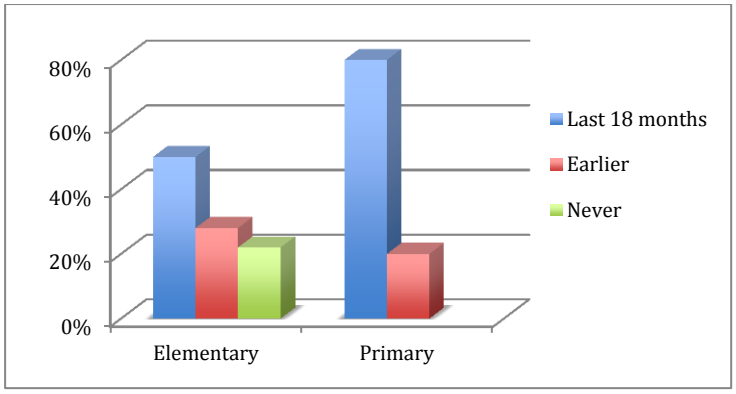


Figure 37: Frequency of School Inspections in the PAOI

Source: ERIAS Group, 2016a

The schools claiming not to have been inspected include Subu 2, Hepere, Ikinu and Iuku. While transport difficulties could contribute to some schools being inspected infrequently, Iuku in particular, is not far from Kerema, and relatively easy to access (that is, transport from Kerema to Iuku is available and regularly occurs via dinghy).

Approximately 75% of schools have received some external assistance in the past decade. This often includes the construction of a double classroom or one or more teacher's houses, but also commonly is a gift of timber, roofing iron or water tanks. The assistance has been provided by donors (AusAID and to a lesser degree, the European Union and Japanese International Cooperation Agency (JICA)); the private sector (InterOil, Digicel Foundation and local logging operators); and Government (either the Governor, DoE or LLG).

Approximately half of the schools impose a 'project fee' on each child. This varies between PGK10 and PGK50 per student per year. The fees are generally used to maintain the classrooms and toilets, or to buy materials and supplies for the school. Some schools reported that parents refused to pay project fees.

6.2.5.3 Education Infrastructure

The majority of elementary and primary schools in the PAOI are made of very basic materials and have very limited facilities and equipment, as shown in Photo 5.



Photo 5: Elementary Classroom, Upaia

Source: ERIAS Group, 2016a.

Some external assistance has been provided, leading to substantially improved facilities, as shown in Photo 6.



Photo 6: Elementary Double-classroom, Herakela

Source: ERIAS Group, 2016a.

When teachers were asked to rank the school's resources, the overwhelming majority indicated dissatisfaction, as shown in Figure 38.

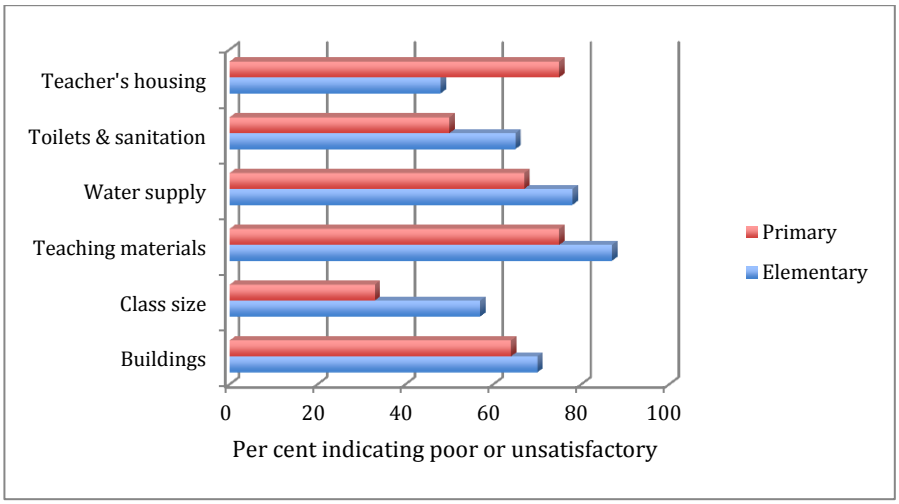


Figure 38: Teacher's Assessment of School Resources in the PAOI, 2016

Source: ERIAS Group, 2016a.

Local women were asked specifically whether the local schools had (i) rainwater tanks, and (ii) adequate drinking water. Results are presented in Table 22.

As shown in Table 22, 41% of schools had rainwater tanks and 25% of schools were assessed as having adequate drinking water for students. The schools with rainwater tanks were not necessarily the same schools as those with adequate drinking water:

- Mapaio has tanks but not an adequate drinking water supply; and
- Subu 2 does not have tanks but it does have an adequate drinking water supply.

Table 22: Schools with Adequate Drinking Water

Language Group	Schools with Rainwater Tanks				Schools with Adequate Water			
	Yes	Villages Responding Yes	No	Villages Responding No	Yes	Villages Responding Yes	No	Villages Responding No
Pawaia	2	Poroi 2, Ura	1	Subu 2	3	Poroi 2, Subu 2, Wabo Stn	0	N/a
Ahia	1	Evara	0	N/a	0	N/a	0	N/a
Koriki	3	Akoma-Kairu'u, Ara'ava, Kairimai	1	Ikinu	0	N/a	4	Akoma-Kairu'u, Ara'ava, Ikinu, Kairimai
Iare	2	Maipenairu, Mapaio	3	Aivai, Aumu, Kaevaria	0	N/a	4	Aivai, Aumu, Mapaio, Maipenairu
Kaimare	0	N/a	2	Mariki, Upaia	1	Upaia	0	N/a
Maipua	0	N/a	1	Apiope	1	Apiope	0	N/a
Orokolo	4	Ere-Kilavi, Kaivukavu, Kavava, Oru-Lariau-Herekela	9	Avavu, Harevavo, Hepere, Huruta, Iuku, Larihairu, Marea, Mareke, Paevera	1	Kavava	10	Avavu, Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Mareke, Oru-Lariau-Herekela, Paevera
TOTAL	**12**		**17**		**6**		**18**	

6.2.5.4 Education Levels

The highest level of education completed for males and females in the PAOI, aged 16 years and above, is summarized in Table 23 and shows clearly that education levels are considerably lower among Pawaian villages and Evara, and in particular, female education levels. Table 24 shows education levels by village.

As shown in Table 23, 10% of males and 21% of females aged 16 years and above have never attended school. As discussed in Section 6.2.5.4, this compares to an estimated 8% of males and 11% of females in Gulf Province that have never attended school. More than half of the females from Pawaian villages aged 16 years and above have never attended school.

Approximately half of all males and females aged 16 years and above have completed between Grade 1 and Grade 6. Approximately 32% of males aged 16 years and above have completed between Grade 7 and Grade 10, compared to only 24% of females of the same aged category. Very few males or females from the PAOI have completed vocational or technical schools or attended university.

The results presented in Table 23 reflect the distribution of elementary, primary and secondary schools in the PAOI: 13% of school aged children in the PAOI do not have access to elementary schools; 18% do not have access to primary schools, and other than the Orokolo area, which is relatively close to Ihu High School, anyone else from the PAOI will need to travel and board or stay with relatives to attend higher studies.

Table 23: Highest Education Completed (age 16 & above)

Language Group	Sample Size	None (%)	Grade 1-6 (%)	Grade 7-10 (%)	Grade 11-12 (%)	Voc or Tech (%)	Uni (%)
Pawaia - males	178	16	49	28	6	0	0
Pawaia – females	121	55	36	8	0	0	0
Ahia – males	23	13	65	2	0	0	0
Ahia – females	21	6	18	1	0	0	0
Koriki – males	112	5	61	31	1	2	0
Koriki – females	108	15	54	28	1	2	0
Iare – males	136	13	35	42	7	4	0
Iare – females	134	13	51	31	3	2	1
Kaimare – males	30	7	57	33	0	3	0
Kaimare – females	41	22	59	20	0	0	0
Maipua – males	37	8	62	24	0	5	0
Maipua – females	34	9	68	18	3	3	0
Orokolo – males	243	8	58	31	1	1	<1
Orokolo – females	253	12	55	30	1	2	<1
TOTAL – males	**759**	**10**	**53**	**32**	**3**	**2**	**<1**
TOTAL - females	**712**	**21**	**52**	**24**	**1**	**1**	**<1**

Source: ERIAS Group, 2016b.

Table 24: Highest Education Completed (age 16 & above) by Village

Village	Language Group	Sample Size	None (%)	Grade 1-6 (%)	Grade 7-10 (%)	Grade 11-12 (%)	Voc or Tech (%)	Uni (%)
Poroi 1	Pawaia	13	31	31	31	8	0	0
Poroi 2	Pawaia	61	23	56	13	5	3	0
Poroi 3 (Suarido)	Pawaia	18	61	11	17	11	0	0
Subu	Pawaia	6	50	50	0	0	0	0
Subu 2	Pawaia	23	39	43	13	0	4	0
Ura	Pawaia	60	18	53	28	0	0	0
Wabo	Pawaia	93	45	40	13	2	0	0
Wabo Station	Pawaia	25	8	36	48	8	0	0
Evara	Ahia	44	18	68	14	0	0	0
Akoma	Koriki	43	12	53	28	2	5	0
Aivai	Iare	40	13	63	20	5	0	0
Kaevaria	Iare	39	10	59	28	0	3	0
Mapaio Fish Camp	Iare	15	13	47	40	0	0	0
Aiere	Kaimare	15	7	87	13	0	0	0
Upaia	Kaimare	44	7	73	16	0	2	0
Apiope	Maipua	72	10	64	21	1	4	0

Village	Language Group	Sample Size	None (%)	Grade 1-6 (%)	Grade 7-10 (%)	Grade 11-12 (%)	Voc or Tech (%)	Uni (%)
Ere	Orokolo	64	8	61	28	3	0	0
Harevavo	Orokolo	125	15	61	22	0	2	0
Herakela	Orokolo	93	5	58	33	1	1	1
Iuku	Orokolo	83	11	47	39	1	2	0
Kilavi	Orokolo	58	3	66	31	0	0	0
Paevera	Orokolo	73	12	45	36	3	3	1

Source: ERIAS Group, 2016a.

6.2.5.5 School Attendance

When teachers were asked about the level of attendance, 15% indicated all students attended on a regular basis, 81% indicated that most students attended on a regular basis, and one school, Wabo Primary (representing 4% of responses), indicated that few students attended on a regular basis.

When women's groups were asked a similar question, a very different perspective was provided, as shown in Figure 39.

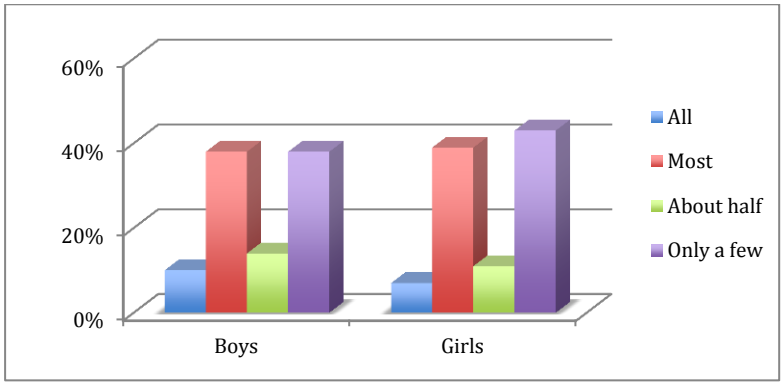


Figure 39: School Attendance in the PAOI, 2016

Source: ERIAS Group, 2016a.

According to the women surveyed, 52% of boys and 54% of girls attended school around half of the time, or less.

Although the teachers were reluctant to admit poor attendance, they were more forthcoming with reasons for poor attendance, as shown in Figure 40.

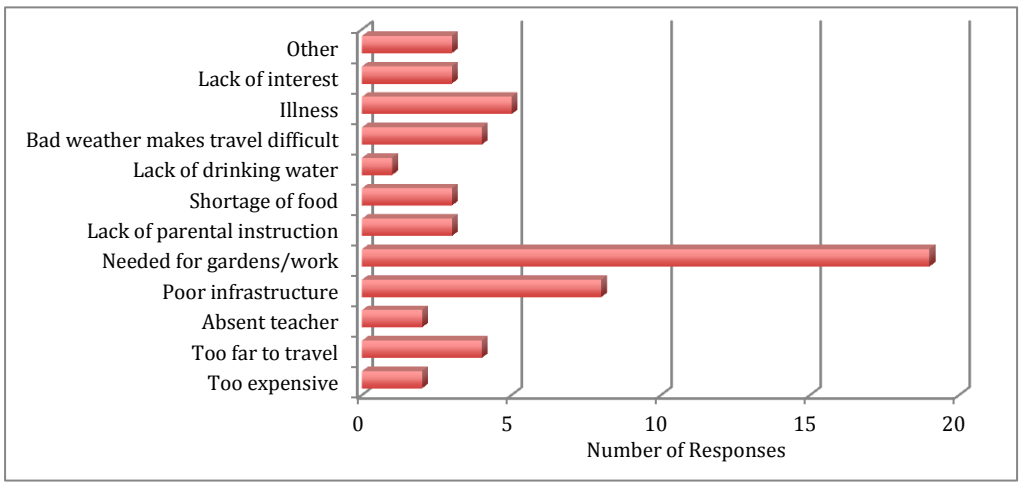


Figure 40: Reasons for Poor School Attendance in the PAOI, 2016

Source: ERIAS Group, 2016a.

The most frequently cited reason for poor attendance was that the students were required to help at home with gardening, making sago or other work. The other main reasons included poor infrastructure, illness, bad weather making travel difficult and a lack of parental guidance. Many of the reasons provided indicated a relatively low commitment to education, either by the students or their parents. As shown in Table 25, results from the household survey indicate that around 29% of boys and 35% of girls in the PAOI aged from six to 15 years are attending school. The vast majority of school-aged children are not attending school, even in the Orokolo area, where the majority of children have relatively good access to schools. Table 26 shows education attendance by village.

Table 25: Education Attendance (age 6 to 15 years)

Language Group	Sample Size	Attending (%)
Pawaia - males	245	21
Pawaia – females	191	18
Ahia – males	39	23
Ahia – females	37	19
Koriki – males	154	38
Koriki – females	146	35
Iare – males	174	10
Iare – females	163	27
Kaimare – males	50	32
Kaimare – females	58	21
Maipua – males	48	46
Maipua – females	51	33
Orokolo – males	342	37
Orokolo – females	151	73
TOTAL – males	**1,052**	**29**
TOTAL - females	**797**	**35**

Source: ERIAS Group, 2016b.

Table 26: Education Attendance (age 6 to 15 years) by Village

Village	Language Group	Sample Size		Attending (%)	
		Male	Female	Male	Female
Poroi 1	Pawaia	1	0	0	0
Poroi 2	Pawaia	13	15	54	87
Poroi 3 (Suarido)	Pawaia	6	1	17	0
Subu	Pawaia	1	1	100	100
Subu 2	Pawaia	7	5	100	40
Ura	Pawaia	13	12	54	8
Wabo	Pawaia	22	31	27	29
Wabo Station	Pawaia	1	5	100	80
Evara	Ahia	16	11	38	45
Akoma	Koriki	5	6	100	83
Kairimai	Koriki	15	10	80	60
Kairu'u	Koriki	7	12	57	8
Aivai	Iare	4	6	25	67
Kaevaria	Iare	4	6	50	33
Mapaio Fish Camp	Iare	2	2	100	0
Aiere	Kaimare	4	8	75	25
Upaia	Kaimare	15	10	0	90
Apiope	Maipua	12	17	92	76
Ere	Orokolo	14	9	86	89
Harevavo	Orokolo	17	27	82	78
Herakela	Orokolo	18	13	89	85
Iuku	Orokolo	25	22	76	73
Kilavi	Orokolo	18	9	83	89
Oru	Orokolo	13	12	54	8
Paevera	Orokolo	10	17	80	71

Source: ERIAS Group, 2016a.

The reason that household survey respondents provided for household members no longer attending school is summarized in Table 27.

Table 27: Reason Not Attending School (children aged 6 to 18 years)

Reason	Males (Number)	Females (Number)
School not accessible	3	1
Not affordable	2	4
Commenced working	0	0
School closed	28	33
Not interested	11	7
Helping parents at home	0	6
Other	30	36
TOTAL	**74**	**87**

Source: ERIAS Group, 2016b.

As shown in Table 27, the main reasons provided for not attending school was that the school was closed, or other (unspecified).

6.2.5.6 Education Priorities

When teachers were asked what the main priorities were to improve education in the local area, the response focused on infrastructure (including teacher's housing, classrooms, water supply and toilets) and teaching materials, as shown in Figure 41.

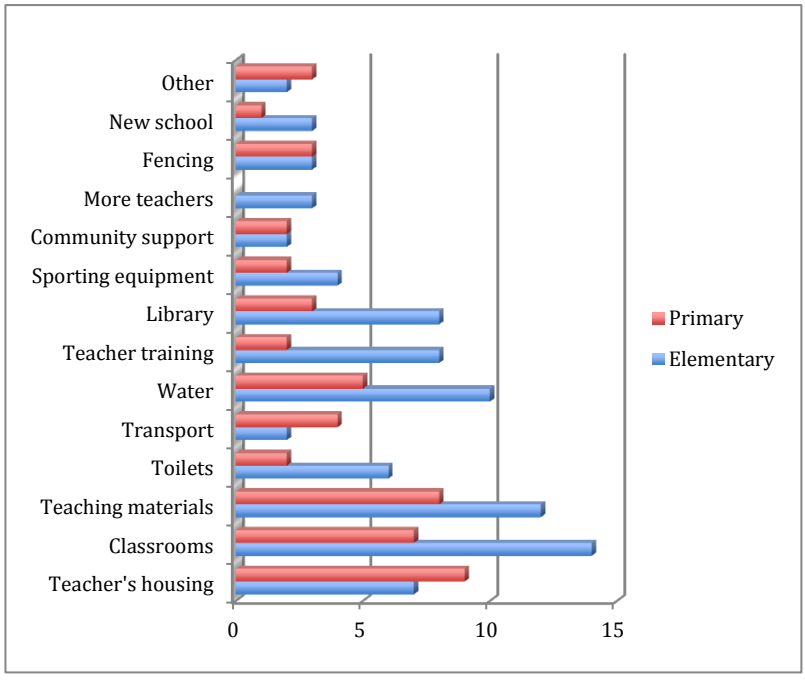


Figure 41: Teacher's Assessment of Education Priorities in the PAOI, 2016

Source: ERIAS Group, 2016a.

Some of the other education priorities identified by teachers included the need for power and improved communications.

Many of the teachers in the PAOI, and particularly those in the Purari delta and further upstream, are unable to access their salaries and are therefore forced to live a subsistence lifestyle. Given their limited access to resources, teachers are often forced to rely on food given to them by members of the community. If community support is not forthcoming, they may be forced to travel to Kerema to access their bank account and buy food. Many teachers are located

in areas without mobile phone reception, and they receive few visits from supervisors, inspectors or other government personnel. In addition to their challenging living conditions, the schools are generally made of very basic materials, often without electricity, adequate drinking water, toilets, furniture or teaching materials. It is not therefore surprising that many of the teachers are absent for extended periods – often to access their salary in Kerema – or apply for positions elsewhere in Papua New Guinea.

As shown in Figure 41, relatively few teachers identified the need for greater community support for schools, or a stronger emphasis given to education, despite indicating that community support is often weak and education is not afforded a high priority, as shown in Figure 42.

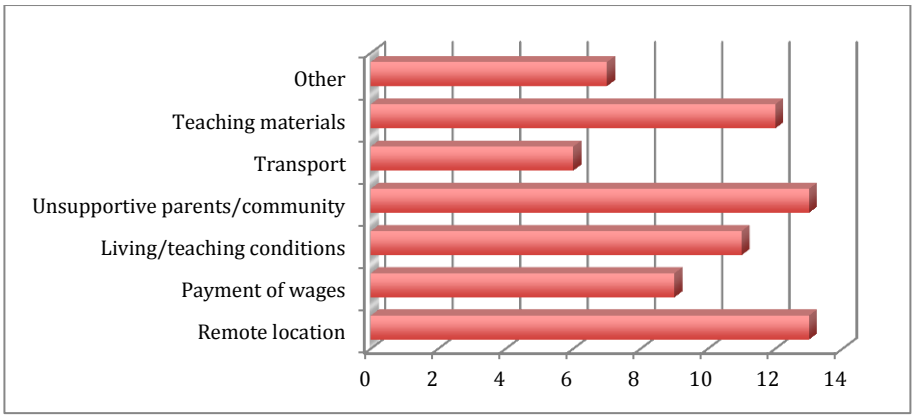


Figure 42: Problems Facing Teachers in the PAOI, 2016

Source: ERIAS Group, 2016a.

Some of the other problems facing teachers included the delay in receiving school subsidies, the lack of training opportunities, poor communications, a shortage of teachers, and a land dispute.

When women's groups were asked, what are the main issues affecting education in the local area, they identified the distance to school and the poor quality of teachers as the major constraints. Results are summarized in Table 28.

Table 28: Main Issues Affecting Education

Language Group	Distance to School	Villages Responding Distance to School	Poor Infrastructure	Villages Responding Poor Infrastructure	Poor Teachers	Villages Responding Poor Teachers	Other	Villages Responding Other
Pawaia	2	Subu, Wabo	1	Subu 2	0	N/a	2	Poroi 2, Ura
Ahia	1	Evara	0	N/a	0	N/a	0	N/a
Koriki	0	N/a	1	Ara'ava	3	Akoma-Kairu'u, Ikinu, Kairimai	0	N/a
Iare	3	Aivai, Aumu, Kaevaria	0	N/a	1	Mapaio	0	N/a
Kaimare	2	Upaia, Mariki	0	N/a	0	N/a	0	N/a
Maipua	1	Apiope	0	N/a	0	N/a	0	N/a

Language Group	Distance to School	Villages Responding Distance to School	Poor Infrastructure	Villages Responding Poor Infrastructure	Poor Teachers	Villages Responding Poor Teachers	Other	Villages Responding Other
Orokolo	2	Paevera, Kaivukavu	1	Kavava	7	Avavu, Ere-Kilavi, Hepere, Huruta, Larihairu, Mareke, Oru-Lariau-Herekela	3	Marea, Iuku, Harevavo
TOTAL	**11**		**3**		**11**		**5**	

Source: ERIAS Group, 2016a.

While the distance to school will determine whether children can access school or not, it is surprising that the poor quality of infrastructure and facilities and the lack of teaching materials didn't warrant greater attention by the women's groups.

Worth specific mentions is that youth leaders in Wabo were of the opinion that the standard of education in Gulf Province was too low, and by their own fund raising activities, were supporting 10 boys and 2 girls to attend secondary school in the Highlands (including Goroka, Kundiawa and Mt Hagen).

6.2.5.7 Literacy

The languages commonly spoken in the PAOI has been described in Section 6.2.2. The level of literacy, based on a self-assessment during the household survey, is summarized in Table 29. As shown in Table 29, 19% of males and 33% of females aged 16 years and above, indicated that they could not read or write. This compares favorably with census data for Papua New Guinea and Gulf Province from 2000. However, as discussed in Section 6.1.4.5, a detailed assessment of literacy levels in Gulf Province revealed that the literacy levels stated by people were much higher than results following a simple literacy assessment. So while Table 29 contains literacy results from the household survey, it must be remembered that in all likelihood, the levels of literacy have been substantially overstated. Nevertheless, it is important to note that literacy levels among males from Evara are particularly low, while literacy levels are particularly low for females from Pawaian and Kaimare villages as well as Evara.

Table 29: Literacy Level in the PAOI (age 16 & above)

Language Group	Sample Size	Read & Write (%)	Read Only (%)	Illiterate (%)
Pawaia - males	178	69	6	25
Pawaia – females	121	28	6	66
Ahia – males	23	39	13	48
Ahia – females	21	19	24	57
Koriki – males	112	83	2	15
Koriki – females	108	71	6	23
Iare – males	136	87	4	9
Iare – females	134	77	5	19

Language Group	Sample Size	Read & Write (%)	Read Only (%)	Illiterate (%)
Kaimare – males	30	87	0	13
Kaimare – females	41	59	5	37
Maipua – males	37	81	0	19
Maipua – females	34	74	0	27
Orokolo – males	243	77	5	19
Orokolo – females	253	71	3	27
TOTAL – males	**759**	**77**	**4**	**19**
TOTAL - females	**712**	**63**	**5**	**33**

Source: ERIAS Group, 2016b.

6.2.5.8 Workforce Skills

A detailed skills audit in the PAOI has not been undertaken. However, information has been collected on both current and previous employment. This can be used, in association with information on current occupations, as a proxy for workforce skills.[7] The types of jobs that people held at the time of the household survey are shown in Table 30.

Table 30: Current Employment (people aged 16 years & above)

Employment Type	Males (Number)	Females (Number)
Laborer	6	2
Pastor	8	2
Policeman	5	0
Village court officials/ ward councilors	10	5
Logging/milling	6	0
Loadmaster	3	1
Driver	3	0
Carpenter	10	1
Mechanic	1	1
Electrician	1	0
Welder	1	0
Stevedore	1	0
Admin/finance	2	2
Cook/catering	5	2
Security	4	2
Cleaner	2	0
Teacher	9	16
Health worker	4	1
Other	19	8
TOTAL	**100 (13.2%)**	**43 (6.0%)**

Source: ERIAS Group, 2016b.

[7] Information on occupations is presented in the Upstream Economics and Governance Baseline Report.

As shown in Table 30, 100 males (13% of respondents aged 16 and above) and 43 (6%) females from the households surveyed were currently employed. The most common jobs included teachers, village court officials and ward councillors, pastors, carpenters, cooks and laborers. People with formal employment, particularly skilled jobs, are highly regarded in the PAOI. Holding a skilled job indicates that the person has had a good education and has been trained in the job they do. The high regard applies equally to men and women who are or have been employed in a skilled job. Additional information on employment, and labor force statistics for the PAOI, are presented in the Economics and Governance SBS Report (refer Section 7.5). The types of jobs that people previously held are shown in Table 31.

Table 31: Previous Employment

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
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 (46.2%)**	**98 (13.6%)**

Source: ERIAS Group, 2016b.

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 31, 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.

6.2.6 Law and Order

There are no police located within the PAOI. The nearest police are based at Ihu and Baimuru. Both locations have one police officer but neither have vehicles, dinghies or reliable radio communications. Both locations also lack additional police accommodation, which is currently preventing the deployment of additional personnel. The Provincial Police Constable (PPC) indicated that in both Baimuru and Ihu the main crimes are sorcery, domestic violence, consumption of marijuana and crimes against the person (assault, verbal abuse, etc).

6.2.6.1 Law and Order Problems

Village leaders, women's groups and youth groups were asked to identify up to five law and order problems in their village. The results are summarized in Figure 43, Figure 44 and Figure 45, respectively.

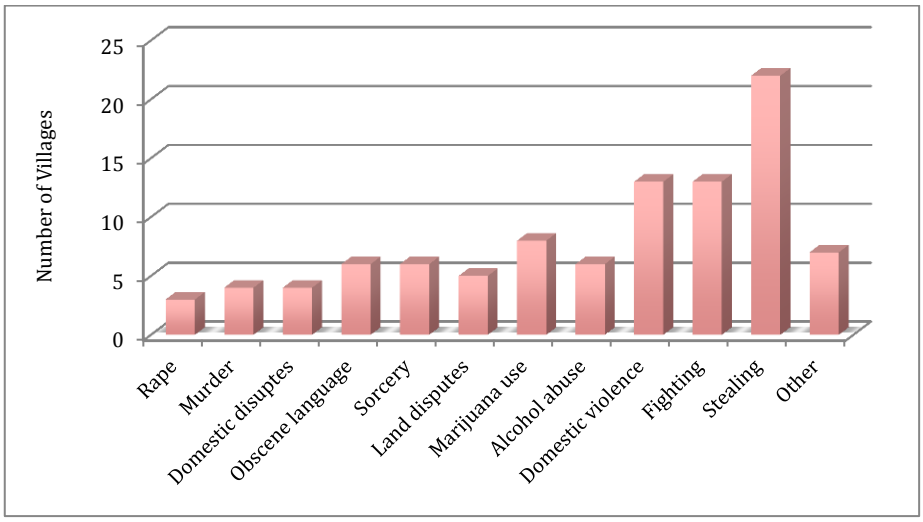


Figure 43: Village Leaders – Law and Order Problems

Source: ERIAS Group, 2016a.

Only the village leaders of Subu indicated that there were no law and order problems in their village. From the 33 villages in which village leaders were asked this question, stealing was identified as a law and order problem in 22 or 67% of villages. As shown in Figure 43, the next most commonly cited law and order problems were fighting and domestic violence (both identified in 39% of villages) and marijuana use (24% of villages).

Stealing most often involved the theft of garden produce, and was not generally regarded as a serious crime. However, the leaders of several villages identified a range of serious crimes, including rape, murder, sorcery and domestic violence. It is understood that at least two murders occurred in the Orokolo area in the past year, and this led to murder being identified as an existing law and order problem. Sorcery is considered a crime in PNG and it is an offence under the *Criminal Code (Amendment) Act 2013* to willfully murder a person on account of accusation of sorcery.

There appeared to be little difference in the type of crimes occurring in different language groups, and while several of the Orokolo villages identified more law and order problems than many of the other villages, this is largely attributed to the involvement of village court officials in the village leaders meetings, and their willingness to talk openly about law and order problems.

Table 32 shows the main law and order problems identified by village leaders, by village, across the PAOI. Alcohol abuse was not mentioned by leaders, thus is not included in the table.

Table 32: Main Law and Order Problems - Leaders

Language Group	Stealing	Village Responding Stealing	Fighting	Village Responding Fighting	DV	Village Responding DV	Marijuana	Village Responding Marijuana	Land Disputes	Village Responding Land Disputes	Other	Villages Responding Other
Pawaia	2	Ura, Poroi 1	0	N/a	1	Wabo	0	N/a	0	N/a	1	Poroi 2
Ahia	1	Evara	0	N/a	0	N/a	0	N/a	0	N/a	0	N/a
Koriki	2	Ara'ava, Ikinu	0	N/a	0	N/a	0	N/a	0	N/a	2	Akoma-Kairu'u, Kairimai
Iare	3	Aivai, Mapaio, Maipenairu	0	N/a	1	Aumu	0	N/a	0	N/a	1	Kaevaria
Kaimari	2	Aiere, Upaia	0	N/a	0	N/a	0	N/a	0	N/a	1	Mariki
Maipua	0	N/a	0	N/a	0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo	6	Kaivukavu, Paevera, Harevavo, Huruta, Marea, Kavava	3	Iuku, Oru-Lariau-Herekela, Hepere,	1	Larihairu	1	Avavu	1	Mareke	1	Ere-Kilavi
TOTAL	**16**		**3**		**3**		**1**		**1**		**6**	

Source: ERIAS Group, 2016b.

The law and order problems identified during meetings with groups of women are shown in Figure 44.

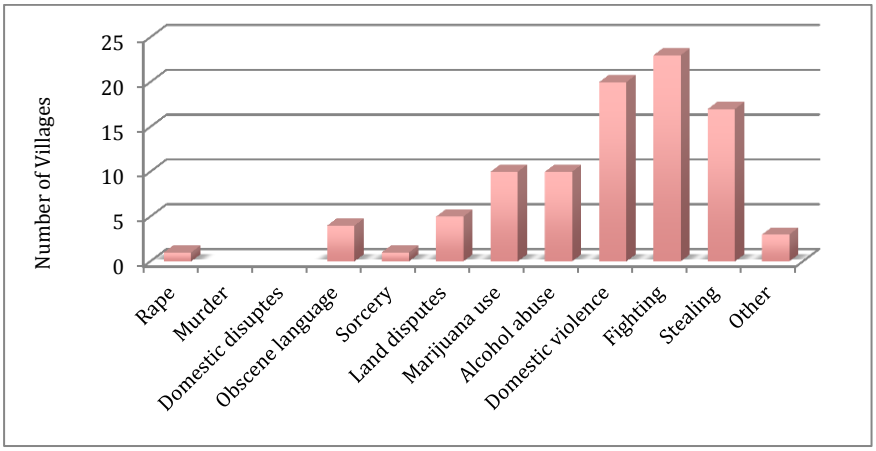


Figure 44: Women's Group – Law and Order Problems

Source: ERIAS Group, 2016a.

The women indicated a higher level of fighting and domestic violence than that portrayed by the village leaders (who were generally male). Stealing was identified in 40% of villages in which a women's group was asked this question, followed by fighting (31%). The next most commonly

cited law and order problem was domestic violence (13% of villages). Sorcery, rape nor murder was identified as primary law and order issues by women.

Table 33 shows the main law and order problems identified by women, by village, across the PAOI. Marijuana was not mentioned by women, thus is not included in the table.

Table 33: Main Law and Order Problems - Women

Language Group	Stealing	Village Responding Stealing	Fighting	Village Responding Fighting	DV	Village Responding DV	Alcohol Abuse	Village Responding Alcohol Abuse	Land Disputes	Village Responding Land Disputes
Pawaia	1	Subu 2	2	Poroi 2, Subu	2	Ura, Wabo	0	N/a	0	N/a
Ahia	1	Evara	0	N/a	0	N/a	0	N/a	0	N/a
Koriki	1	Ara'ava	2	Akoma-Kairu'u, Ikinu	1	Kairimai	0	N/a	0	N/a
Iare	4	Aivai, Kaevaria, Mapaio, Maipenairu	1	Aumu	0	N/a	0	Kapai 2	0	N/a
Kaimari	2	Upaia, Mariki	0	N/a	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	5	Ere-Kilavi, Iuku, Kaivukavu, Mareke, Paevera	5	Harevavo, Huruta, Larihairu, Marea, Oru-Lariau-Herekela	1	Hepere	1	Kavava	1	Avavu
TOTAL	**15**		**10**		**4**		**2**		**1**	

Source: ERIAS Group, 2016b.

The law and order problems identified by the youth are shown in Figure 45.

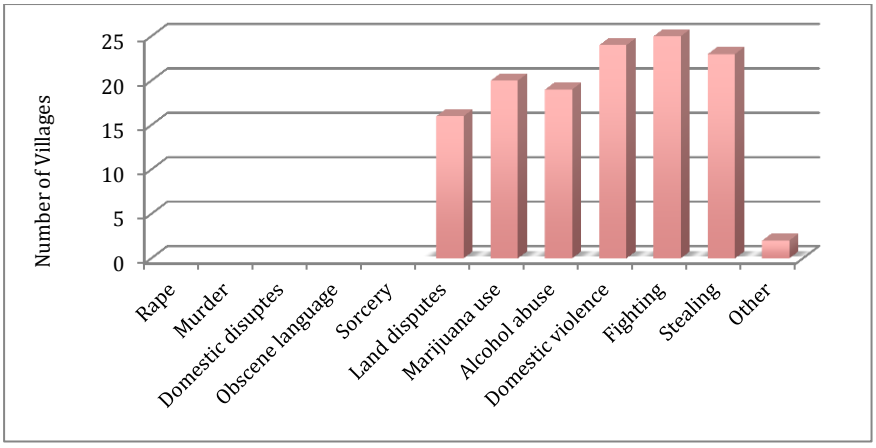


Figure 45: Youth Group – Law and Order Problems

Source: ERIAS Group, 2016a.

Of the 29 youth groups in which the law and order question was asked, the main law and order problems were fighting (identified in 86% of villages), domestic violence (83% of villages) and stealing (79% of villages). Marijuana use, alcohol abuse and land disputes were also identified in more than 55% of villages surveyed.

Table 34 shows the main law and order problems identified by youth in each village across the PAOI. 'Land disputes' and 'Other' were not mentioned by any youth groups, thus the categories have not been included in the table.

Table 34: Main Law and Order Problems - Youth

Language Group	Stealing	Village responding Stealing	Fighting	Village responding Fighting	DV	Village responding DV	Alcohol abuse	Village responding Alcohol abuse	Marijuana	Village responding Marijuana
Pawaia	3	Poroi 2, Ura, Wabo								
Ahia	1	Evara								
Koriki	3	Ara'ava, Koriki, Ikinu	1	Kairimai						
Iare	4	Aivai, Kaevaria, Mapaio, Aumu			1	Maipenairu				
Kaimari	2	Mariki, Upaia								
Maipua	1	Apiope								
Orokolo	3	Kaivukavu, Paevera, Harevavo,	3	Marea, Oru-Lariau-Herekela, Hepere	3	Iuku, Kavava, Avavu	1	Larihairu	3	Ere-Kilavi, Mareke, Huruta
TOTAL	**17**		**4**		**4**		**1**		**3**	

Source: ERIAS Group, 2016b.

Although a range of law and order problems were raised during the social baseline study, there was a reluctance to identify serious law and order issues in some villages. Some reluctance can be attributed to either the shame involved in admitting that crime occurs in the village, or as a result of the fear in discussing it. Sorcery, for example, was only identified by the village leaders in six villages, and by the women in one village. However, Williams concluded that sorcery was not very prevalent in the Purari delta (1924, p. 237), particularly in comparison to the Elema tribes to the east, including the Orokolo. However, sorcery was identified as a serious issue in most villages within the PAOI during the social baseline study, and a suspected sorcerer was burned to death in Mapaio in April 2016, just two weeks before the arrival of the social baseline study team. Those responsible were held in police custody at the time of the survey.

6.2.6.2 Prevalence of Alcohol Consumption and Illicit Activities

Village leaders and women's groups were asked how prevalent the consumption of alcohol, marijuana and harder drugs (such as heroin, cocaine, amphetamine and ecstasy), and gambling and prostitution is in their village. Youth groups were also asked how prevalent consumption of alcohol, marijuana and harder drugs, and gambling is among the youth of their village.

Results showing the number of males and females who consume alcohol are presented in Figure 46 and Figure 47, respectively.

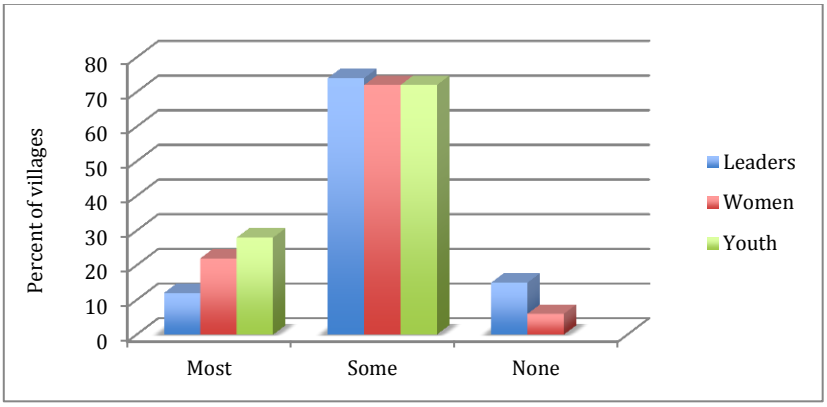


Figure 46: Males Who Consume Alcohol

Source: ERIAS Group, 2016a.

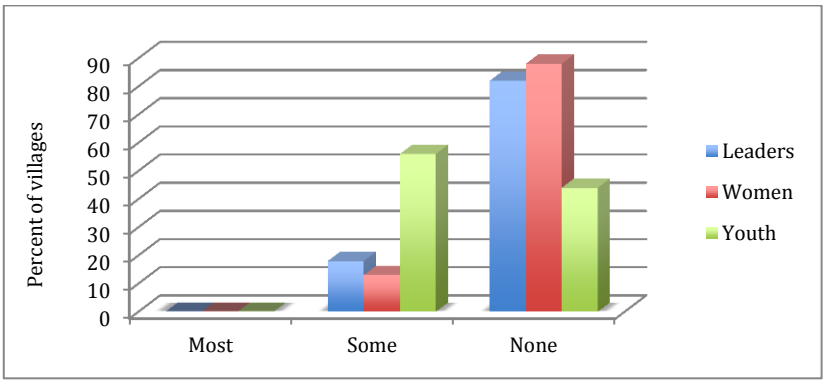


Figure 47: Females Who Consume Alcohol

Source: ERIAS Group, 2016a.

As shown in Figure 46, some males consume alcohol from the majority of villages in the PAOI. In most villages, the consumption of alcohol is generally limited to special occasions, such as Independence, Christmas or local sports events. In perhaps one quarter of the villages in the PAOI, alcohol consumption appears to be more common: consumed by most males in the village, rather than some males. However, there was a poor correlation between the village

leaders, women and youth when it came to identifying the villages in which most males consumed alcohol.

As shown in Figure 47, far fewer females consume alcohol in the PAOI. However, it is difficult to identify any consistent patterns relating to alcohol consumption in terms of higher consumption among any specific group.

Some home brew is made and consumed locally, while other alcohol is brought in from Port Moresby or other urban areas. There are no bottle shops in the PAOI. As noted in Section 6.2.6.1, alcohol abuse is regarded as a law and order problem in the PAOI, particularly as it is associated with various criminal activities, including fighting, domestic violence and obscene or abusive language. Results showing the number of males and females who smoke marijuana are presented in Figure 48 and Figure 49, respectively.

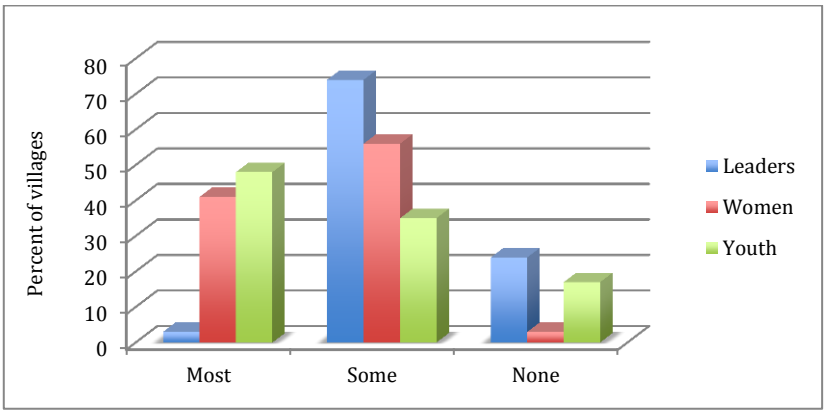


Figure 48: Males Who Consume Marijuana

Source: ERIAS Group, 2016a.

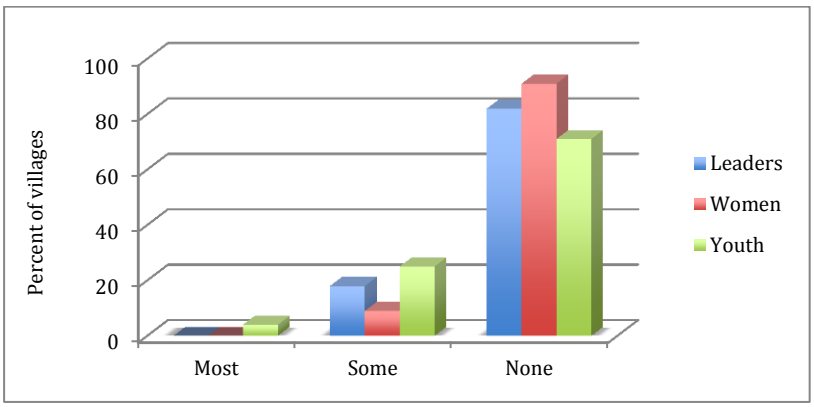


Figure 49: Females Who Consume Marijuana

Source: ERIAS Group, 2016a.

As shown in Figure 48, the vast majority of villages in the PAOI contain some males who smoke marijuana. Village leaders and the women interviewed indicated that the use of marijuana is common and widespread, particularly among young males. Relatively few females smoke marijuana in the PAOI. Marijuana consumption is often done discreetly, but is also associated with other criminal activities. One women's group indicated that some males in their village consumed 'harder drugs' than marijuana, however none of the other women's groups, nor the village leaders or youth groups, indicated drug consumption other than marijuana.

Results showing the number of males and females who gamble are presented in Figure 50 and Figure 51, respectively.

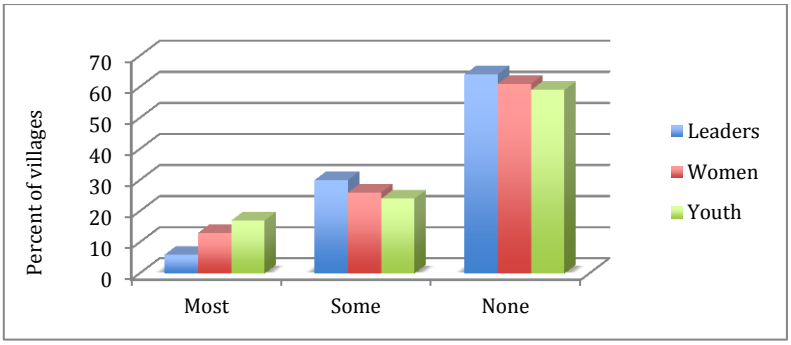


Figure 50: Males Who Gamble

Source: ERIAS Group, 2016a.

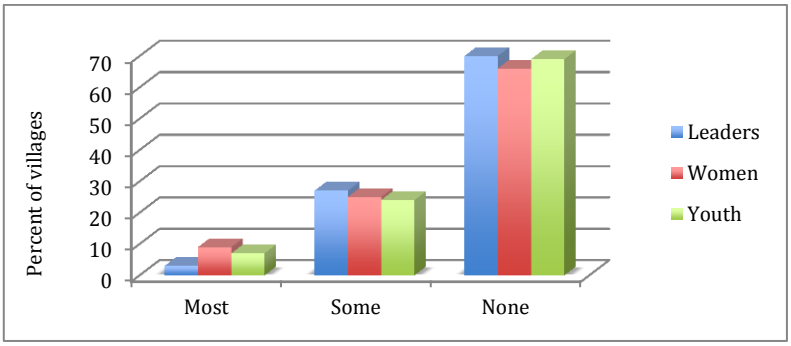


Figure 51: Females Who Gamble

Source: ERIAS Group, 2016a.

As shown in Figure 50 and Figure 51, gambling is not uncommon in the PAOI, with gambling by at least some males from around 40% of villages, and gambling by at least some females from around 40% of villages. There is relative consistency in the assessment by village leaders, women's groups and youth groups, and relatively little difference between the number of villages in which males and females gamble, particularly when compared to differences in alcohol or marijuana consumption. Gambling amounts are likely to be small due to the small amount of employment and income generated across the PAOI.

It is difficult to identify any consistent patterns relating to gambling. It was observed in Ura, however, that women from Highland villages that now reside in the adjoining Wabo station area, are the women that are gambling, rather than women that are from Ura.

Only the village leaders from one village indicated that prostitution occurred in their village. However, as shown in Figure 52, prostitution was identified by a significant proportion of the women's groups.

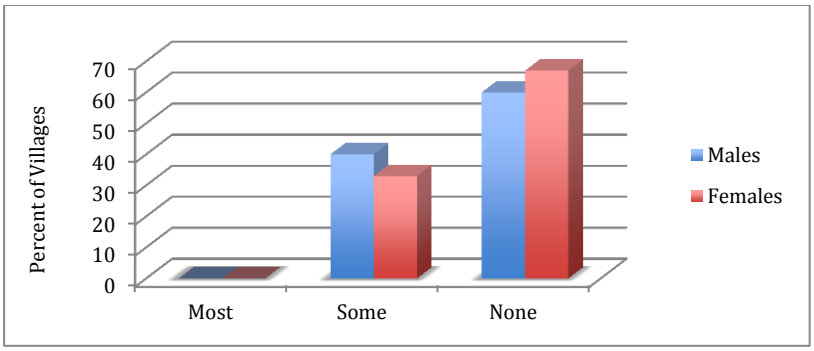


Figure 52: Men and Women Engaged in Prostitution

Source: ERIAS Group, 2016a.

The women's groups indicated that men participated in prostitution in 40% of villages in the PAOI, while women participated in prostitution in 33% of villages. Again, it was difficult to identify any patterns grouping these villages together, as often, a women's group would acknowledge prostitution occurring, only for it to be vehemently denied in the neighboring village.

Williams described wife exchange and other opportunities for promiscuous activity involving men of any age and married women (not single women). While he referred to this as prostitution (1924, p. 56), it was often done with the consent of the partner, and usually rewarded with a gift such as an arm-shell. Although this was the main currency at the time, it appears it is not necessarily adultery or prostitution but a customary practice that could also provide an opportunity for a woman to extract herself from an unpleasant relationship (Williams, 1924, p. 56).

6.2.6.3 Level of Safety

Village leaders and women were asked if they generally felt safe in their village. Results are summarized in Table 35.

Table 35: Do People Feel Safe in the Village

Language Group	Village Leaders				Women			
	Yes	Villages Responding Yes	No	Villages Responding No	Yes	Villages Responding Yes	No	Villages Responding No
Pawaia	6	Subu 2, Poroi 2, Subu, Ura, Poroi 1, Poroi 3	1	Wabo	1	Subu 2	4	Poroi 2, Subu, Ura, Wabo
Ahia	1	Evara	0	N/a	1	Evara	0	N/a
Koriki	2	Ara'ava, Kairimai	2	Akoma-Kairu'u, Ikinu	4	Ara'ava, Kairimai, Akoma-Kairu'u, Ikinu	0	N/a
Iare	4	Aivai, Kaevaria, Mapaio, Maipenairu	1	Aumu	5	Aivai, Kaevaria, Mapaio, Maipenairu, Aumu	1	Kapai 2
Kaimare	3	Aiere, Mariki, Upaia	0	N/a	2	Mariki, Upaia	0	N/a
Maipua	1	Apiope	0	N/a	1	Apiope	0	N/a

Language Group	Village Leaders				Women			
	Yes	Villages Responding Yes	No	Villages Responding No	Yes	Villages Responding Yes	No	Villages Responding No
Orokolo	8	Ere-Kilavi, Iuku, Kaivukavu, Harevavo, Huruta, Larihairu, Hepere, Kavava	5	Mareke, Paevera, Marea, Oru-Lariau-Herekela, Avavu	11	Ere-Kilavi, Iuku, Kaivukavu, Harevavo, Huruta, Larihairu, Kavava, Mareke, Marea, Oru-Lariau-Herekela, Avavu	2	Hepere, Paevera
TOTAL	**25**		**9**		**25**		**7**	

As shown in Table 35, 68% of the village leaders and 74% of the women's groups indicated that it was safe in their village. The main safety concerns expressed by the village leaders were sorcery (mentioned in all nine villages) and naturally occurring problems, including snakes, crocodiles and floods (mentioned in two villages). Seven of the women's groups indicated that they were not safe: four due to sorcery and three due to social or cultural norms that put them at risk of domestic violence, sexual assault or other forms of violence. While this fear was greatest among some Pawaian villages, the women from seven additional villages did mention that they feared sorcery, despite initially indicating they were safe in their village. Sorcery was said to be most commonly practiced by men, and could be presented as crocodiles, snakes or illness. A young girl was killed by a crocodile in a river near Harevavo in 2016. The death was attributed to sorcery and prevented many people from fishing, swimming and/or washing in the general vicinity.

Village leaders and women were also asked if the level of safety had changed in recent years. Results, summarized in Table 36, indicate that the while the majority of women indicate no change in the level of security, 45% of the village leader groups assessed the level of security as having improved. This was attributed, primarily, to the reintroduction and strengthening of the village court system in most of the PAOI.

Table 36: Change in Safety and Security in Recent Years

Language Group	Village Leaders			Women		
	Improving	Worsening	No Change	Improving	Worsening	No Change
Pawaia	2	2	1	1		4
Ahia	1				1	
Koriki	3		1			4
Iare	2	1	2			5
Kaimare	2					3
Maipua	1					1
Orokolo	3	2	8		2	11
TOTAL	**14**	**5**	**12**	**1**	**3**	**28**

Source: ERIAS Group, 2016a.

The groups of men and women that indicated a declining level of safety and security were from the following villages:

Village leaders: Aumu, Wabo, Ura, Mareke, Ere and Kilavi; and

Women: Evara, Kaivakavu and Larihairu.

Youth leaders from Wabo indicated that domestic violence, fighting and stealing were all problems resulting from in-migration and increased consumption of marijuana. Gambling was also attributed to people who had migrated to Wabo Station.

6.2.6.4 Domestic Violence

Women were asked if women in their village experienced problems with domestic violence. Results are presented in Table 37 and indicate that women from every village suffer from domestic violence, either from their husbands or other family members.

Sexual assault was identified as a problem in seven (22%) of villages. Women were asked when the last time a women from the village was assaulted. Results are summarized in Table 38.

Table 37: Villages Recording Problems with Domestic Violence or Sexual Assault

Language Group	Number of Villages	DV from Husband	Village Responding DV from Husband	DV from other Family Members	Village Responding DV from Family Member	Sexual Assault from Husband	Village Responding Sexual Assault from Husband	Sexual Assault from Family Members	Village Responding Sexual Assault from Family Members	Sexual Assault from Outsiders	Village Responding Sexual Assault from Outsiders
Pawaia	5	4	Wabo, Ura, Subu, Poroi 2	4	Subu 2, Subu, Ura, Wabo	0	N/a	1	Poroi 2	0	N/a
Ahia	1	1	Evara	1	Evara	0	N/a	0	N/a	0	N/a
Koriki	4	4	Ara'ava, Akoma-Kairu'u, Ikinu, Kairimai	4	Ara'ava, Akoma-Kairu'u, Ikinu, Kairimai	1	Kairimai	2	Ara'ava, Kairimai	0	N/a
Iare	6	5	Aivai, Kaevaria, Mapaio, Maipenairu, Aumu	3	Aivai, Maipenairu, Aumu	0	N/a	0	N/a	0	N/a
Kaimare	2	2	Mariki, Upaia	2	Mariki, Upaia	0	N/a	0	N/a	0	N/a
Maipua	1	1	Apiope	1	Apiope	0	N/a	0	N/a	0	N/a
Orokolo	13	13	Ere-Kilavi, Iuku, Kaivukavu, Mareke, Paevera, Harevavo, Huruta, Larihairu, Marea, Oru-Lariau-Herekela, Hepere, Kavava, Avavu	13	Ere-Kilavi, Iuku, Kaivukavu, Mareke, Paevera, Harevavo, Huruta, Larihairu, Marea, Oru-Lariau-Herekela, Hepere, Kavava, Avavu	0	N/a	0	N/a	4	Iuku, Lairihairu, Oru-Lariau-Herekela, Hepere
TOTAL	**32**	**30**		**28**		**1**		**3**		**4**	

Source: ERIAS Group, 2016a.

Table 38: Last Time a Women was Assaulted

Language Group	Last 2 Weeks	Village Responding Last 2 Weeks	< One Year	Village Responding < One Year	> One Year	Village Responding > One Year
Pawaia	2		1		1	
Ahia	1	Evara	0	N/a	0	N/a
Koriki	1		3			
Iare	0	N/a	2	Maipenairu, Aumu	3	Aivai, Kaevaria, Mapaio
Kaimare	1	Upaia	1	Mariki	0	N/a
Maipua	0	N/a	1	Apiope	0	N/a
Orokolo	7	Iuku, Kaivukavu, Mareke, Larihairu, Marea, Hepere, Avavu	6	Ere-Kilavi, Paevera, Harevavo, Huruta, Our-Lariau-Herekela, Kavava	0	N/a
TOTAL	**12**		**14**		**4**	

Source: ERIAS Group, 2016a.

As shown in Table 38, women were assaulted in 40% of the villages in the past two weeks, and in an additional 47% of villages within the past year.

6.2.6.5 Addressing Law and Order Problems

The village court system, described in Section 6.1.5.1, is relatively active in the PAOI, with the exception of the Pawaian villages. The responsibility for village court was transferred from the Provincial Government to the Department of Justice in 2014, which, with support from the Australian Government, led to the identification of village court officials, some training, and the commencement of their duties.

Although paid a monthly allowance to resolve disputes and minor crimes, the village court officials do not receive transport or phone allowances and do not have an office or office facilities. Some elected officials indicated that they are yet to be trained, and some indicated that they are yet to be paid. They also receive no supervision. As discussed in Section 6.1.5.1, the Department of Justice is responsible for the village courts and is working with the Australian Government to initiate a second phase of the Papua New Guinea-Australia Law and Justice Support Program. This will apparently include the distribution of village court manuals (prepared under the initial phase of the project) and training of village court officials in Gulf Province (Australian Government, 2010b).

Nevertheless, the village court system is the main mechanism in the PAOI for dealing with relatively minor crimes and disputes. As mentioned in Section 6.1.5.1, village courts are dealing with disputes relating to stealing garden produce, disputes over gardens, general bad behavior (arguments, noise, gossip, etc) and disputes between husband and wife, and are obliged to attempt the resolution of disputes first by way of mediation. Traditional and/or church leaders often play a supportive role to the village court officials. If disputes cannot be resolved, they will be referred to the provincial court. However, this requires travel to Kerema.

The village courts appear to tackle minor land dispute issues. However, anything more serious will generally involve a Land Mediator, of which there are four in each LLG area. Their role is to

try and mediate any land disputes between conflicting parties. If land disputes cannot be resolved then the parties may take their dispute to a local land court hearing, which will also require travel to Kerema. As stated in Section 6.1.5.1, most land disputes in Gulf Province reportedly involve logging benefits, and these have often by-passed the local land dispute resolution process, and go direct to the National Court.

More serious crimes, including rape and murder, are referred as quickly as possible to the police in Baimuru, Ihu or Kerema. Given the limited resources available to the police in Baimuru, Ihu or Kerema, there can be considerable delays between reporting a crime and seeing police on the ground.

6.2.7 Community Infrastructure and Household Assets

6.2.7.1 Housing

Houses among the Orokolo and Purari tribes have changed substantially since the influence of Tom Kabu in the late 1940s and 1950s. Traditional houses were large and had a raised front, as shown in Photo 7.

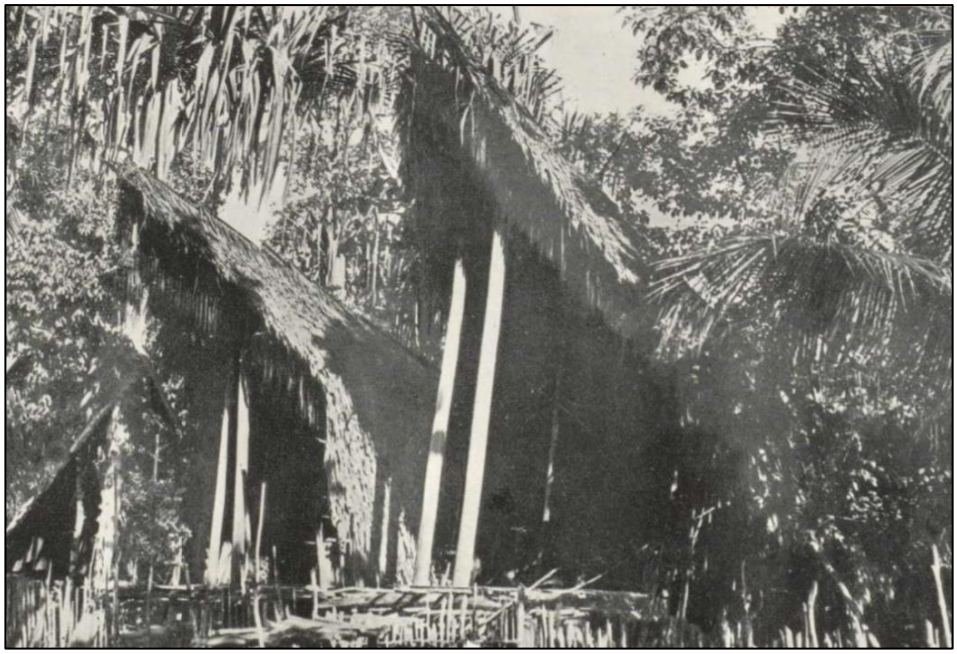


Photo 7: Purari Houses

Source: Williams, 1924, p. 5.

Although the traditional style of houses in the Purari delta and Orokolo areas has changed, many of the housing materials remain in use today. Houses are generally constructed of hardwood poles, so they are elevated to avoid flooding, with rough sawn timber frames, split black palm floors, woven sago panels on the walls, and a roof made of sago, nipa palm or grass.

Traditional Pawaian houses were also raised off the ground but had a semi-circular frame extending from one side of the floor to the other (Photo 8). The roof was made of grass or sago leaves (Photo 9) and extended across the top, encompassing the walls. Split timber was used at each end of the house, into which a door was made. The floor was usually split bamboo cane. Each house generally had several sunken fire pits in the floor, which would be the main source of lighting and use for both cooking and warmth.



Photo 8: Traditional Pawaian House

Source: Bill Gammage, 1956 (refer http://asiapacific.anu.edu.au)

Today, Pawaian houses have been adapted and often include a more traditional (rectangular) shape with split timber walls, windows and an iron roof. Although the coastal communities generally have external kitchens, fires are relatively common in houses as this helps prevent insects from infesting and eating the roof and walls (Photo 10).

Throughout the PAOI, many families have more than one building which comprises their home. Many families have a separate *haus kuk* (kitchen) while others may have a *haus win* (open-sided single-room building), or an additional building where some family members sleep. Young boys will sometimes sleep in a *haus boi*, and while the occupants may come from different families, they will generally return to their parents to eat.

Within the PAOI, 73% of houses were made of traditional materials, 25% were semi-improved (incorporating sawn timber or sheets of roofing iron) and 2% were of modern design (completely made of sawn timber, iron roofing and other purchased building materials). The vast majority of houses (99.6%) were raised from the ground, as opposed to being built on the ground. This is essential, particularly in the Purari delta, to help reduce impacts of high tides and/or flooding.



Photo 9: Community members making palm rooves, Avavu, August 2016

Source: ERIAS Group, 2016a.



Photo 10: Typical house, Kairimai, October 2016

Source: ERIAS Group, 2016a.

Within the PAOI, 97% of families live in their own house, with the remaining 3% staying with friends or relatives. If a house is destroyed, for example by fire, the family will often stay with relatives until they have an opportunity to construct a new house. As this may take several months, it is relatively common for families to share a house for a short period of time. Five families (approximately 0.2% of households in the PAOI) had relocated to the Evara logging camp and were residing in houses belonging to the logging company.

6.2.7.2 Fuel & Energy Sources

The main and secondary sources of fuel for lighting in the PAOI is summarized in Table 39 and Table 40, respectively. Table 39 shows the main source of fuel for lighting by village.

Table 39: Main Source of Lighting (%)

Language Group	Fire	Kero Lamp	Battery Lamp	Generator	Solar	Torch	Other
Pawaia	8	1	4	0	51	28	7
Ahia	0	43	0	14	7	29	7
Koriki	3	13	30	3	23	30	0
Iare	2	2	16	5	48	25	2
Kaimare	3	6	11	3	64	11	0
Maipua	0	0	44	6	31	19	0
Orokolo	3	11	20	3	33	30	1
TOTAL	**4**	**8**	**17**	**3**	**40**	**26**	**2**

Source: ERIAS Group, 2016b.

Table 40: Secondary Source of Lighting (%)

Language Group	Fire	Kero Lamp	Gas Lamp	Battery Lamp	Generator	Solar	Torch	Other
Pawaia	28	3	0	5	0	7	36	17
Ahia	14	0	14	21	0	21	29	0
Koriki	25	5	0	23	0	5	33	10
Iare	16	5	0	11	16	9	32	11
Kaimare	14	8	3	11	3	11	42	8
Maipua	6	6	0	0	13	13	56	6
Orokolo	20	14	1	16	4	13	30	3
TOTAL	**20**	**8**	**1**	**13**	**5**	**10**	**34**	**9**

Source: ERIAS Group, 2016b.

As shown above, the most common main source of power for lighting is solar (40% of households), torches (26% of households) and battery-powered lamps (17% of households). Generators provide the main source of lighting for only 3% of households in the PAOI. Torches and fires remain important secondary lighting sources.

It is interesting to compare national data from the 2009/10 HIES, in which solar power was not identified as a leading source of lighting at all.

Solar power has replaced kerosene as the main source of fuel for lighting over the past five years following the introduction of low cost solar panels (such as the ones shown in Photo 11) and accessories that can be used to provide light and charge mobile phones and other uses.



Photo 11: Solar Panels and Battery, Maipenairu

Source: ERIAS Group 2016a.

Other sources of power used for lighting in the PAOI include generators, firewood and *bom* torches, a traditional torch made of palm fronds and other materials from the forest.

Table 41: Main Source of Fuel for Lighting by Village

Village	Language Group	Sample Size	Fire (%)	Kero Lamp (%)	Battery Lamp (%)	Generator (%)	Solar (%)	Torch (%)	Other (%)
Poroi 1	Pawaia	5	0	0	0	0	80	20	0
Poroi 2	Pawaia	14	7	0	0	0	50	21	21
Poroi 3 (Suarido)	Pawaia	5	0	0	0	0	40	60	0
Subu	Pawaia	2	100	0	0	0	0	0	0
Subu 2	Pawaia	7	0	0	0	0	57	29	14
Ura	Pawaia	12	17	8	17	0	33	25	0
Wabo	Pawaia	22	5	0	0	0	64	27	5
Wabo Station	Pawaia	7	0	0	14	0	43	43	0
Evara	Ahia	14	0	43	0	14	7	29	7
Akoma	Koriki	11	0	0	45	0	9	45	0
Kairimai	Koriki	19	0	26	21	0	26	26	0
Kairu'u	Koriki	10	10	0	30	10	30	20	0
Aivai	Iare	9	11	0	33	0	44	11	0
Kaevaria	Iare	10	0	0	20	0	60	20	0
Mapaio Fish Camp	Iare	3	0	0	0	0	100	0	0
Aiere	Kaimare	6	17	0	0	0	67	17	0
Upaia	Kaimare	13	0	0	15	0	69	15	0
Apiope	Maipua	16	0	0	44	6	31	19	0
Ere	Orokolo	13	0	8	31	0	62	0	0
Harevavo	Orokolo	30	7	3	13	0	30	43	3
Herakela	Orokolo	21	0	14	33	5	38	10	0
Iuku	Orokolo	24	4	25	8	8	13	42	0
Kilavi	Orokolo	15	0	0	33	0	40	27	0
Paevera	Orokolo	15	0	13	13	0	33	40	0

Source: ERIAS Group, 2016b.

Results from the community level surveys indicate that the most common source of fuel for cooking in all 28 villages is firewood. Results from the household survey, showing the main and secondary sources of fuel for cooking in the PAOI, are shown in Table 42.

Table 42: Main and Secondary Source of Fuel for Cooking (%)

Language Group	Main Source as Firewood	Secondary Source		
		Kerosene Stove	Coconut Husk or Shell	None or No Answer
Pawaia	100	1	12	82
Ahia	100	0	14	86
Koriki	100	0	25	75
Iare	100	4	27	70
Kaimare	100	0	17	83
Maipua	100	0	50	50
Orokolo	100	2	28	70
TOTAL	**100**	**2**	**74**	**23**

Source: ERIAS Group, 2016b.

As shown in Table 42, firewood is the main source of fuel for cooking throughout the PAOI. This compares to 88% of households across Papua New Guinea identifying firewood as the main source of fuel for cooking in the 2009/10 HIES.

There are limited secondary sources of fuel for cooking, with only 2% of households indicating kerosene stoves, and 74% of households indicating coconut husk or shell, which is sometimes burned as an alternative to firewood. The remaining 23% of households did not have a backup fuel source.

While solar power has become an important source of lighting in the PAOI, many people also need to charge mobile phones, or desire to use other electrical appliances. The level of access to generators and solar panels – the two methods that can be used to generate electricity in the PAOI – is shown in Table 43.

Table 44 shows access to generators and solar panels by village.

Table 43: Households with Access to Generators and 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, 2016b.

As shown in Table 44, 28% of households have access to a generator and 53% of households have access to solar panels. The rapid adoption of solar panels in the PAOI is expected to continue as the benefits of solar power and the potential applications increase. At present, power from generators or solar panels is used predominantly for lighting and charging mobile

phones. However, a small number of households use the power to run refrigerators or freezers or other electrical appliances.

Table 44: Access to Generators and Solar Panels by Village (%)

Village	Language Group	Generator	Solar Panels
Poroi 1	Pawaia	0	100
Poroi 2	Pawaia	21	50
Poroi 3 (Suarido)	Pawaia	0	40
Subu	Pawaia	0	0
Subu 2	Pawaia	0	86
Ura	Pawaia	0	30
Wabo	Pawaia	9	77
Wabo Station	Pawaia	0	86
Evara	Ahia	29	14
Akoma	Koriki	0	27
Kairimai	Koriki	42	32
Kairu'u	Koriki	10	50
Aivai	Iare	22	67
Kaevaria	Iare	30	60
Mapaio Fish Camp	Iare	67	100
Aiere	Kaimare	67	67
Upaia	Kaimare	54	54
Apiope	Maipua	63	56
Ere	Orokolo	31	77
Harevavo	Orokolo	7	50
Herakela	Orokolo	38	43
Iuku	Orokolo	25	3
Kilavi	Orokolo	20	54
Paevera	Orokolo	40	47

Source: ERIAS Group, 2016a.

6.2.7.3 Water and Sanitation

Drinking water

In the Purari delta and along the Orokolo coast, where fresh surface water is uncommon and groundwater is often salty, rainwater tanks are often regarded as providing the highest quality of drinking water.

Households were asked what their main source of drinking water was, and what secondary source of drinking water they had in the event that the main source dried up or was not available for some reason. The main and secondary sources of drinking water are summarized in Table 45 and Table 46, respectively. The main source of drinking water by village is shown in Table 45.

Table 45: Main Source of Drinking Water (%)

Language Group	Piped	Well	Spring	River or Creek	Tank	Rainwater	Other
Pawaia	1	1	7	28	34	28	0
Ahia	0	0	0	36	43	21	0
Koriki	8	0	3	35	15	40	0
Iare	7	0	0	13	13	65	4
Kaimari	3	0	0	6	39	53	0
Maipua	0	6	0	50	6	38	0
Orokolo	2	24	0	0	47	25	4
TOTAL	**3**	**8**	**2**	**16**	**32**	**37**	**2**

Source: ERIAS Group, 2016b.

As shown in Table 45, the main source of drinking water is from rainwater containers (37% of households), tanks (32% of households), rivers and creeks (16% of households) and shallow wells (8% of households). Rainwater catchments include any drums, pots or other containers that can be used to collect and store rainwater from a roof (Photo 12). The rainwater is not treated. The longevity depends on the rate of consumption and quantity of storage available for each family.

Some of the 16% of respondents who indicated that they relied on a river or creek as their main source of drinking water extracted water from the Purari River, while others extracted water from smaller creeks that flowed into the Purari River. Water is extracted from the Purari River or its tributaries for drinking by people residing Ura, Wabo, Subu, Subu 2, Poroi 2, Poroi 3, Upaia, Aiere, Kairu'u, Akoma, Evara, Kaevaria, Kairimai, Aivai, Apiope and Mapaio Fish Camp. The extent that these people extract water from the Purari for drinking and cooking will depend on the availability of and distance to alternative (better) sources. Greater dependency on the Purari River as a source of drinking water will occur during extended dry periods, when alternative sources may not be available. The elderly, or others with limited mobility, may also favor the Purari River, simply because of the ease at which water can be collected. Few people appear to boil water from the Purari River before drinking it.



Photo 12: Rainwater catchment and container, Subu 2, August 2016

Source: ERIAS Group, 2016a.

The Orokolo villages are the most dependent on shallow wells, as they have more of a pronounced dry season, and tanks and other rainwater catchments soon dry up.

Table 46: Secondary Source of Drinking Water According to Household Survey (%)

Language Group	Piped	Well	Spring	River or Creek	Tank	Rainwater	Other
Pawaia	1	1	7	26	35	29	0
Ahia	0	0	0	31	46	23	0
Koriki	8	0	3	35	15	40	0
Iare	8	0	0	13	13	62	4
Kaimari	3	0	0	6	40	51	0
Maipua	0	0	0	46	8	46	0
Orokolo	2	24	0	0	47	25	2
TOTAL	**1**	**27**	**6**	**36**	**8**	**18**	**5**

Source: ERIAS Group, 2016b.

The majority of people in the PAOI identified secondary sources of drinking water, as shown in Table 46, as rivers/creeks, wells and other rainwater catchments. When considering both the main and secondary source of drinking water, people are extracting water from the Purari River or its tributaries from Ura, Wabo, Subu, Subu 2, Poroi 1, Poroi 2, Poroi 3, Upaia, Aiere, Kairu'u, Akoma, Evara, Kaevaria, Kairimai, Aivai, Apiope, Mariki, Maipenairu, Kapai 2, Wabo Station, Paevera, Kilavi, Iuku and Mapaio Fish Camp.

Additional discussion on water supplies was held with the women's groups. The single main source of drinking water for each village in the PAOI, identified by women's groups, is shown in Table 47.

Table 47: Main Source of Drinking Water

Language Group	Pipeline	Well	River or Creek	Tank	Other
Pawaia	0	0	6	0	1
Ahia	0	0	1	0	0
Koriki	0	0	1	2	0
Iare	0	0	4	2	0
Kaimare	0	1	0	2	0
Maipua	0	0	1	0	0
Orokolo	0	9	2	2	0
TOTAL	**0**	**10**	**15**	**8**	**1**

Source: ERIAS Group, 2016a.

Shallow wells were common in coastal villages. One problem in the coastal area is that a well dug in the sand would soon collapse and render the well useless. To overcome this problem, several communities have dug wells into the root base of an old coconut palm. Despite the enormous workload to dig a well inside the root system, the roots line the side of the well and provide stability and therefore cleaner water and well longevity. In some cases, as shown in Photo 13, concrete is used to line the edges of the well to avoid wall-collapse, but this is not common in the PAOI and is more commonly implemented by donors.



Photo 13: Shallow Well at Larihairu

Source: ERIAS Group, 2016a.

The proportion of women's groups that were satisfied with the quality of their main source of drinking water is summarized in Table 48.

Table 48: Villages Satisfied with Drinking Water Quality

Language Group	Yes	Villages Responding Yes	No	Villages Responding No	Unsure	Villages Responding Unsure
Pawaia	6	Subu, Poroi 1, Poroi 3, Poroi 2, Ura, Wabo	0	N/a	1	Subu 2
Ahia	0	N/a	0	N/a	1	Evara
Koriki	1	Akoma & Kairu'u	3	Ara'ava, Kairimai, Ikinu	0	N/a
Iare	3	Aumu, Kapai 2, Maipenairu	3	Mapaio, Kaevaria, Aivai	0	N/a
Kaimare	3	Aiere, Mariki, Upaia	0	N/a	0	N/a
Maipua	0	N/a	1	Apiope	0	N/a
Orokolo	8	Ere/Kilavi, Avavu, Paevera, Kaivukavu, Marea, Larihairu, Iuku, Oru/Lariau/Herekela	5	Hepere, Huruta, Harevavo, Mareke, Kavava	0	N/a
TOTAL	**21**		**12**		**2**	

Source: ERIAS Group, 2016a.

While 64% of women's groups indicated that their main source of drinking water was satisfactory, there were women's groups from 12 villages that were not satisfied. These included:

- Harevavo, Mareke and Kavava, all of which relied predominantly on shallow wells;
- Ara'ava, which relied predominantly on tanks; and

- Kairimai, Mapaio, Kaevaria, Aivai, Apiope, Hepere, Huruta and Ikinu, all of which relied predominantly on rivers or streams.

As shown in Table 49 the main problem with the main drinking water supplies was the fear that the source was contaminated. Seven of these eight villages sourced their water from rivers or streams. The other sourced their water from a shallow well. Poor taste was the main problem with one village relying on tank water (Ara'ava), and one on shallow wells (Kavava). The other two reasons for being dissatisfied with water quality was the adverse impact of logging on rivers/streams from which the water was sourced, and animals also drinking from shallow wells.

The time required to walk to the main source of drinking water (one direction only) is shown in Table 50.

Table 49: Reasons Why Women are Not Satisfied with Water Quality

Language Group	Poor Taste	Villages Responding Poor Taste	Contains Contaminants	Villages Responding Contains Contaminants	Other	Villages Responding Other
Pawaia	0	N/a	0	N/a	0	N/a
Ahia	0	N/a	0	N/a	0	N/a
Koriki	1	Ara'ava	2	Kairimai	0	N/a
Iare	0	N/a	4	Mapaio, Kaevaria, Aivai, Kapai 2	0	N/a
Kaimare	0	N/a	0	N/a	0	N/a
Maipua	0	N/a	1	Apiope	0	N/a
Orokolo	1	Kavava	2	Huruta, Harevavo,	2	Mareke, Hepere,
TOTAL	**2**		**8**		**2**	

Source: ERIAS Group, 2016a. 0 response mean respondents were satisfied with water quality. Unsure response was obtained from Evara and Subu.

Table 50: Time to Walk to the Main Source of Drinking Water

Language Group	< 2 mins	Villages Responding < 2 mins	2-10 mins	Villages Responding 2-10 mins	10-30 mins	Villages Responding 10-30 mins	30-60 mins	Villages Responding 30-60 mins	More > 60 mins	Villages Responding > 60 mins
Pawaia	1	Poroi 2	3	Wabo, Ura, Subu	0	N/a	0	N/a	1	Subu 2
Ahia	1	Evara	0	N/a	0	N/a	0	N/a	0	N/a
Koriki	1	Ikinu	1	Akoma & Kairu'u	2	Kairimai, Ara'ava	0	N/a	0	N/a
Iare	3	Mapaio, Kaevaria, Aivai	1	Kapai 2, Maipenairu	1	Aumu	0	N/a	0	N/a
Kaimare	0	N/a	0	N/a	0	N/a	0	N/a	3	Upaia, Mariki, Aiere
Maipua	0		0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo	2	Huruta, Mareke	5	Avavu, Harevavo, Marea, Larihairu, Iuku	N/a	N/a	1	Kaivukavu	1	Paevera
TOTAL	**8**		**10**		**3**		**1**		**6**	

Source: ERIAS Group, 2016a.

As shown in Table 50, 88% of villages access their main source of drinking water within a 10-minute walk from the village. The villages that need to walk further include Kairimai (10 to 20 minutes), Ara'ava (10 to 15 minutes), Wabo (30 minutes) and Subu 2 (three hours).
As shown in Table 51, women from 74% of villages indicated that all household members collected water. Women were primarily responsible for the collection of water in the other nine villages, which include Kairimai, Ara'ava, Poroi 2, Ere, Avavu, Hepere, Huruta, Oru and Aiere. In some villages, including Ere and Kilavi, men are forbidden to collect water due to customary beliefs.

Table 51: Who Collects Water

Language Group	Women	Men	Children	All
Pawaia	1	0	0	6
Ahia	0	0	0	1
Koriki	2	0	0	2
Iare	0	0	0	6
Kaimare	1	0	0	2
Maipua	0	0	0	1
Orokolo	5	0	0	8
TOTAL	**9**	**0**	**0**	**26**

Source: ERIAS Group, 2016a.

The women from Kairimai and Ara'ava indicated that they are responsible for carrying water, and in both villages, are required to carry water for a period of 10 to 20 minutes.

Women were also asked whether water quality or quantity was susceptible to seasonal influence. The women from 86% of villages indicated that water was influenced by the seasons:

- Four villages indicated that water quantity was adversely affected during the wet season months of April to July (Ura, Subu 2, Evara and Ere), these villages generally being located inland, and likely due to flooding. Another 13 villages indicated that water quantity was adversely affected during the dry season months of August to December.
- Seven villages indicated that water quality was adversely affected during the dry season; 16 villages indicated that water quality was adversely affected during the wet season.

The secondary (or back-up) source of drinking water for each village in the PAOI, identified by women's groups, is shown in Table 52.

Table 52: Secondary Source of Drinking Water According to Women's Groups

Language Group	Pipeline[8]	Well	River or Creek	Tank	Other
Pawaia	0	0	7	0	0
Ahia	0	0	1	0	0
Koriki	0	1	2	0	1
Iare	0	0	3	2	0
Kaimare	0	1	1	1	0
Maipua	0	1	0	0	0
Orokolo	0	8	3	0	2
TOTAL		**11**	**17**	**3**	**3**

Source: ERIAS Group, 2016a.

As shown in Table 52, the secondary water sources were generally rivers/creeks or shallow wells. The time required to walk to the secondary source of drinking water (one direction only) is shown in Table 53.

Table 53: Time to Walk to the Secondary Source of Drinking Water

Language Group	Less than 2 mins	2-10 mins	10-30 mins	30-60 mins	More than 60 mins
Pawaia	1	3	0	0	1
Ahia	1	0	0	0	0
Koriki	1	1	2	0	0
Iare	3	1	1	0	0
Kaimare	0	0	0	0	3
Maipua	0	0	0	0	1
Orokolo	2	5	0	1	1
TOTAL	**8**	**10**	**3**	**1**	**6**

Source: ERIAS Group, 2016a.

[8] Pipeline = reticulated to houses or a central point in village.

As shown in Table 53, 36% of the secondary water sources are located more than 10 minutes from the village, and for 21% of villages, the source is more than an hour from the village.

In relation to drinking water, quantity of drinking water available to most of the residents of the PAOI is adequate, except for the coastal Orokolo villages whose primary, and sometimes secondary, sources deplete most notably in the dry season. Water quality is discussed in the Upstream Community Health Base Report (NewFields 2016) and is variable but in no cases treated in any way, across the entire PAOI. The Purari River or its tributaries are the main sources of drinking water for more than half of the villages in the PAOI. The majority of residents of the PAOI can access water within a 10-minute walk from their village.

The number of houses with tanks in the PAOI is summarized in Table 54, while a typical water tank is shown in Photo 14.

Table 54: Houses with Rainwater Tanks

Language Group	All	Villages Responding All	Some	Villages Responding Some	None	Villages Responding None
Pawaia	0	N/a	2	Subu, Subu 2	5	Poroi 1, Poroi 2, Poroi 3, Subu, Wabo
Ahia	0	N/a	1	Evara	0	N/a
Koriki	1	Ara'ava	3	Akoma-Kairu'u, Ikinu, Kairimai	0	N/a
Iare	1	Maipenairu	3	Aivai, Kapai 2, Mapaio	2	Aumu, Kaevaria
Kaimare	1	Upaia	2	Aiere, Mariki	0	N/a
Maipua	0	N/a	1	Apiope	0	N/a
Orokolo	0	N/a	10	Harevavo, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera	3	Avavu, Ere-Kilavi, Hepere
TOTAL	**3**		**22**		**10**	

Source: ERIAS Group, 2016a.



Photo 14: Water Tanks at Upaia
Source: ERIAS Group, 2016a.

Washing Water

The main source of water for washing is shown in Table 55.

Table 55: Main Source of Water for Washing

Language Group	Pipeline[9]	Well	River/ Creek	Pond	Tank	Other
Pawaia	0	0	7	0	0	0
Ahia	0	0	1	0	0	0
Koriki	0	0	4	0	0	0
Iare	0	1	4	0	1	0
Kaimare	0	0	3	0	0	0
Maipua	0	0	1	0	0	0
Orokolo	0	6	5	0	0	0
TOTAL	**0**	**7**	**25**	**0**	**1**	**0**

Source: ERIAS Group, 2016a.

As shown in Table 55, 76% of villages wash in a river or creek. The remainder use well water. Those using well water are villages from or near the coast.

Toilets

The type of toilets used in the PAOI by language group, based on results of the household survey, is shown in Table 56. Type of toilets by village, based on results of the community survey, is shown in Table 57.

[9] Pipeline = reticulated to houses or a central point in village.

Table 56: Toilet Facilities in the PAOI (%)

Language Group	Traditional Pit Latrine[10]	Improved Pit Latrine[11]	Over Sea or River	None (Bush)	None (Sea or River)	Other
Pawaia	62	34	0	4	0	0
Ahia	43	36	0	21	0	0
Koriki	40	25	18	18	0	0
Iare	23	36	4	30	5	2
Kaimare	19	6	25	42	6	0
Maipua	31	0	6	56	6	0
Orokolo	25	24	0	50	1	1
TOTAL	35	25	5	32	2	1

Source: ERIAS Group, 2016b.

As shown in Table 56, around 34% of households indicated that they did not use a toilet, but used the bush, river or sea. Few households in the villages of Harevavo, Iuku, Kapai 2 and Mariki, had a toilet. Most other villages included in the household survey also contained some households without a toilet, with the exception of Kaevaria, Kairimai and the Pawaian villages of Poroi 1, Subu, Subu 2, Ura and Wabo, where all households surveyed had a toilet. The high proportion of households without a toilet indicates a reluctance to change traditional practices, despite encouragement by church groups and health workers over several generations.
The most common types of toilets in the PAOI are traditional pit latrines and improved pit latrines. Toilets built over the river, as shown in Photo 15, were not common in any particular village, but were used by some households in Aiere, Akoma, Apiope, Kairu'u, Kapai 2, Maipenairu, Mariki and Upaia.

The traditional pit latrine, the most common type of toilet in the PAOI, is simply a hole dug in the ground, generally with a floor made of branches, logs or rough sawn timber, and often with roughly constructed walls and roof. Their odor is unfavorable and possibly a significant reason why toilets are not universally accepted in the PAOI. In lowland areas, pit toilets are often susceptible to flooding during high tides, which can result in fecal matter being deposited within village areas: another reason why some people may be reluctant to have toilets. Refer to the Upstream Community Health Baseline Report (NewFields 2016) for further information about sanitation.

[10] Pit dug into ground with no associated structure.
[11] Pit dug into ground with associated structure (i.e., seat and/or walls and roof).



Photo 15: Toilet over the River, Ara'ava

Source: ERIAS Group, 2016a.

Table 57: Toilet Facilities by Village

Village	Language Group	Sample Size	Traditional Pit Latrine (%)	Improved Latrine (%)	Bucket (%)	Closet over Water (%)	Bush (%)	Sea/River (%)	Other (%)
Poroi 1	Pawaia	5	0	100	0	0	0	0	0
Poroi 2	Pawaia	14	57	36	0	0	7	0	0
Poroi 3 (Suarido)	Pawaia	5	20	40	0	0	40	0	0
Subu	Pawaia	2	100	0	0	0	0	0	0
Subu 2	Pawaia	7	86	14	0	0	0	0	0
Ura	Pawaia	12	67	33	0	0	0	0	0
Wabo	Pawaia	22	77	23	0	0	0	0	0
Wabo Station	Pawaia	7	57	43	0	0	0	0	0
Evara	Ahia	14	43	36	0	0	21	0	0
Akoma	Koriki	11	27	0	0	36	36	0	0
Kairimai	Koriki	19	53	47	0	0	0	0	0
Kairu'u	Koriki	10	30	10	0	30	30	0	0
Aivai	Iare	9	44	44	0	0	11	0	0
Kaevaria	Iare	10	50	50	0	0	0	0	0
Mapaio FC	Iare	3	0	67	0	0	33	0	0
Aiere	Kaimare	6	17	0	0	33	17	17	0
Upaia	Kaimare	13	23	15	8	38	8	8	0
Apiope	Maipua	16	31	0	0	6	56	6	0
Ere	Orokolo	13	62	23	0	0	8	0	8
Harevavo	Orokolo	30	0	3	0	0	93	3	0
Herakela	Orokolo	21	19	52	0	0	29	0	0
Iuku	Orokolo	24	21	8	0	0	67	0	0
Kilavi	Orokolo	15	53	33	0	0	13	0	0
Paevera	Orokolo	15	27	33	0	0	40	0	0

Source: ERIAS Group, 2016a.

The proportion of households who have their own toilet is shown for each language group in Table 58.

Table 58: Use of Own or Shared Toilet Facilities (%)

Language Group	Own Toilet
Pawaia	70
Ahia	64
Koriki	49
Iare	43
Kaimare	68
Maipua	50
Orokolo	58
TOTAL	59

Source: ERIAS Group, 2016b.

As shown in Table 58, 59% of households in the PAOI who use a toilet use their own toilet. The remaining 41% use a shared toilet. This calculation excludes households who do not use a toilet.

6.2.7.4 Waste Management

Women's groups were asked to describe methods of waste disposal. The method of disposing tins/batteries, paper/plastics and food scraps is summarized in Table 59, Table 60 and Table 61.

Table 59: Disposal of Tins/Batteries

Language Group	Burn	Villages Responding Burn	Bury	Villages Responding Bury	Bush	Villages Responding Bush	Sea or River	Villages Responding Sea or River	Other	Villages Responding Other
Pawaia	0	N/A	2	Ura, Poroi 1	1	Subu	2	Poroi 2, Poroi 3	2	Subu 2, Wabo
Ahia	0	N/a	0	N/a	0	N/a	1	Evara	0	N/a
Koriki	1	Kairimai	2	Akoma-Kairu'u, Ara'ava	1	Ikinu	0	N/a	0	N/a
Iare	0	N/a	0	N/a	3	Aivai, Maipenairu, Kapai 2	2	Kaevaria, Mapaio	0	N/a
Kaimare	0	N/a	0	N/a	2	Upaia, Mariki	1	Aiere	0	N/a
Maipua	0	N/a	0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo	1	Iuku	5	Ere-Kilavi, Kaivukavu, Huruta, Marea, Oru-Lariau-Herekela	4	Mareke, Paevera, Hepere, Avavu	2	Harevavo, Larihairu	1	Kavava
TOTAL	**2**		**9**		**11**		**8**		**4**	

As shown in Table 59, tins and batteries are commonly thrown in the bush, sea or river in 56% of villages in the PAOI. Tins and batteries are commonly buried in 27% of villages and burned in 6% of villages. 'Other' generally refers to disposing waste in a combination of the river and bush or in sago swamps.

Table 60: Disposal of Paper/Plastics

Language Group	Burn	Villages Responding Burn	Bury	Villages Responding Bury	Bush	Villages Responding Bush	Sea or River	Villages Responding Sea or River	Other	Villages Responding Other
Pawaia	2	Ura, Poroi 3	1	Poroi 1	1	Subu	1	Poroi 2	2	Subu 2, Wabo
Ahia	0	N/a	0	N/a	0	N/a	1	Evara	0	N/a
Koriki	3	Ara'ava, Akoma-Kairu'u, Kairimai	0	N/a	1	Ikinu	0	N/a	0	N/a
Iare	3	Kaevaria, Kapai 2, Aumu	1	Mapaio	1	Maipenairu	0	N/a	0	N/a
Kaimare	1	Mariki	0	N/a	1	Upaia	1	Aiere	0	N/a
Maipua	0	N/a	0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo	8	Iuku, Kaivukavu, Mareke, Huruta, Larihairu, Oru-Lariau-Herekela, Kavava, Avavu	3	Ere-Kilavi, Marea, Hepere	1	Paevera	1	Harevavo	0	N/a
TOTAL	**17**		**5**		**5**		**4**		**3**	

Source: ERIAS Group, 2016a.

As shown in Table 60, most villages dispose of paper and plastic items by burning (50%), throwing in the bush, river or sea (27%) and burying (15%).

Table 61: Disposal of Food Scraps

Language Group	Burn	Villages Responding Burn	Bury	Villages Responding Bury	Bush	Villages Responding Bush	Sea or River	Villages Responding Sea or River	Other	Villages Responding Other
Pawaia	0	N/a	1	Poroi 1	1	Subu	2	Poroi 2, Poroi 3	3	Subu, Ura, Wabo
Ahia	0	N/a	0	N/a	0	N/a	1	Evara	0	N/a
Koriki	0	N/a	0	N/a	0	N/a	1	Ikinu	3	Ara'ava, Akoma-Kairu'u, Kairimai
Iare	1	Kaevaria	1	Aivai	0	N/a	1	Mapaio	2	Aumu, Kapai 2
Kaimare	0	N/a	0	N/a	0	N/a	1	Aiere	2	Upaia, Mariki
Maipua	0	N/a	0	N/a	0	N/a	0	N/a	1	Apiope
Orokolo	0	N/a	0	N/a	1	Hepere	0	N/a	12	Ere-Kilavi, Iuku, Kaivukavu, Mareke, Paevera, Harevavo, Huruta, Larihairu, Marea, Oru-Lariau-Herekela, Kavava, Avavu
TOTAL	**1**		**2**		**2**		**6**		**23**	

Source: ERIAS Group, 2016a.

Most food scraps are fed to pigs and chickens. Although, as shown in Table 61, some food scraps are also thrown in the bush, river or sea, buried or burned.

The women's groups were also asked whether rubbish was thrown in an agreed place in the village. Results are presented in Table 62 and indicate that designated rubbish areas have been identified in only 19% of villages.

Table 62: Villages that Dispose of Rubbish in an Agreed Location

Language Group	Yes	Villages Responding Yes	No	Villages Responding No
Pawaia	2	Subu, Wabo	5	Subu 2, Poroi 2, Ura, Poroi 1, Poroi 3
Ahia	0	N/a	1	Evara
Koriki	2	Ara'ava, Kairimai	1	Akoma-Kairu'u
Iare	1	Aumu	5	Aivai, Kaevaria, Mapaio, Maipenairu, Kapai 2
Kaimare	1	Upaia	2	Mariki, Aiere
Maipua	0	N/a	1	Apiope
Orokolo	0	N/a	10	Ere-Kilavi, Kaivukavu, Mareke, Paevera, Harevavo, Huruta, Marea, Oru-Lariau-Herekela, Hepere Kavava, Avavu
TOTAL	**6**		**25**	

Source: ERIAS Group, 2016a.

One village in which all rubbish was buried in pits around the perimeter of the village was Poroi 1. Not only was all rubbish disposed of in pits, the village was kept very tidy and all residents washed their hands before cooking and eating and after going to the toilet. Several of the men worked for InterOil for several years and implemented the health awareness messages provided by the company in their own village.

6.2.7.5 Phone and Internet Access

The proportion of villages in the PAOI with mobile phone coverage is summarized in Table 63.

Table 63: Number of Villages with Mobile Phone Reception

Language Group	Villages Surveyed	No. of Villages with Mobile Phone Reception	Name of Villages with Mobile Phone Reception
Pawaia	7	3	Subu, Ura, Wabo
Ahia	1	0	N/a
Koriki	4	1	Ikinu
Iare	6	4	Aivai, Aumu, Mapaio, Maipenairu
Kaimare	3	2	Aiere, Upaia
Maipua	1	1	Apiope
Orokolo	13	12	Ere-Kilavi, Harevavo, Hepere, Huruta, Iuku, Kaivukavu, Kavava, Larihairu, Marea, Mareke, Oru-Lariau-Herekela, Paevera
TOTAL	**35**	**23**	

Source: ERIAS Group, 2016a.

As shown in Table 63, 66% of the villages surveyed had mobile phone reception. The best mobile phone coverage was in the Orokolo area (Map 6).

The proportion of households who own a computer or iPad, a TV, mobile phone or radio, and the average number of mobile phones per household, is shown in Table 64.

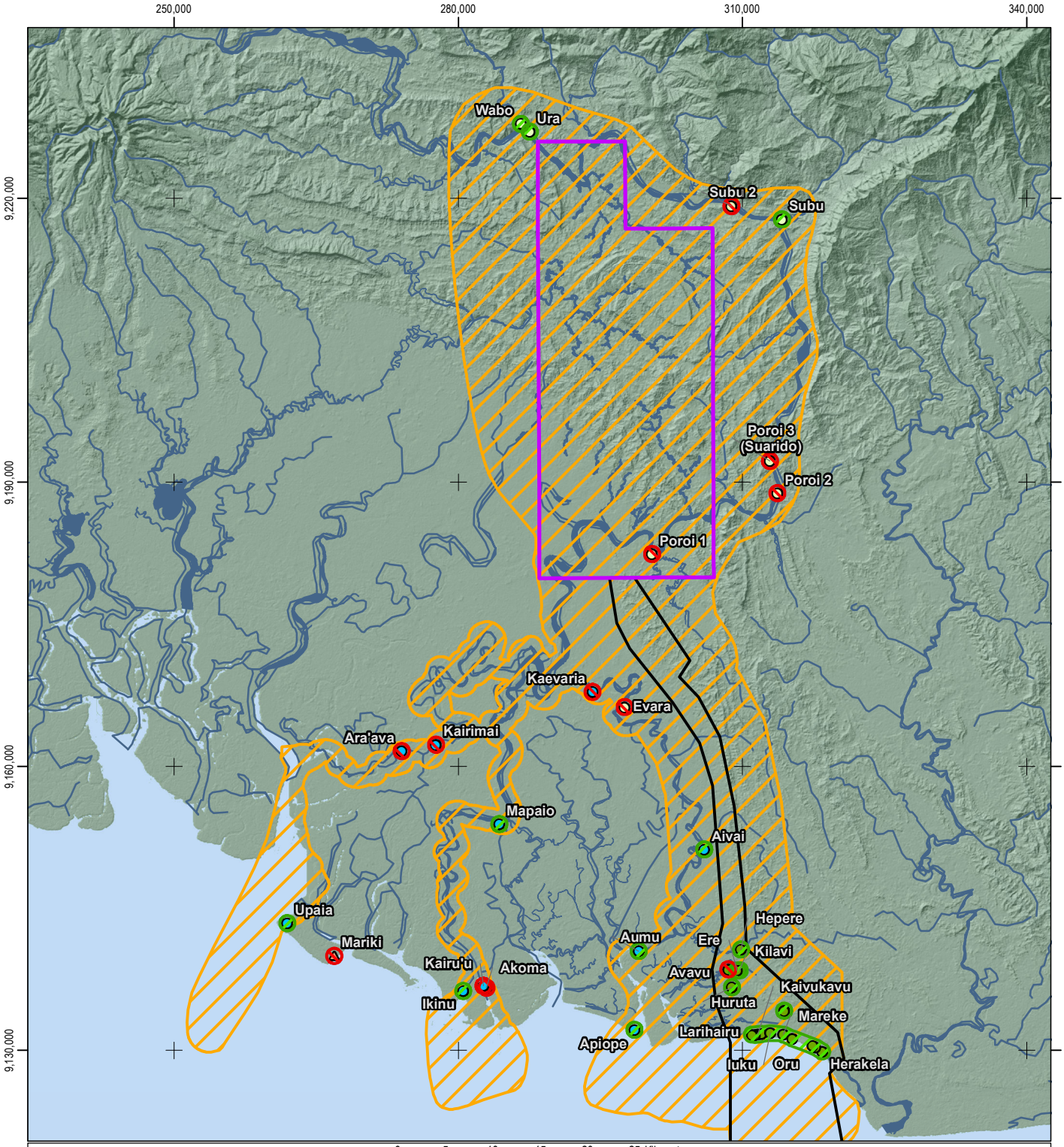
Table 64: Proportion of Households with Electronic Equipment (%)

Language Group	Computer or iPad	TV	Mobile Phone	Radio
Pawaia	5	15	61	32
Ahia	0	36	29	43
Koriki	0	18	50	30
Iare	9	21	70	32
Kaimare	0	31	67	44
Maipua	6	31	75	44
Orokolo	3	12	64	30
TOTAL	**4**	**18**	**62**	**33**

Source: ERIAS Group, 2016a & b.

As shown in Table 64, only 4% of households own a computer or iPad, 18% own a TV, 62% of households had one or more mobile phones and 33% of households own a radio.

The proportion of households who have used EFTPOS and the internet is shown in Table 65.



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: 6

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_110-81389 **REVISION:** D

DATE: 14/07/2017

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).

CLIENT:

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Table 65: Use of EFTPOS and Internet (%)

Language Group	EFTPOS	Internet
Pawaia	28	32
Ahia	21	14
Koriki	15	10
Iare	39	45
Kaimare	39	19
Maipua	38	31
Orokolo	41	17
TOTAL	**34**	**25**

Source: ERIAS Group, 2016b.

As shown in Table 65, 34% of the households surveyed indicated that they had used EFTPOS facilities, and 25% had used the internet. The Iare, Kaimare, Maipua and Orokolo have a relatively high proportion of households that have used EFTPOS facilities in the past, probably as they are physically closer to shops in Kerema and Orokolo with EFTPOS facilities. Although it is unclear why, the Iare, Pawaians and Maipua have higher exposure to the internet.

Households who have accessed the internet were asked how often they access the internet. Results are presented in Table 66.

Table 66: Frequency of Internet Access (for Households that have used the Internet) (%)

Language Group	Daily	Once per Week	Once a Month	Less Often	Unsure
Pawaia	4	4	22	65	4
Ahia	0	0	0	50	50
Koriki	0	0	25	75	0
Iare	0	32	36	20	12
Kaimare	0	29	29	0	43
Maipua	0	20	40	40	0
Orokolo	5	20	30	35	10
TOTAL	**2**	**19**	**30**	**40**	**8**

Source: ERIAS Group, 2016b.

As shown in Table 66, internet access is infrequent, with only 21% of households who use the internet accessing the internet once a week or more frequently.

Household members who have accessed the internet were asked if they have used social media. Results are presented in Table 67.

Table 67: Use of Social Media (for Households that have used the Internet) (%)

Language Group	Social Media
Pawaia	88
Ahia	100
Koriki	100
Iare	84
Kaimare	43
Maipua	80
Orokolo	85
TOTAL	**83**

Source: ERIAS Group, 2016b.

As shown in Table 67, 83% of households indicating that they used the internet also indicated that they had used social media. In the majority of cases, this is expected to be Facebook. As 25% of households had used the internet, this means that 21% of households had used social media.

Youth Recreation

During the youth group interviews, the participants were asked what they do in their spare time for recreation. The responses are summarized in Table 68.

Table 68: Types of Recreation for the Youth

Language Group	Sport	Relax	Hang with Friends	Craft	Surf the Internet	Other
Pawaia	3	3	3	1	0	3
Ahia	2	0	1	0	0	2
Koriki	4	3	3	3	0	2
Iare	5	3	5	6	0	3
Kaimare	2	1	1	1	0	2
Maipua	1	1	1	1	0	0
Orokolo	13	13	12	10	5	5
TOTAL	**30**	**24**	**26**	**22**	**5**	**17**

Source: ERIAS Group, 2016a.

As shown in Table 68, while many of the more traditional forms of recreation, such as sport, hanging with friends and craft, are most common in the PAOI, surfing the internet was cited as a form of recreation by five of the youth groups from the Orokolo area.

6.2.7.6 Public Infrastructure

Other than schools and health facilities, and economic infrastructure such as roads, communications facilities, an airstrip at Wabo, jetties and markets (which are described in Finlayson 2017) the only other public or community infrastructure in the PAOI are churches and sports fields.

Most villages have a church, and different denominations often share a church. The majority of churches are made of traditional materials, with open sides, although some will have sheets of iron on the roof.

Most villages also have one or more sports fields. These typically include a sports field for playing soccer and touch rugby, and a basketball or volleyball court. The sports fields are quite basic and generally use local materials for goal posts, posts and backboards, etc.

6.2.7.7 Household Assets

Traditionally, key household assets most often included canoes, clothes and decorative items, and axes, knives and other tools required for hunting, fishing, making sago, cooking, making mats and gardening. Change has occurred rapidly, and while some traditional items such as canoes and fishing nets continue to be used, many others have been replaced.

The proportion of households owning a refrigerator or freezer, sewing machine, chainsaw or gun/rifle, is summarized in Table 69.

Table 69: Level of Ownership of Selected Household Items (%)

Language Group	Fridge or Freezer	Sewing Machine	Chainsaw	Gun or Rifle
Pawaia	1	23	5	5
Ahia	14	0	14	0
Koriki	0	23	5	3
Iare	2	29	7	7
Kaimare	0	42	3	0
Maipua	6	25	0	0
Orokolo	2	23	8	5
TOTAL	**2**	**25**	**6**	**4**

Source: ERIAS Group, 2016b.

As shown in Table 69, very few households own a refrigerator or freezer, a chainsaw or a gun or rifle, and around 25% of households own a sewing machine. Those people owning a refrigerator or freezer will generally operate a business and use it to sell cold drinks and ice-blocks. Sewing machines – which are not electrical – are more commonly used to make and repair clothes. Relatively few people have chainsaws or a gun or rifle: instead choosing to use axes to fell trees or cut timber, and traditional weapons to hunt. Another factor limiting the ownership of many items is the lack of commercial services in the PAOI, specifically those that could repair a chainsaw or sell shotgun cartridges or bullets.

The proportion of households owning transport assets is shown in Table 70.

Table 70: 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.

As shown in Table 70, 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. Other than walking, canoes are the traditional form of transport in the PAOI (Photo 16). Some people have invested in dinghies and/or outboard motors. Dinghies last longer than canoes and with an outboard motor can travel at a much faster speed. Smaller outboard motors are often attached to canoes, which substantially reduces travel times. However, without regular servicing, outboard motors often have a short lifespan. Nevertheless, a significant proportion of people have opted to buy dinghies and/or outboard motors. This usually occurs when people receive a significant amount of money, which may originate from business activities, formal employment, logging royalties or traditional exchange. Household income and expenditure levels in the PAOI are discussed further in the Upstream Economics and Governance Baseline Report (refer Section 7.6).



Photo 16: Canoes moored at Ara'ava, August 2016
Source: ERIAS Group, 2016a.

There were no motor vehicles or motorbikes recorded in the PAOI. This reflects the lack of road infrastructure in the PAOI.

6.2.8 Vulnerability

Vulnerability is given particular attention by Total in the social baseline study 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. 75). In this context, vulnerability is an assessment of project impact and will therefore receive more detailed analysis in the Social Impact Assessment. A preliminary assessment is presented below.

Information on disadvantaged groups (rather than vulnerability) is presented in the Economic and Governance Baseline Report and includes analysis of the village-level and household surveys. Results from the village-level surveys indicate that people from within the PAOI identify women headed households, single mothers and widows as being disadvantaged. 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. Within the PAOI, disadvantaged people are cared for by their families. While they could be considered vulnerable because they may not be able to gain project employment, they could benefit proportionally more from an improvement in health services, should this occur as a result of the Project.

People with no or limited formal education will have more difficulty than others in understanding the Project and anticipating Project impacts or opportunities. The villages with the highest proportion of people over 10 years of age that have no education, or have not attended primary school, are the Pawaian villages (with the exception of Poroi 1) and Evara, Mariki, Upaia, Harevavo, Mapaio Fish Camp and Aiere (refer Table 71).

Table 71: Villages with Low Formal Education Levels (%)

Village	Males with no Primary or Secondary Education	Females with no Primary or Secondary Education
Aiere	20	50
Evara	50	60
Harevavo	34	40
Mapaio Fish Camp	13	60
Mariki	42	53
Poroi 2	24	56
Poroi 3	42	100
Subu	50	90
Subu 2	26	90
Upaia	41	48
Ura	30	67
Wabo	43	70
ALL VILLAGES	**25**	**38**

Source: ERIAS Group, 2016b.

In addition to having low formal education levels, the villages of Subu, Subu 2, Poroi 3, Mapaio Fish Camp and Aiere are among the villages with the lowest population in the PAOI. They are less likely to understand the Project and anticipate Project impacts or opportunities because they have relatively few people in the village to guide them or provide leadership.

As discussed in Section 6.2.5.1, the villages of Kaevaria, Aivai, Aumu, Subu, Subu 2, Evara, Poroi 1, Poroi 3, Mapaio Fish Camp, Apiope, Aiere, Upaia and Paevera do not have access to a functioning primary school. Education levels in these villages will fall as the children age unless schools are re-opened or constructed.

Evara provides an example of how a resource project can have a negative impact on a community with low education levels. Despite income from logging, and the construction of classrooms and a health facility by the logging company, there is limited evidence that cash incomes have been used to improve housing; teachers have not stayed so the schools are not functioning; and the community appears to lack leadership and appears to be fragmented. Alcohol consumption and gambling are common, and women interviewed during the social baseline study indicated that the level of security has deteriorated since logging commenced.

Other people potentially vulnerable to project-related impacts include the residents of villages that are likely to experience substantial in-migration. Ura has already experienced substantial in-migration, which has been linked by some residents to an increase in alcohol abuse and drug use. Illegal exploitation of local resources and various law and order problems could occur in Ura, Wabo and other villages likely to experience in-migration. This may include Poroi 1, Poroi 2 and Mapaio Fish Camp due to their general proximity to Herd Base.

Another factor that could impact on people's subsistence base, and therefore make them more vulnerable to potential adverse Project impacts, is climate change. The majority of Orokolo

villages located on the coast are experiencing coastal erosion. Some houses and schools have been relocated inland. Rising sea level and/or more intense storms could continue to cause coastal erosion and both reduce land suitable for villages and adversely affect subsistence resources (e.g. washing coconuts into the ocean, or flooding garden or sago areas). In addition to coastal Orokolo villages, climate change could adversely affect villages located in the Purari delta, including Aiere, Upaia, Kinipo, Ikinu, Akoma, Kairu'u and Apiope.

7. Conclusions

In mid-2016 the PAOI contained 12,763 people from seven language groups. The main populations lie along the coast, an area inland of Orokolo Bay, and an area across the Purari Delta that roughly conforms with the upper tidal reaches. All villages in the Purari Delta are located on the banks of the Purari's tributaries. The Pawaian villages are located along the banks of the Purari River, upstream of the delta. Other than the Orokolo area, population densities are low.

The local language (known in Pidgin as *tok ples*) is spoken by 83% of people in the PAOI when conversing at home. Knowledge of other languages varies: approximately 90% of males and 80% of females understand Melanesian Pidgin, and 38% of males and 31% of females understand Motu, compared with approximately 45% of males and 39% of females over 10 years of age from the PAOI who understand English.

Survey results indicate that the PAOI has a relatively young population and relatively low life expectancy (only 7% of the population of the PAOI are 55 years or above, which is low given Papua New Guinea's life expectancy at birth of 61 years for males and 65 for females (WHO 2015)). Relatively few people have migrated into the PAOI however, substantial outmigration has occurred over an extended period of time as people search for employment opportunities and improved access to public and commercial services.

Education facilities in the PAOI are poor and education levels are low. Approximately 10% of males and 21% of females in the PAOI aged 16 years and above have never attended school. Results from the household survey indicate that only 29% of boys and 35% of girls in the PAOI aged from 6 to 15 years are attending school. The vast majority of school-aged children are not attending school, even in the Orokolo area, where the majority of children have relatively good access to schools. Teachers said that the main reason for children not attending school was that they had to help their parents at home with various subsistence activities. However, women interviewed during the social baseline surveys indicated that the distance to the nearest school, schools being closed, and poor teachers were the main reasons for low attendance.

An estimated 19% of males and 33% of females from the PAOI, aged 16 years and above, indicated that they could not read or write. This compares favorably with census data for Papua New Guinea and Gulf Province from 2000 (NSO 2013a). However, a detailed assessment of literacy levels in Gulf Province in 2009 revealed that the literacy levels stated by people (self-assessment) were much higher than results following a simple literacy test. Nevertheless, it is important to note that self-assessed literacy levels among males from Evara are particularly low, while literacy levels are particularly low for females from Pawaian and Kaimare villages as well as Evara.

The main law and order problems in the PAOI are typically stealing, fighting and domestic violence, the latter being widespread and almost expected in some villages. Alcohol is not consumed regularly, but some males (including teenagers) often drink on special occasions. Excess consumption can contribute to various social problems, including fighting, domestic violence, abusive language and general disruptions to the village. Marijuana consumption is common among boys and young men and some girls and young women in the PAOI. Marijuana is not generally smoked in public, but is also linked to a range of social problems.

Village leaders and women's groups from around 70% of the villages in the PAOI indicated that people generally felt safe. One of the main concerns, however, was the fear of sorcery, which can influence what some people do, and where some people go. The village leaders from around half of the villages indicated that the general level of security had improved since the strengthening of the village court system in 2012, whereas most of the women's groups thought there had been no significant change.

In the PAOI, approximately 73% of houses are made of traditional materials (which compares to 67% for Papua New Guinea in 2009/10), with 25% of houses categorized as semi-improved and 2% as a modern design. The most common source of power for lighting is solar (40% of households), torches (26% of households) and battery-powered lamps (17% of households), whereas 45% of households used kerosene lamps across Papua New Guinea in 2009/10. All households in the PAOI use firewood as the main source of fuel for cooking, compared to 88% of households across Papua New Guinea in 2009/10.

In the PAOI the most common source of drinking water was from rainwater in rainwater containers (37% of households) and rainwater tanks (32% of households), rivers or streams, including the Purari River and its tributaries (16% of household) and shallow wells (8% of households). Women from 34% of villages in the PAOI indicated that they were not satisfied with their drinking water, with the major concern being the fear of contamination.

The most common types of toilets in the PAOI were simple or improved pit latrines, however, 34% of households indicated that they did not use a toilet and relied on the bush, river or sea. Around 80% of villages in the PAOI indicated that they did not have designated areas for garbage disposal. Tins and batteries were generally thrown in the bush, sea or river, or buried; plastic and paper is generally burned; and food scraps are generally fed to chickens and pigs.

In the PAOI, 66% of the villages have mobile phone reception and 62% of households surveyed had mobile phones. Other than canoes, households possess a limited range of assets. No households in the PAOI owned any motor vehicles.

Adequate information has been collected, analyzed and presented in this report to meet the specific objectives outlined in Section 1.2. However, 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 shall be outlined in the Social Impact Assessment report, which will be an attachment to the EIS for the Papua LNG Project.

8. Study Team

Mike Finlayson prepared the Community and Demographic Baseline Report. Survey 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 72 and Table 73 list the full SBS study team. Photo 17 shows the team members and Photo 18 shows the team members with the Kaevaria community.

Table 72: 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	PNG
Yvonne Hani	• FGD – Women • KII – Education, markets and store	ERIAS Group	PNG
Sally Jerome	• FGD – Women • KII – Education, markets and stores	Booyong Forest Science	PNG
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	PNG
Robert Skelly	• KII – Cultural Heritage • Field survey/inspection	Andrew Long and Associates	Australian
John Sepe	• KII – Cultural Heritage • Field survey/inspection	Andrew Long and Associates	PNG

Table 73: 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	PNG
Claire Gangai	Enumerator	ERIAS Group	PNG
Charles Wakinau	Enumerator	ERIAS Group	PNG
Auvita Kilori	Enumerator	ERIAS Group	PNG
Joyleen Noki	Enumerator	ERIAS Group	PNG
Gerard Gowae	Enumerator	ERIAS Group	PNG
Alex Nava	Enumerator	ERIAS Group	PNG
Levana Vanua	Enumerator	ERIAS Group	PNG
Elai Soutai	Enumerator	ERIAS Group	PNG

Photo 17: SBS community level survey team members, May 2016

Source: ERIAS Group, 2016a.



Photo 18: SBS household survey team members with the Kaevaria community, August 2016

Source: ERIAS Group, 2016a.



9. Glossary and Abbreviations

9.1 Acronyms and Abbreviations

AOI	Area of Influence
ASPABAE	Asia South Pacific Association for Basic and Adult Education
AusAID	Australian Agency for International Development (now integrated within and known as the Department of Foreign Affairs and Trade)
CA	Community Affairs
CBC	Community Based Constable
CDI	Community Development Initiative
CEPA	Conservation and Environmental Protection Authority
CPF	Central Processing Facility
DNPM	Department of National Planning and Monitoring
DoE	Department of Education
EIS	Environmental Impact Statement
FGD	Focus Group Discussion
FODE	Flexible Open Distance Education
GoPNG	Government of Papua New Guinea
HIES	Household Income and Expenditure Survey
IAIA	International Association for Impact Assessment
IFC	International Finance Corporation
IPIECA	International Petroleum Industry Environment and Conservation Agency
KII	Key Informant Interview
LLG	Local-level Government
LNG	Liquefied Natural Gas
MTDP	Medium Term Development Plan
NCD	National Capital District
NSO	National Statistics Office
NSRSD	National Strategy for Responsible Sustainable Development
PAOI	Project Area of Influence
PDL	Petroleum Development License
PER	Export Pipeline Route
PGK	Papua New Guinea Kina
PNG	Papua New Guinea
PPFL	Petroleum Processing Facility License
PL	Pipeline License
PPC	Provincial Police Commander
PRL	Petroleum Retention License
RPNGC	Royal Papua New Guinea Constabulary
TEP PNG	Total Exploration & Production Papua New Guinea Limited
UNDP	United Nations Development Programme

9.2 Glossary

Term	Definition
Cohort completion ratio	The percentage of the population that enrolled in Elementary Prep which complete Primary Grade 8 (DoE, 2009, p.9).
Dependency ratio	The number of dependents (people aged less than 15 or more than 55 years of age) in a household, divided by the number of people aged between 15 and 55 years of age, multiplied by 100.
Elementary school	Prep and Grades 1 and 2.
Gross admission ratio	Total number of new entrants in Elementary Prep, regardless of age, expressed as a percentage of the population at the official elementary school-entrance age (DoE, 2009, p. ix).
Gross enrolment ratio	Total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year (DoE, 2009, p. ix).
Household	A group of people living together, sharing resources and having common arrangements for cooking and eating.
Net Admission Ratio	Number of 6-year olds enrolled in Elementary Prep as a percentage of the total population of 6-year olds (DoE, 2009, p. ix).
Net enrolment ratio	Enrolment of the official age group for a given level of education expressed as a percentage of the corresponding population (DoE, 2009, p. ix).
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.
Primary school	Grades 3 to 8.
Secondary school	Grades 9 to 12.
Sex ratio	The number of males to every 100 females.
Sorcery	Sorcery includes witchcraft, magic, enchantment, puripuri, mura mura dikana, vada, mea mea, sanguma, or malira, whether or not connected with or related to the supernatural
Transition ratio	The number of students admitted to the first Grade of a higher level of education in a given year, expressed as a percentage of the number of students enrolled in the final Grade of the lower level of education in the previous year (DoE, 2009, p. ix).

Currency Equivalents

PGK 1.00 = US $ 0.32 = Euro 0.30

2 December 2016

10. References

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Attachment 1
Sample of Awareness Material

DRAFT

What is EIS?

1



Company must do studies into animals, plants, ground, water, air and people to show that impacts from the project can be managed.

2



All studies are reported in an EIS which is used by Government to decide if project can proceed or not.

3



EIS stands for Environment Impact Statement. It looks at the potential impact on people and environment.

4



An important part of the EIS is stakeholder engagement – talks with people close to the project, and others, about things important to manage.

5



After the studies, the company tells people what the studies found and how the company will manage its impacts.

6



The Government makes a decision about whether the company can manage its impacts and decides if the project can proceed or not.

Attachment 2
List of People Consulted

People Consulted During Community Survey

Name	Position	Organisation
Haivela Kavo	Governor	Gulf Provincial Government
Mark Avai	Provincial Administrator	Gulf Administration
James Hasu	Acting Provincial Administrator	Gulf Administration
Joshua Aivei	Director, Education	Gulf Administration
Max Hulama	Literacy Officer	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
Bonny Moisou	Deputy Director, Rural Health Services	Gulf Administration
James Opa	Commerce	Gulf Administration
Ahovo Laepa	Deputy Administrator	Gulf Administration
Ekaloa Mefaramu	Kikori District Health Manager	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
Valerie Pierre	Project Coordinator	MSF – Gulf Province
Tavi Kauca	Education Planner	Gulf Administration

NB: People consulted in villages in the PAOI, and officers from TEP PNG, are not included in the above list.

Attachment 3
Community Directory

PAPUA LNG PROJECT

COMMUNITY DIRECTORY – UPSTREAM

Version	Details	Prepared (ERIAS Group)	Endorsed (ERIAS Group)	Approved (TEP PNG)	Date Issued
V6	Final	K. Munro	C. Coyne		23/08/2017

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IDENTIFICATION PAGE

Author	Danielle Martin/K Munro
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Abbreviations

AP	affected persons
CPF	central processing facility
EIS/ESHIA	environmental impact statement/environmental social health impact assessment
FGD	focus group discussion
IFC	International Finance Cooperation
HH	household
HHS	household survey
KII	key informant interview
LLG	local level government
LNG	liquefied natural gas
PAC	Project affected community
PAOI	Project area of influence
PDL	petroleum development license
POM	Port Moresby
PRL	petroleum retention license
SBS	social baseline study
SMLI	social mapping and landowner identification
TEP PNG	Total E&P PNG Limited
QA/QC	quality assurance/quality control

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1. Introduction

1.1 Project Overview

Joint venture partners are currently planning the development of the Elk-Antelope gas field, which is located within Petroleum Retention License 15 (PRL-15) in the Gulf Province, Papua New Guinea. Total E&P PNG Limited (TEP PNG), a wholly owned subsidiary of 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.

1.2 This Document

The purpose of the community directory is to provide key data and information characterizing villages within the Project area of influence (PAOI) shown in Figures 1.1 and 1.2.

Information on certain topics is similar or the same for some villages of the same language group in this report. Where information is the same, it is repeated for each village such that each village profile is complete and can be read in isolation of other profiles. The language groups that have been verified in the upstream area are shown in Figure 1.3.

The distances described in this document between villages and Herd Base are based on a direct route (‘as the crow flies’).

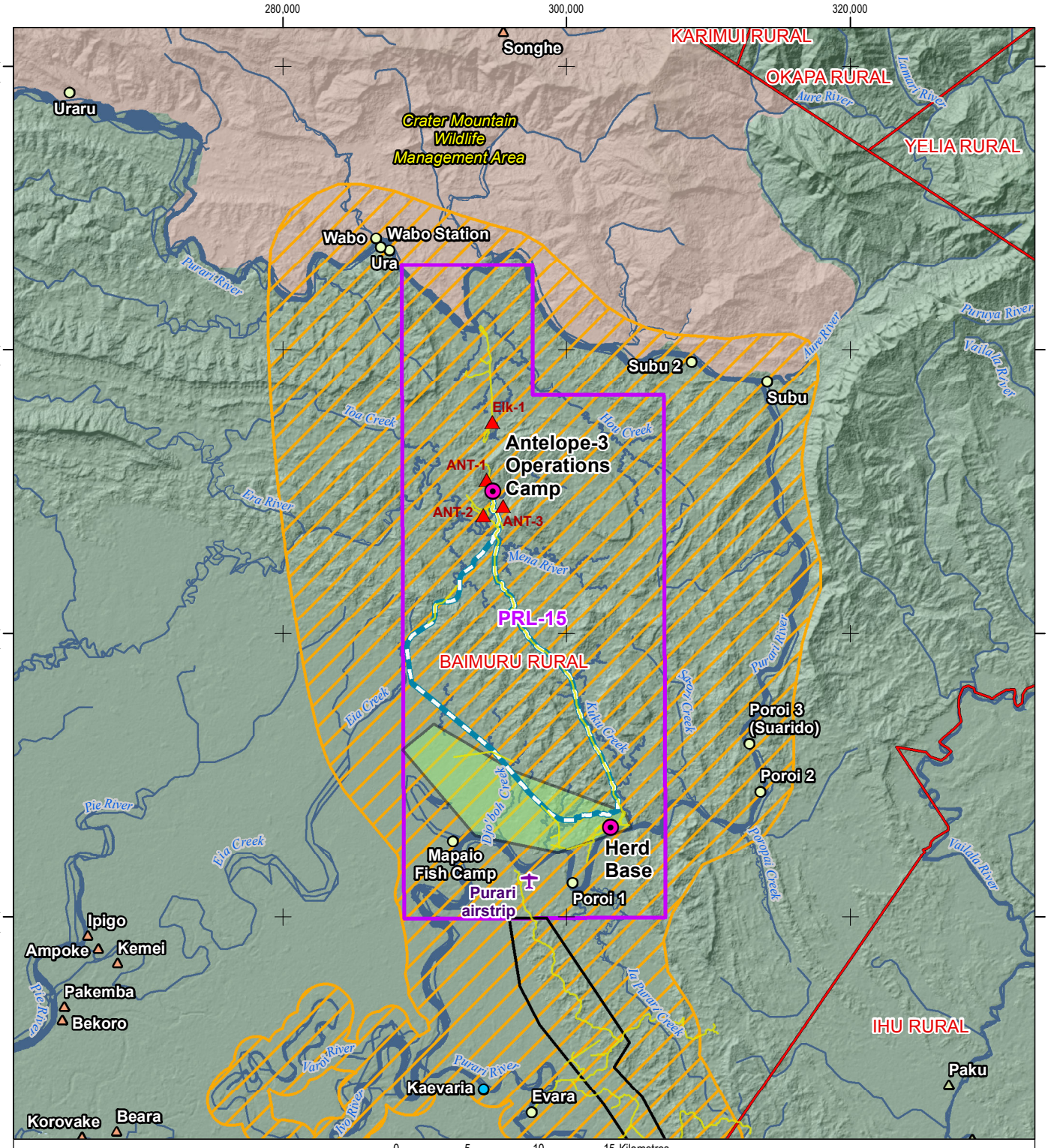
In the summary tables for each village, nearest education facility refers to i) the nearest functioning facility, or ii) the nearest facility offering further education. ‘Traditional’ housing refers to housing made of traditional materials sourced from the local environment. ‘Semi-improved’ housing refers to housing made with some sawn timber or sheets of roofing iron, and ‘modern’ housing refers to housing made completely made of sawn timber, iron roofing and other purchased building materials.

There is no village layout figure for Aiere as the SBS team was unable to physically visit that location (due to logistical constraints). Information about Aiere was collected from residents who travelled to Upaia to participate in SBS surveying.

An abbreviated version of the community survey was conducted at Arehava 2 and therefore no data is available on the topics of women, youths, subsistence, sanitation and cultural heritage. There are no plates for Arehava 2.

The section titled Settlement History for each village is a description of information told to SBS team members during the village leader’s focus group discussions. The information has not been verified as part of an extensive Social Mapping and Landowner Identification (SMLI) study.

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SCALE: 1:400,000 @ A4

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 and Infrastructure
- Base camp
- Purari airstrip

Proposed Facilities
- Wellpad

- Trunkline corridor
- CPF, logistics base and airstrip area
- Export pipeline corridor

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

TITLE: Upstream Project Area of Influence PRL-15

FIGURE: 1.1

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-79905 **REVISION:** W

DATE: 2/05/2017

DATA SOURCES:
Facilities, CPF, logistics base and airstrip 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.

CLIENT:

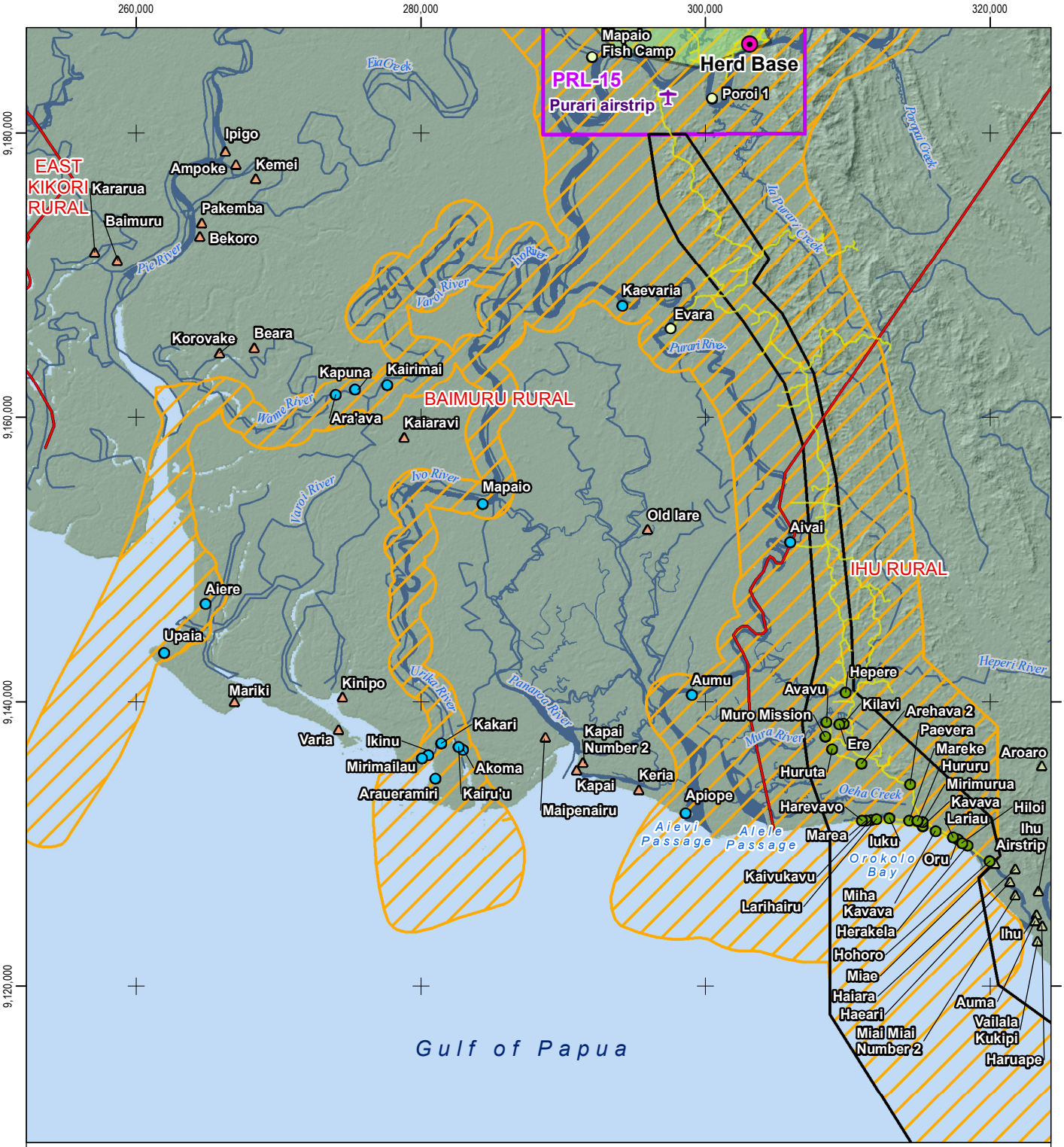
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SCALE: 1:400,000 @ A4

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 and Infrastructure
- Base camp
- Purari airstrip

Proposed Facilities and Infrastructure
- 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

FIGURE: 1.2

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-79712 **REVISION:** W

DATE: 18/04/2017

DATA SOURCES:
Facilities, CPF area, export pipeline corridor, towns and villages, waterways, tracks, PRL-15, hillshade supplied by ERIAS Group and TOTAL (2015-2016). 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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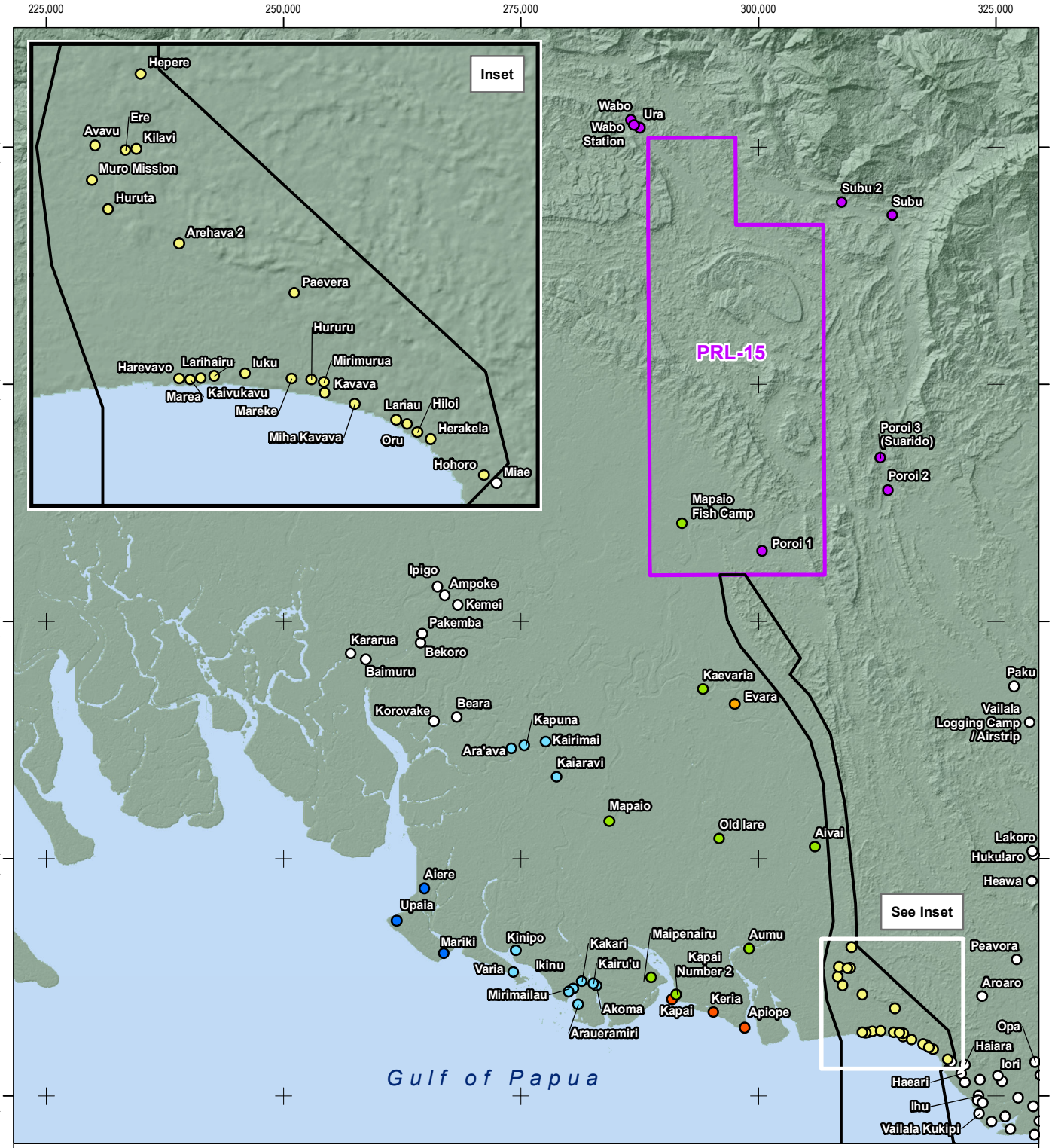
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SCALE: 1:600,000 @ A4

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

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: Upstream Language Groups

FIGURE: 1.3

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77438 **REVISION:** H

DATE: 15/12/2016

DATA SOURCES:

Language Groups, villages, rivers, tracks, PRL15, hillshade supplied by ERIAS and TOTAL (2015-2016)

LLG Boundaries from HDX and then spatially adjusted to align with background and coastal boundaries removed.

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2. Community Summary

Table 2.1 presents key social data by Project area i.e., PRL-15, export pipeline corridor and riverways.

Table 2.1 – Key Social Data by Project Area[1]

Thematic Area	PRL-15	Export Pipeline Corridor	Riverways
Province	Gulf	Gulf	Gulf
District	Kikori	Kikori	Kikori
Local Level Government (rural)	Baimuru	Ihu	Baimuru
Population	1450	6752	4473
No. of households	228	1162	665
Average household size	5.9	5.9	6.8
Ethnic group	Pawaia, Ahia	Orokolo, Ahia	Kaimare, Iare, Koriki, Maipua, Ahia
Health facilities	2 (1 x operating; 1 x partially operating)	3 (all operating)	5 (3 x operating; 2 x partially operating)
Education facilities	5 (3 x elementary and 2 x primary)	16 (12 x elementary and 4 x primary)	11 (8 x elementary and 3 x primary)
Cultural heritage sites	11	33	10

[1] Summary data in Table 2.1 does not include the villages of Maipenairu, Kapai 2 and Mariki as they are not within the Project Area of Influence.

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Tables 2.2 to 2.5 present key social data by village (presented in alphabetical order).

Table 2.2 – Key Social Data by Village (A – H)

Thematic Area	Aiere	Aivai	Akoma & Kairu'u	Apiope	Ara'ava	Arehava 2	Aumu	Avavu	Ere-Kilavi	Evara	Harevavo
Province	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf
District	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori
Local Level Government (rural)	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru	Ihu	Baimuru	Ihu	Ihu	Baimuru	Ihu
Ward	5 (Mariki)	19 (Aivei)	13 (Akoma)	18 (Apiope)	8 (Ara'ava)	4 (Arehava 2)	19 (Aumu)	1 (Avavu)	1 (Avavu)	14 (Mapaio)	2 (Harevavo)
Population	~50	107	549	301	751	96	244	283	396	542	651
No. of households	~14	13	68	45	113	13	31	42	75	67	100
Average household size	~3.6	8.2	8.1	6.7	6.7	7.4	7.9	6.7	5.2	8.1	6.5
Gender ratio	N/a	81	114	106	96	118	85	105	114	99	94
Ethnic group	Kaimare	Iare	Koriki	Maipua	Koriki	Orokolo	Iare	Orokolo	Orokolo	Ahia	Orokolo
Year established	1957	1952	1934&1944	1950s	1943	Unknown	1922	Unknown	Unknown	Unknown	Unknown
Health facilities	0	0	1	1[2]	0	0	0	0	0	1[2]	0
Education facilities	0	0	2	1[3]	2	0	0	2[4]	1	0	1
Cult. heritage sites	N/a	1	3	0	3	Unknown	0	2	3	0	0

[2] Partially operating health facility
[3] Elementary school is operating. Primary School due to open in 2017
[4] Including Muro Mission Primary School

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Table 2.3 – Key Social Data by Village (H – K)

Thematic Area	Hepere	Herekela	Hohoro	Huruta	Ikinu	Iuku	Kaevaria	Kairimai	Kaivukavu	Kapai 2
Province	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf
District	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori
Local Level Government (rural)	Ihu	Ihu	Ihu	Ihu	Baimuru	Ihu	Baimuru	Baimuru	Ihu	Baimuru
Ward	1 (Avavu)	7 (Lariau)	7 (Lariau)	1 (Avavu)	12 (Ikinu)	4 (Arehava)	15 (Aikavaravi)	9 (Kaiarimai)	3 (Kaivukavu)	17 (Kapai)
Population	297	331	70	246	294	514	113	386	640	326
No. of households	51	66	12	45	42	80	17	62	101	52
Average household size	5.8	5.0	5.8	5.6	7.0	6.4	6.7	6.2	6.3	6.3
Gender ratio	117	99	112	107	109	104	102	101	107	94
Ethnic group	Orokolo	Orokolo	Orokolo	Orokolo	Koriki	Orokolo	Iare	Koriki	Orokolo	Iare
Year established	Unknown	Unknown	Unknown	1959	1964	Unknown	1947	1942	Unknown	1967
Health facilities	0	0	0	0	0	0	0	0	0	0
Education facilities	1	1	0	1	1[5]	1	0	1	2	1
Cult. heritage sites	1	3	3	2	2	5	0	1	2	Unknown

[5] Refers to Mirimailau Elementary School at Kakari (opposite side of river).

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Table 2.4 – Key Social Data by Village (K – O)

Thematic Area	Kavava	Lariau	Larihairu	Maipenairu	Mapaio Fish Camp[6]	Mapaio	Marea	Mariki	Mareke	Oru
Province	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf
District	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori
Local Level Government (rural)	Ihu Rural	Ihu Rural	Ihu Rural	Baimuru	Baimuru	Baimuru	Ihu	Baimuru	Ihu	Ihu
Ward	5 (Kavava)	7 (Lariau)	3 (Kaivukavu)	16 (Maipenairu)	N/a	14 (Mapaio)	2 (Harevavo)	5 (Mariki)	6 (Harilarewa)	7 (Lariau)
Population	962	223	450	339	32	859	435	222	808	144
No. of households	178	38	73	60	5	152	79	41	145	31
Average household size	5.4	5.9	6.2	5.7	6.4	5.7	5.5	5.4	5.6	4.7
Gender ratio	105	114	112	90	88	108	108	93	106	106
Ethnic group	Orokolo	Orokolo	Orokolo	Iare	Iare	Iare	Orokolo	Kaimare	Orokolo	Orokolo
Year established	Unknown	Unknown	Unknown	1947	1990s	1946	Unknown	1947	1913	Unknown
Health facilities	1	1	0	1	0	1	0	1	0	0
Education facilities	2	1	0	2	0	3	0	0	1	1
Cult. heritage sites	2	3	3	3	Unknown	0	3	4	0	3

[6] Mapaio Fish Camp is a settlement of six families of people originally from Mapaio.

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Table 2.5 – Key Social Data by Village (P – W)

Thematic Area	Paevera	Poroi 1	Poroi 2	Poroi 3	Subu	Subu 2	Upaia	Ura	Wabo	Wabo Stn
Province	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf	Gulf
District	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori	Kikori
Local Level Government (rural)	Ihu	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru	Baimuru
Ward	4 (Arehava)	20 (Poroi)	20 (Poroi)	20 (Poroi)	20 (Poroi)	20 (Poroi)	5 (Mariki)	21 (Wabo)	21 (Wabo)	21 (Wabo)
Population	294	34	301	45	62	97	277	229	542	108
No. of households	47	10	44	8	11	13	41	42	73	22
Average household size	6.3	3.4	6.8	5.6	5.6	7.5	6.8	5.5	7.4	4.9
Gender ratio	121	150	110	150	170	102	94	127	108	242
Ethnic group	Orokolo	Pawaia	Pawaia	Pawaia	Pawaia	Pawaia	Kaimare	Pawaia	Pawaia	Pawaia
Year established	Unknown	Unknown	1970s	2001	Unknown	2014	2007	1970s	1970s	1970s
Health facilities	0	0	1[7]	0	0	0	0	0	0	1
Education facilities	1	0	2	0	0	1	1	0[8]	0	2
Cult. heritage sites	1	0	0	0	2	2	0	6	1	Unknown

[7] Partially operating health facility
[8] Wabo Primary School is located at Wabo Station

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3. Village Profiles

3.1 Aiere

3.1.1 Summary

Table 3.1 summarizes key social data for Aiere.

Table 3.1 – Aiere Summary

Thematic Area	Indicator	Description
Location	**Description**	Purari River delta, immediately south of the Pie River mouth, approximately 60 km southwest of Herd Base
Administrative structure	**Province**	Gulf
	District	Kikori
	LLG	Baimuru Rural LLG
	Ward	5 (Mariki)
Population and demography	**Population**	Approx. 50
	Ethnic group	Kaimare
	Affiliations	Upaia, Mariki
	Households	Approx. 14
	Household size	Approx. 3.6
	Language	Kaimare
	Other languages	Motu, Tok Pisin
Settlement	**Year established**	1957
	Name meaning	“To leave”
Housing	**Drinking Water**	1 x communal tank or from relatives at Upaia
	Cooking	Inside using firewood
	Lighting	Battery and solar
Health	**Facilities**	None
	Nearest facilities used	Mariki Aid Post, approximately 7.5 km south-southeast
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	Unknown
Education	**Facilities**	None
	Attendance	N/a
	Nearest facilities used	Upaia (1 x elementary school) approx. 62 km southeast; Varia (primary school) approx. 13 km southeast
Religion	**Churches**	United Church, Church of Christ
Water and Sanitation	**Toilet facilities**	Private pit, bush, sea/river
	Waste disposal	All domestic waste is disposed in river

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Table 3.1 – Aiere Summary (cont'd)

Thematic Area	Indicator	Description
Law and order	**Prevalent issues**	Stealing garden food
	Resolution mechanisms	Peace officer

A composite survey was conducted at Aiere, thus only a selection of information was collected. The SBS survey team was unable to visit Aiere due to logistical constraints. The survey was conducted with Aiere residents at Upaia.

3.1.2 Settlement History

Aiere was settled in 1957 when people moved from Mariki because of overcrowding.

3.1.3 Social Organization

Social organization was maintained by a ward councillor, village court magistrate and auxiliary police. There were also two church groups – United Church and Church of Christ – and a women's group.

3.1.4 Land Ownership

Land tenure was strictly patrilineal; ownership was passed from father to son. In the absence of a male heir, male family members of the clan could assume custodianship until a male heir from the blood line was reproduced to assume ownership. Female members of a clan were expected to marry outside of the tribe so that they would produce the male heirs of their husbands. Male members of the clan were expected to marry women outside of the tribe who would bear the next male heirs for the clan and the tribe. It was forbidden to marry within the clan or tribe as it was thought this would cause serious issues of ownership and inheritance.

3.1.5 Health

There were no health facilities at Aiere. People sought treatment from Mariki Aid Post. The main health issues in the village were thought to be respiratory infections, coughs and headaches. Kapuna Health Centre conducted a health patrol to Aiere in August 2016.

3.1.6 Education

There were no education facilities in Aiere. Approximately four students (two males and 2 females) travelled to attend school at Upaia (an elementary school) and Varia (a primary school).

3.1.7 Law and Order

The main law and order issue was the stealing of garden food. Cases were generally resolved by the peace officer. There were no land disputes between Aiere and other villages. No-one reportedly drank alcohol, smoked marijuana or gambled for money.

People in Aiere generally felt safe and secure.

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3.2 Aivai

3.2.1 Summary

Table 3.2 summarizes key social data for Aivai.

Table 3.2 – Aivai Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Purari River on the 'Small Purari' arm (known locally as *Aivei*), approximately 35 km downstream from Herd Base	
	Coordinates	145° 14' 24.49" E	-7° 40' 34.84" S
	Physical setting	Located on the banks of the Purari River, and surrounded by lowland swamp forest.	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	19 (Aivai)	
Population and demography	**Population**	107	
	Gender ratio (M:F)	81 (48:59)	
	Ethnic group	Iare	
	Affiliations	Mapaio, Aikavaravi, Old Iare, Aumu, Kapai, Maipenaru, Kaiaravai and Kaevaria	
	Households	13	
	Household size	8.2	
	Language	Uhe (Iare)[9]	
	Other languages	Tok Pisin, Motu and English	
Settlement	**Year established**	1952	
	Name meaning	Aivai refers to the name of a woman believed to be a spiritual custodian of the land the village was created on	
	Land ownership	Each family within each clan allocated land for their exclusive use. Both men and women had same user rights, even after marriage	
Subsistence and land use	**Subsistence base**	Main staple sago. Garden food including cooking bananas, kaukau and cassava. Extensive hunting and fishing for a range of species including cassowary, bandicoot, pig, wallaby and tilapia	
	Resources	Extensive sago swamps, mixed swamp forest and grassland swamps providing array of essential timber and non-timber forest products including medicinal plants	
Commercial activities	**Businesses**	None. Villagers bought and/or sold food crops, sago, fish, coconut and betel nut at Rimbunan Hijau (RH) Logging, a nearby logging camp	

[9] Uhe is a dialect (variation) of the Iare language used by the Aivai people.

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Table 3.2 – Aivai Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	100% traditional
	Floor type	100% raised
	Housing materials	Split black palm or split timber floors, woven sago panels on the walls and sago leaf roof
	Cooking	Inside with firewood
	Lighting	Battery powered torches; some solar power
Health	**Facilities**	None
	Nearest facilities used	Orokolo Health Centre at Kavava, approximately 22 km to the southeast of Aivai
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	17-19 years
Education	**Facilities**	None. An elementary school ceased operating in 2010
	Attendance	N/a
	Nearest facilities used	Mapaio (1 x primary and 2 x elementary schools) approximately 22 km west and Maipenaru (1 x primary and 1 x elementary schools) approximately 23 km southwest
Religion	**Churches**	Catholic, Bahai, United Church, Seventh Day Adventist
Water and sanitation	**Drinking Water**	Predominately sourced from the Purari River. One community water tank; reported to be quickly depleted in the dry season.
	Toilet facilities	Private pit toilets
	Waste disposal	Tin cans and batteries disposed in bush; paper and plastic burnt and thrown in bush and river; food scraps thrown in bush
Law and order	**Prevalent issues**	Fighting; stealing; sorcery; marijuana use; domestic violence
	Resolution mechanisms	Village magistrate; village court; compensation; police; peace officers
Cultural heritage	**Tangible cultural heritage sites**	A spirit/ritual site called *Akia Ini Laua* that spans three separate locations on the banks of the Purari River
	Intangible cultural heritage	Traditional dances and songs performed on special occasions such as welcoming visitors or on Christmas, the most common being songs called '*aiakinu'* and '*auanapera*'

3.2.2 Settlement History

The Iare people have a common ancestral story. Aivai villagers were originally living at a downstream Aumu village but due to clan disputes and continuous infighting, family divisions began to appear. This led their ancestors to relocate to the present village. The Iare believed that their original place was in Subu but several migrations took place that eventually saw them settle in present day Aumu. Aumu was the name given to them by Samoan missionaries sometime before 1920. The original name was Lavi Kivau No. 2.

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3.2.3 Social Organization

Aivai was represented by a ward councillor and village court magistrate but did not have a land mediator in the village. Like other Purari tribes, the Iare had maintained traditional leadership in the form of chiefs. The chief system was strictly hereditary. Chiefs played important roles in settling land disputes as well as assisting in resolving serious law and order problems in the village.

3.2.4 Land Ownership

Land came under each clan that made up their incorporated land group (ILG). Each family within each clan was allocated land for their exclusive use. Both men and women of a clan had the same rights to land ownership even after marriage. Children were shown portions of their clan land so that they would know where to go to use land. They maintained family and trade networks with their clan members living in other villages (such as Aumu).

3.2.5 Women

Daily activities included caring for children, cleaning the house, fetching water and collecting firewood. Tending gardens, making sago, and fishing are done at least once a week. Making sago was regarded as the most important activity followed by fishing and gardening. Most women engaged in income earning activities and tended to spend most of their income for the household (rather than save).

Women reported feeling safe and secure, that feeling having stayed the same over time.

Most women delivered babies in the bush. Others travelled to Orokolo Sub Health Centre (a two-day journey by paddle canoe and walking).

3.2.6 Youths

The youth group (Aueakikos Youth Club) consisted of about 47 members. It was involved in playing sports and participating in community services activities (such as clearing and building the basketball court and building a canoe for a family in need). For recreation, youths played sport, spent time with friends, made crafts (mainly mats and baskets) and used their mobile phones to text and ring friends (limited access to mobile network).

3.2.7 Subsistence

The main staple food was sago, which was harvested from extensive sago swamps along the Purari River. Garden food was also grown including the staples, cooking bananas, kaukau and cassava. In addition, a wide range of foods were grown including a range of ‘greens’ (e.g. aibika and aupa), other crops (e.g. pumpkin, sweet corn, eggplant, cucumber, onion, ginger, Chinese cabbage, snake bean pitpit, sugar cane and peanuts) and fruits (e.g., papaya, pineapples and watermelon). Coconuts, guava, okari nut, kumu mosong, mango, citrus trees, laulau, kapiak (bread fruit) and to a lesser extent tulip (a tree with edible leaves and bark fibres used to make bilums) were extensively planted.

Extensive hunting was reported to occur in forests for wild pigs, cassowary, monitor lizards, pythons, bandicoots, wallaby, megapodes, cuscus, bush rats, megapodes, hornbills, Victoria

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crowned pigeon, and flying fox. Various insect larvae were also harvested including larvae from dead trees and sago.

Extensive fishing was reported to occur along the Purari River and associated creeks for tilapia, super tilapia, barramundi, black bass, microfish, mudfish and mullet. Other aquatic resources included prawns, marine and freshwater turtles, including turtle eggs harvested from nests in the river sand banks. Saltwater and freshwater crocodiles were also hunted.

Two coastal fishing camps (Evepe and Karere) were also visited by residents (approximately one day's paddling in canoe). The main species fished for from the fishing camps were barramundi and occasional sharks. Shellfish were also collected.

3.2.8 Land and Natural Resource Use

Land resources included extensive sago swamps, mixed swamp forest and grassland swamps. These provided an array of essential timber and non-timber forest products including medicinal plants. Forest products were harvested from along the river banks and from either side of the logging road on the east bank of the Purari River.

Sago was the main material used for house walls and nipa palm was used for house thatch. Nipa palms were collected from nearer the ocean from land owned by relatives at Aumu. Kwila was the preferred tree species for house posts but coconut palms were also used since they could easily be sourced within the village. Other building materials, especially bearers and studs were sourced from the mangrove swamp near Aumu. Black palms were split for flooring and a range of rattans were harvested to use as rope as a replacement for nails. Erema was the main species used to make dugout canoes.

Drinking water was mostly sourced from the Purari River, however there was one community water tank but it was quickly depleted in the dry season.

The Purari River was also the primary transport route to visit riverside gardens and to harvest sago. The river was also used to travel to the fishing camps, medical services and markets at Kapuna and Orokolo Bay, the market at the Rimbunan Hijau (RH) Logging camp located approximately 19 km up river near Evara, Aumu to harvest resources and Baimuru for services.

Women tended to have some say in natural resource management especially in terms of gardening and during periods of flood and drought when there was food shortage.

3.2.9 Health

Malaria, diarrhoea, cough and skin infections were reported as main health issues for the village. Most illnesses were treated in the village with traditional medicines. Serious illnesses were sometimes treated at Orokolo or Kapuna Health centres.

Women perceived that most health issues faced by them were attributed to their workload. The main reason for poor health of children was believed to be heat, exposure to mosquitos during gardening and washing in the river.

Women believed there to be some cases of sexually transmitted diseases (STDs) within the village. However women were not sure of how STDs were transmitted. *Noni* plant was commonly used as a remedy for symptoms that sufferers associated with STDs. All women reportedly knew

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about family planning and most used contraceptive methods. The decision to use contraceptives was most often a shared decision of both husbands and wives.

Youths had heard about STDs but were not sure about prevalence, transmission or treatment.

3.2.10 Education

An elementary school operated from 2008-2010 but ceased operation when the Catholic agency withdrew its support in 2010. More than 100 students from Aivai, Apiope and Aumu villages attended the school when it was open. Since closure, students travelled to primary and elementary schools at either Mapaio or Maipenairu.

3.2.11 Law and Order

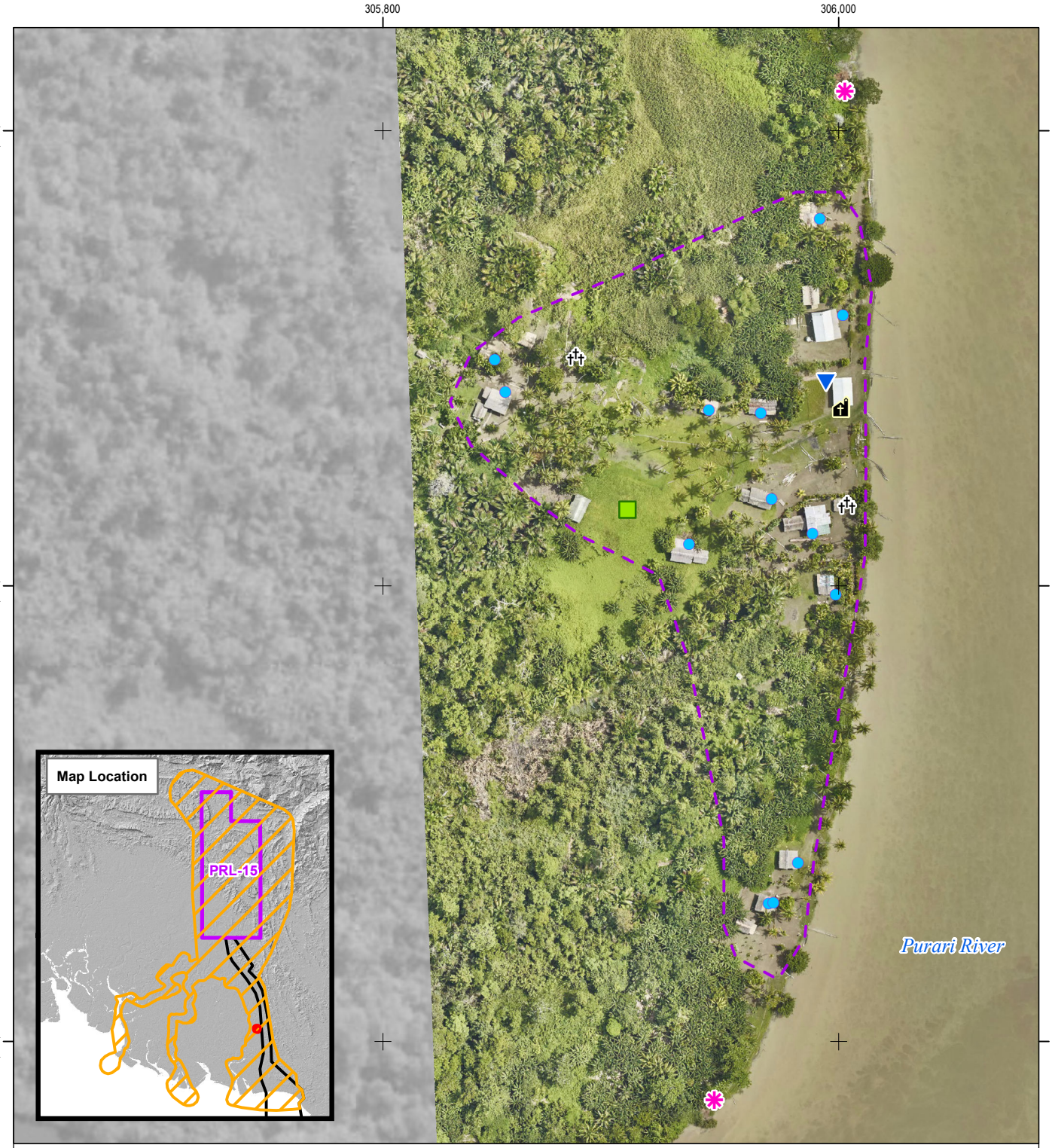
The main law and order problems were stealing and fighting, but were reported not to happen often. In cases of stealing where the perpetrator was known the matter was referred to the village court. In cases of fighting, involving domestic violence from husbands and family members, the village elders intervened. If domestic violence was considered serious, it was referred to the village court. Most men consumed marijuana and sometimes consumed alcohol. Yet there was a secure feeling among women within the village.

Law and order problems flagged by the youths included rape (reportedly common during youth gatherings such as camps and sports, and perpetrated by outsiders), and fighting related to alcohol consumption and stealing.

3.2.12 Cultural Heritage

Aivai village came under the influence of Tom Kabu during the 1960s (although it may have been earlier). Tom Kabu was a man from Mapaio who advocated the destruction of cultural heritage values in the Purari region and, as a consequence of his influence, people at Aivai had very little by way of material culture items from ancestral times. Elders could however name a sequence of four ancestral villages. The village was called *Vaii Vavere* and was occupied four-to-five generations before the present-day adult generation. A spirit site (*Akia Ini Laua*) that spaned three separate locations on the banks of the Purari River was recorded. The spirit site told the story of two sisters one of whom transformed into a fruit and one who transformed into a legume. The story also included their younger brother who became a bird. The three spiritually connected locations that formed the site were two small drainage channels (*Akia Ini Lau*) and a spirit tree (*Eere*). The spirit site and the ancestral village were of significance to clan leaders. Aivai elders also described intangible cultural heritage values that were taught to children. Traditional dances and songs were performed on special occasions. Women were not allowed to eat coconuts, crabs, prawns, and unscaled fish for a month after giving birth as it was thought to cause sores on the babies' skin. Men were not allowed to assist women to scrape sago as it was believed to result in a low yield of sago. Women were forbidden to cook for men, sleep with their husbands or touch their fishing gear prior to hunting or fishing trips, as this was believed to bring bad luck.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Sago processing
- Sporting field
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Aivai Village Layout

FIGURE: 3.2

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77443 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total.
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.2 – Aivai Gallery



Photo 1 – Fishing net and platform



Photo 2 – Sago making site



Photo 3 – Basketball court



Photo 4 – Disused aid post



Photo 5 – Elder displaying material culture (stone axe)



Photo 6 – Vaii Vavere is an ancestral village site bounded to the north by the drainage channel

3.3 Akoma & Kairu'u

3.3.1 Summary

Table 3.3 summarizes key social data for Akoma and Kairu'u.

Table 3.3 – Akoma & Kairu'u Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located in the Purari River delta on the Urika River (southern end of the central tributary of the Purari River) approximately 54 km downstream from Herd Base	
	Coordinates	145° 1' 43.97" E	-7° 48' 18.31" S
	Physical setting	Located on the eastern bank of the Urika River. Surrounded by mangroves and extensive tidal nipa palm swamps. Akoma and Kairu'u differentiate themselves as separate settlements but function and consider themselves one community	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	13 (Akoma)	
Population and demography	**Population**	549 (247 Akoma & 302 Kairu'u)	
	Gender ratio (M:F)	Total 114 (292:257); Akoma 119 (134:113); Kairu'u 110 (158:144)	
	Ethnic group	Koriki	
	Affiliations	Ikinu, Ara'ava, Kairimai	
	Households	68 (35 Akoma & 33 Kairu'u)	
	Household size	8.1 (7.1 Akoma & 9.2 Kairu'u)	
	Language	Koriki	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Akoma 1934; Kairu'u 1944	
	Name meaning	Akoma referred to an expression of sorrow at leaving something behind for good, while Kairu'u meant "head" or "root"	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, cassava and kaukau. Limited hunting for wild pigs, cuscus, bandicoots and monitor lizards; extensive fishing (main species catfish)	
	Resources	Beach dunes, mangroves, mudflats, small patches of forest, sago stands	
Commercial activities	**Businesses**	1 x trade store	

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Table 3.3 – Akoma & Kairu'u Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	82% traditional 18% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm floor, hardwood posts, sago leaf or grass roof, split timber or woven panel walls
	Cooking	Inside using firewood
	Lighting	Battery, kerosene, solar and generator
Health	**Facilities**	Akoma Aid Post
	Nearest facilities used	Kapuna Health Centre, approximately 22 km to the northwest
	Community Health Worker	1
	Trained birth attendant	1
	Marrying age (women)	16 to 21
Education	**Facilities**	Elementary (not operating in 2016) and primary school
	Attendance	73 students at elementary school 111 students at primary school
	Nearest facilities used	Ihu High School, located 40 km to the east-southeast
Religion	**Churches**	Four square, United Church, Solavest, Bhahai
Water and sanitation	**Drinking Water**	Four community water tanks donated by AusAid and Kapuna Health Centre. Drinking water sourced from Urika River during dry season
	Toilet facilities	Bush, sea/river
	Waste disposal	Tin cans/batteries in pits. Paper/plastics burnt and food scraps fed to pigs and dogs
Law and order	**Prevalent issues**	Fighting, domestic violence, consumption of alcohol and marijuana
	Resolution mechanisms	Police, village leaders, village court
Cultural heritage	**Tangible cultural heritage sites**	Ancestral villages called *Unia Uku Pari, U'upu Akoma, Pana Poa, Old Akoma*. Spirit sites called *Alau Kaipu* and *Aua Euao*
	Intangible cultural heritage	Tool making skills, stories, traditional dress, song and dance

3.3.2 Settlement History

All Koriki people traced their origins to a time when two brothers split and moved away from each other in search of land and resources for their growing families. The split and subsequent out-migration were attributed to the burning of their ancestral men's house and further cultural destruction by outsiders. At the time of the social baseline community level survey (May 2016), Akoma and Kairu'u had reportedly been co-located for more than 70 years and didn't see themselves as separate villages as they shared the same culture and way of life.

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3.3.3 Social Organization

Akoma and Kairu'u were represented by a ward councillor, village court magistrate and land mediator. Traditional leadership was present in the form of chiefs. Each clan had a chief. The villages had strong leadership responsible for maintaining social order as well as law and order. There were four different churches in the two villages, working closely with village leaders and village court officials.

3.3.4 Land Ownership

Land tenure was strictly patrilineal; ownership was passed from father to son. In the absence of a male heir, male family members of the clan could become custodians until a male heir from the blood line was reproduced to assume ownership. Female members of a clan were expected to marry outside of the tribe so that they would produce the male heirs of their husbands, and vice versa. It was forbidden to marry within the clan or tribe as this was thought to potentially create serious issues of ownership and inheritance of rights.

3.3.5 Women

Sago making was regarded as the most important role for woman. Men usually cut the sago trees and floated it to the sago making location. The women then continued with the rest of the sago making process. Women would also cut and transport the sago themselves (in the absence of men).

Fishing, collecting shells and raising livestock were activities that were considered as important for women as they yielded protein to supplement sago. Most women engaged in income earning activities and tended to spend most of their income for the household. They sometimes travelled upstream, furthest to Evara logging camp, to sell items such as sago, crab, fish, shells, coconuts, and betel nut.

Women generally felt safe and secure and this sense of security had remained stable over the years.

Marrying age was between 16 and 21. The village had a trained birth attendant and a traditional birth attendant yet women also travelled to Kapuna Health Centre to deliver their babies.

3.3.6 Youths

Youths were engaged in community service work and playing sports. Recreationally, male youths listened to legend stories from their elders and learned how to cut canoes and paddles. Female youths learned life skills such as how to weave baskets, mats, fishing nets and traps and how to cook.

3.3.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had been planted along the banks of the Urika River and associated creeks. Wild sago stands were present in the swamps but due to high water content they were not harvested.

Small amounts of garden food were grown towards the beach, and in the nipa palm swamps on raised mud mounds that were produced by small crustacean. Garden food was not grown in the village because of the presence of domestic pigs that would eat most garden produce. The main

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garden food staples included cooking banana, cassava, kaukau and smaller amounts of taro. Other food crops including aibika, pitpit, sugar cane, snake beans, cucumber, pumpkin, cabbage were also grown. Coconuts, kapiak (bread fruit), okari nut, mangoes, laulau, citrus trees and pineapple were also planted. Some crops would only grow in the better soil of the beach gardens. These included cucumber, watermelon, pumpkin, pitpit, sugarcane, taro and snake beans. Edible nuts were also harvested from the wild nipa palms in May and December. There were fewer gardens in Akoma and Kairu'u than villages further upstream reflecting the limited suitable land available to grow crops due to frequent flooding and tidal inundation in the nipa palm swamps.

Limited hunting reportedly occurred in forests and swamps for wild pigs, cuscus, bandicoots wildfowl (eggs also collected) and monitor lizards.

Extensive fishing was reported to occur along the Purari River and associated creeks. Catfish was the main species caught but other species such as salmon, tilapia, barramundi, black bass, mullet and eels were also caught. Nets and fishing lines were used. Other aquatic resources included sharks, sawfish, stingrays, prawns, and shellfish. Two species of turtle were also caught for their meat and their eggs were collected. These included a marine turtle that laid eggs from September to January and the freshwater turtles. Saltwater and freshwater crocodiles were also hunted.

3.3.8 Land and Natural Resource Use

Land resources included beach dunes which were used for gardens, mangroves, and extensive tidal nipa palm swamps. The extent of mangroves increased each year due to high levels of siltation forming mudflats, which were initially colonised by a range of mangrove species.

Small patches of forest were present on raised sites within the nipa palm swamps, which become more extensive upstream. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants.

Land resources, particularly the low-lying village areas, were frequently affected by flooding from high tides and heavy rain events resulting in extensive waterlogging and a high water table. However, the amount of land had increased substantially over the last 50 years. The beach was reportedly previously adjacent to the village but at the time of the social baseline community level survey (May 2016) it was several hundred meters further south.

Sago was the main material used for house walls and nipa palm was used for roofs. Kwila was the preferred tree species for house posts but was not common in the local area so other timbers were often used including rosewood, hibiscus and a tree known locally as po'o. House bearers were made from mangrove species and a tree known as muria harvested from forest. A black palm known as karara was split for flooring and a range of rattans were harvested to use as rope as a replacement for nails. Several species of tree were used to make dugout canoes, but erema was the main species. Other species included kepere, kuru and ururu (tok ples), and rosewood.

Drinking water was mostly sourced from several community water tanks, but also from the Purari River in the dry season. Water collected from the Purari River was left for the silt to settle, decanted and then boiled.

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There was no land-based access to the village, although a walking track connected it to the mission station – Urika – at Maipenairu approximately 5 km to the east. The Purari River was the primary transport route to access riverside gardens, nipa palm swamps and to harvest planted sago. The Purari River was also used to paddle to medical facilities at Kapuna, which took approximately one day. Motorised dinghies were used to travel to Kerema to shop and for bus transport to Port Moresby.

3.3.9 Health

An aid post was located at Akoma, run by a community health worker from the local community who had been providing services for 16 years. The post had good facilities and was reasonably equipped with supplies. The nearest heath centre was located at Kapuna.

The main illnesses affecting villagers were reported to be malaria, diarrhoea, cough and tuberculosis. Treatment for these illnesses was traditional medicine supplemented with a visit to Kapuna Health Centre if needed.

Almost everyone in the community had an understanding of how STDs were transmitted and treated, however most were not sure if there were cases of STDs in the villages. Likewise, almost all women knew about family planning and most used contraceptive methods and knew where to access them. The decision to use contraceptives was most often a shared decision of both men and women.

Youths also demonstrated some level of understanding about STDs, how they were transmitted and treated (reportedly as the result of awareness conducted by the Akoma and Kapuna health facilities).

3.3.10 Education

Elementary and primary school facilities, and teachers, were present in Akoma but the elementary school was not operating in 2016. This was because the community had not completed building new elementary school classrooms (the school had operated out of the health centres in 2015 but was not permitted to in 2016). Approximately 73 elementary students (40 males and 33 females) were enrolled in three classes - Prep, Grade 1 and Grade 2. There was one teacher and two vacant teaching positions. In 2015, most students attended classes the majority of the time. It was reportedly due to unsupportive parents that the new classroom had not been completed. The elementary school did not charge project fees (and school fees were subsidised were the government).

A total of 111 students (65 males and 46 females) were attending primary school in 2016 in grades 3, 5, 6, 7 and 8. The school was also a feeder school for Ikinu. It had three teachers and two vacant teaching positions. Most students attended classes most of the time. Those that didn't were usually accompanying parents to gardens, markets or elsewhere. Again, no project fees were sought or paid.

3.3.11 Law and Order

Women reported the main law and order problems in the village as being fighting, domestic violence, consumption of alcohol (especially homebrew) and marijuana. It was reported that often the younger men consumed homebrew and marijuana. In some cases the influence of alcohol

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and marijuana led to fighting. Serious cases of fighting and domestic violence were referred to the village court.

Youths highlighted marijuana consumption and trafficking with the Highlanders as the main law and order issue. They also reported that boy-girl relationships, especially when a boy ran away with a girl without the permission of the families, was a main cause of fights between families. Other problems such as alcohol abuse and sexual assaults also reportedly happened once in a while. Youths consumed alcohol during Christmas periods or bride price ceremonies. Offenders of sexual assault were reportedly from other villages. Gambling was banned.

3.3.12 Cultural Heritage

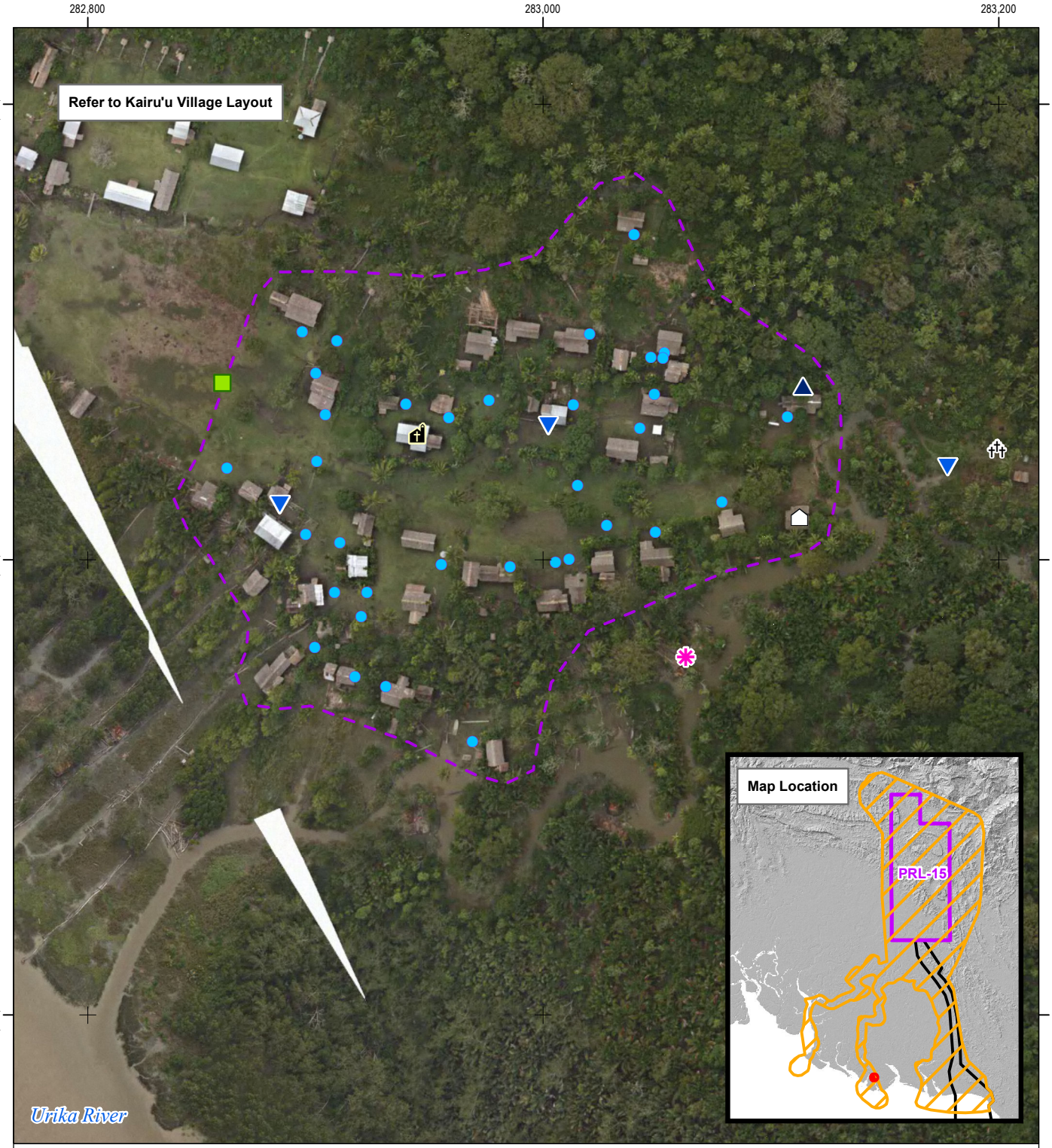
The Akoma & Kairu'u communities lost a vast amount of cultural knowledge when Tom Kabu came to the area in the 1940s and encouraged the destruction of cultural heritage values for evangelical reasons. Elders deeply regretted the loss of connectedness to cultural values, which they believed left their people listless and that many died due to a lack of connectedness to their cultural values. They also lost a repertoire of cultural knowledge used to mediate interactions with their environment. For example, during traditional times crocodiles didn't pose a threat because village sorcerers controlled them. After Tom Kabu and in the absence of ritual mediation, crocodiles became a constant physical and psychological threat.

There were no known tangible cultural heritage sites in the vicinity of Akoma & Kairu'u and the people possessed no ancestral heirlooms. Cultural history was traced inland through a sequence of ancestral villages; the details of which were taught to boys as they grew up.

The community was proactive in protecting intangible cultural heritage values; tool making skills and knowledge about hunting magic was passed to boys and girls were taught how to make tools to process sago. In addition, elders regularly visited the school to teach children about history and cultural heritage. On special occasions the community wore traditional dress and join together in traditional sing-sing (song and dance).

Taboos relating to food and drinks applied to women who experienced their menstrual period during which time a woman was not allowed to cook for the family. Another still-practiced taboo was that a woman must wash her hands in the morning before cooking a meal for her family if she had had sex with her husband the previous night. Cooking without washing her hands may cause her family to become ill.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Community hall
- Sago processing
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Akoma Village Layout

FIGURE: 3.3a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77442 **REVISION:** D

DATE: 20/12/2016

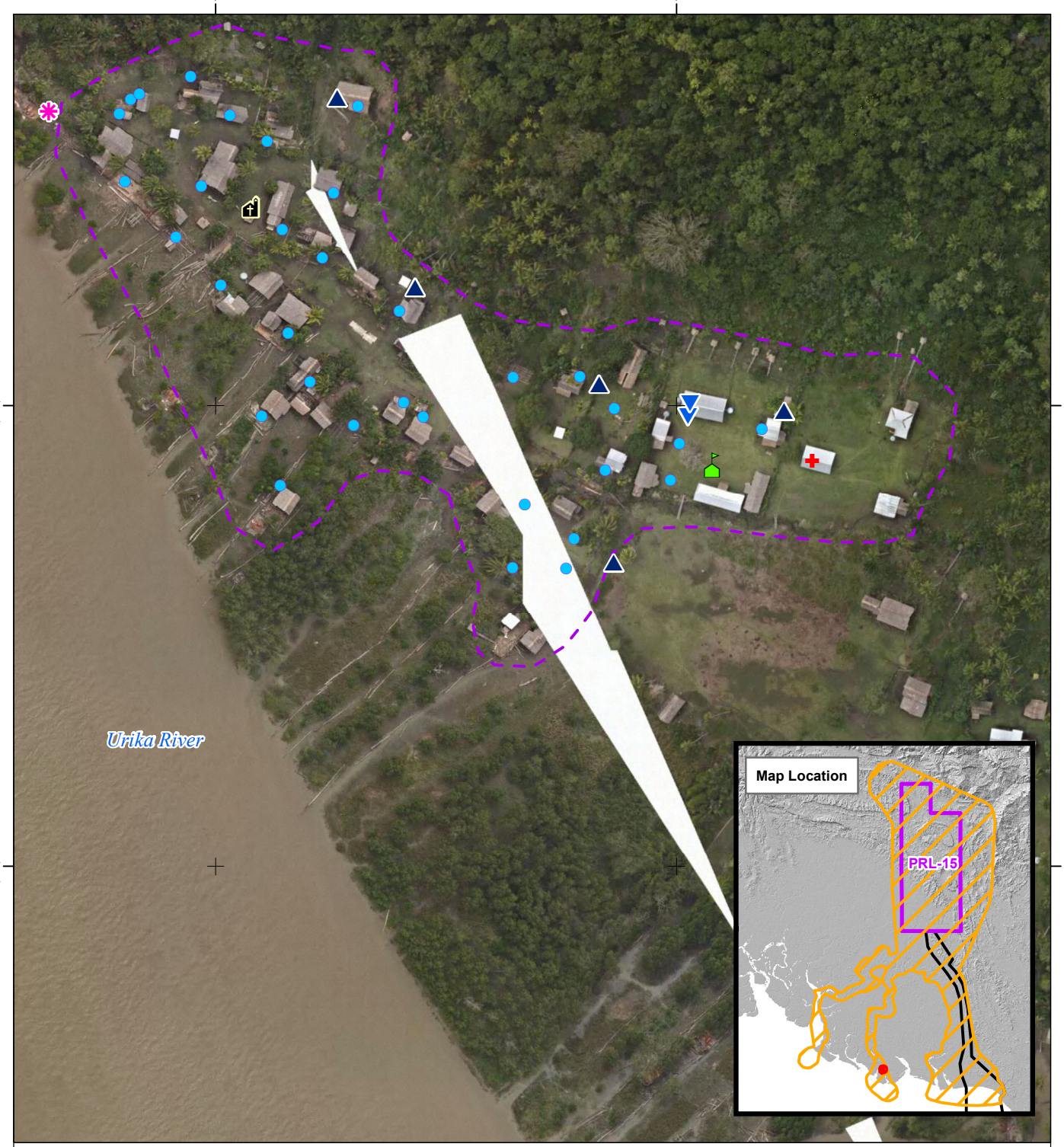
DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary and Primary School
- Aid Post, Operating
- Church
- Sago processing
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Kairu'u Village Layout

FIGURE: 3.3b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77451 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.3 – Akoma & Kairu'u Gallery



Photo 1 – Locally called 'black market' makeshift trade store



Photo 2 – Teaching staff inside one of the Akoma Primary School classrooms



Photo 3 – Key informants in cultural heritage discussions



Photo 4 – A captured crocodile kept in a disused water tank



Photo 5 – Access to Akoma Primary School during the wet season



Photo 6 – Nipa palm and pandanus shoots

3.4 Apiope

3.4.1 Summary

Table 3.4 summarizes key social data for Apiope.

Table 3.4 – Apiope Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Aievi Passage (locally called *Aivei 1*) at the mouth of the Purari River, approximately 55 km downstream from Herd Base	
	Coordinates	145° 10' 19.84" E	-7° 50' 54.74" S
	Physical setting	Located on the western bank of the Purari River. Surrounded by beach dunes, mangroves and extensive tidal nipa palm and sago swamps	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	18 (Apiope)	
Population and demography	**Population**	301	
	Gender ratio (M:F)	106 (155:146)	
	Ethnic group	Maipua	
	Affiliations	Maipenairu, Evara, Kapai, Aumu, Old Iare and Mapaio	
	Households	45	
	Household size	6.7	
	Language	Maipua	
	Other languages	Tok Pisin, Motu and English	
Settlement	**Year established**	1950s	
	Name meaning	Apiope referred to the ancestral, Api, who paddled downstream in his canoe to found the present village when he stuck his ope (stick) on the banks of the present village to settle	
	Land ownership	Land tenure was strictly patrilineal	
Subsistence and land use	**Subsistence base**	Main staple sago. Garden food including cooking bananas, kaukau and cassava. Extensive hunting and fishing for a range of species including wild pigs, cuscus, bandicoot, python and catfish	
	Resources	Beach dunes, mangroves and extensive tidal nipa palm and sago swamps and small patches of forests	
Commercial activities	**Businesses**	1 x trade store	

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Table 3.4 – Apiope Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	93% traditional 7% semi-improved
	Floor type	100% raised
	Housing materials	Hardwood posts, split black palm floor, sago leaf or grass roof, split timber or woven panel walls from sago leaves
	Cooking	Inside using firewood
	Lighting	Battery powered torches, kerosene and some solar and generator power
Health	**Facilities**	No aid post (disused, dilapidated building) however CHW operated from under his house
	Nearest facilities used	Kapuna Health Clinic, approximately 37.5 km to the northwest of Apiope
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	15-18 years
Religion	**Churches**	Catholic, United Church, Seventh Day Adventist
Education	**Facilities**	1 x elementary school (primary school opening 2017)
	Attendance	43 students at elementary school
	Nearest facilities used	Maipenairu (1 x elementary school, 1 x primary school) approximately 12 km to the northwest
Water and sanitation	**Drinking Water**	Predominately sourced from the Purari River. There was one community water tank, quickly depleted in the dry season
	Toilet facilities	Bush, long drop
	Waste disposal	No designated area for waste disposal; disposed anywhere.
Law and order	**Prevalent issues**	Fighting; stealing; sexual violence; alcohol abuse; marijuana; domestic violence; land disputes
	Resolution mechanisms	Village court; peace officers
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Knowledge of traditional ritual and spiritual practices had eroded over recent decades

3.4.2 Settlement History

People used to live further upstream in a placed called Vaivere, where all the tribes once lived together. Tribes dispersed and migrated downstream as the result of food shortages and internal family conflicts over land and other resources. Some of the Maipua clans settled in Apiope and some went to settle in Eremai (Elema), Muro communities and Kairu'u. "Large" Apiope was described as also comprising the nearby villages of Kerea and Kapai 1 (but not Kapai 2).

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3.4.3 Social Organization

Apiope was represented by a village court magistrate and land mediator but did not have a ward councillor in the village. Traditional leadership was present in the form of chiefs. Each clan had a chief. Succession was strictly hereditary, passed from father to son. There were also three religious denominations represented in the village.

3.4.4 Land Ownership

Land tenure was strictly patrilineal; ownership was passed from father to son. In the absence of a male heir, male family members of the clan could become custodians until a male heir from the blood line was reproduced to assume ownership. Female members of a clan were expected to marry outside of the tribe so that they would produce the male heirs of their husbands, and vice versa. It was forbidden to marry with the clan or tribe as it was thought this would potentially create issues of ownership and inheritance of rights. Apiope men allowed their women user-rights to do gardening. However, the women were not permitted to grow or plant long-term food trees like sago or coconuts.

3.4.5 Women

Making sago was regarded as the most important job of women followed by fishing, collecting crabs, prawns, and shells. Most women engaged in income earning activities and tended to save their money for school (project) fees and other needs for their children attending school in other areas.

Women reported feeling safe and secure, that feeling having stayed the same over time.

Most women delivered babies in the village with the assistance of a traditional birth attendant. Others travelled to Kapuna Health Centre to give birth (a two-day journey by paddle canoe).

3.4.6 Youths

The youth group (Koivimai) consisted of about 44 members. It was mainly involved in church and sports activities, and assisted their community in cutting grass and cleaning the church and community grounds. Youths were also involved in fundraising activities in that they would help build houses, weave nipa palm roofs, beat sago and make canoes.

For recreation, youths spent their time with their parents or elders learning how to sew fishing nets and weave baskets (for the young women) while the young men learned how to make canoes and paddles, and make spears and bows and arrows.

3.4.7 Subsistence

The main staple food was sago, which was harvested from sago palms planted along the east bank of the Purari River and associated creeks and from wild sago from the swamps. Nipa palm nuts were also harvested for food from the extensive stands of nipa palms that dominated much of the tidal coastal swamps of the delta. Garden food was also grown including the staples, cooking bananas, kaukau, cassava, taro, pitpit, sugar cane, snake bean, pumpkin, watermelon, pineapples and the ‘greens’ (e.g. aibika and aupa). Several food trees were grown in the village including the ‘green’ kumu mosong, laulau, mango, lemons, pawpaw, okari nut, breadfruit (kapiok) and coconuts.

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Extensive hunting was reported to occur in forests for wild pigs, cuscus, bandicoots wildfowl (eggs also collected), most bird species, bandicoots, python, bush rats and monitor lizards. Insect larvae were also eaten including sago grubs and grubs that lived in dead mangrove trees.

Extensive fishing was reported to occur along the Purari River and associated creeks for catfish, salmon, tilapia, barramundi, black bass, mullet, sawfish and hammerhead sharks.

Other aquatic resources included prawns, and three species of shellfish including the tiny aipaua (tok ples) collected from the beach sands in the intertidal zone. Two species of turtle were also caught for their meat and their eggs were collected. These included marine and freshwater turtles. Saltwater and freshwater crocodiles were also hunted.

3.4.8 Land and Natural Resource Use

Land resources included beach dunes, mangroves, extensive tidal nipa palm swamps and sago swamps. Small patches of forest were also present on raised sites within the nipa palm swamps, which became more extensive upstream. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Also commonly planted near houses were other medicinal plants including noni plant and rosewood.

Land resources, particularly the low-lying village areas were frequently affected by flooding from high tides and heavy rain events resulting in extensive waterlogging and a high water table. Flooding was exacerbated by a large sandbar developing in the Purari River. Ongoing beach side erosion was also occurring.

Sago was the main material used for house walls and nipa palm was used for roofing. Kwila was the preferred tree species for house posts but was not so common in the local area so other timbers were often used including kaipu, auru and mangrove cedar. House bearers were made from two main species, amane and kara (tok ples names). A black palm known as karara was split for flooring and a range of rattans were harvested to use as rope as a replacement for nails. A distinctive feature of the village was the extensive amount of fencing of house sites to keep out free-range domestic pigs. The fencing was made from bamboo, the rachis of sago palm fronds and the sides of old dugout canoes.

There were no local sources of canoe trees, however canoe trees were occasionally found washed up on the beach or floating down the river after a major flooding event.

Drinking water was mostly sourced from several wells, but also upstream from the Purari River in the dry season and when there was drought.

The only land access was via the beach front to Keria and Kapai 1 to the west of Apiope. The Purari River and Karuma River were the primary transport routes to visit riverside gardens, the nipa palm swamps and to harvest planted sago. The Purari River was also used to paddle to Mapaio, Ara'ava and Harevavo to walk to medical facilities at Orokolo Sub Health Centre, and to paddle to Kapuna if a medical condition was life threatening. Access to Orokolo Sub Health Centre was also possible along the coast if the sea state was calm. The sea was also the primary route to Kerema and then by road to Port Moresby.

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3.4.9 Health

Women reported common illnesses in the village to include malaria, diarrhoea, flu and tuberculosis. The women attributed most illnesses to poor diet and climatic factors (as a result of poor water quality particularly during the dry season and when the sand became dusty, causing respiratory infections). Villagers often travelled to various health facilities in the area, including Old Iare Aid Post, Maipenairu Aid Post, Akoma Aid Post and Kapuna Health Centre. Most illnesses were treated by the community health worker present at Apiope from under his house, primarily for malaria and coughs.

Only some women knew how STDs were transmitted or treated and none knew of the prevalence of such. Most women knew about contraceptive methods and how to access them. Using contraceptives was reported as a mutual decision between husbands and wives. A few of the male youths knew what STDs were but were unaware of any existing cases in their village. The female youths appeared to have no knowledge of what STDs were.

3.4.10 Education

An elementary school provided grades Prep, 1 and 2 to 43 students (male/female ratio unknown). There was one teacher and reportedly two vacant teaching positions. Students were reported to attend school most of the time. No project fees were charged.

At the time of surveying, a primary school (double classroom and two teachers houses) had just been constructed with the aid of a National/Provincial government grant (of 60,000K). It was expected to open for Grade 3 and 5 classes in 2017, and would be the first time in 20 years that Apiope had primary school classes.

3.4.11 Law and Order

Men reported only minor domestic disputes that occurred mostly within families and that were resolved through discussion. Peace officers intervened in serious cases.

Women reported the main law and order problems as stealing, fighting, issues related to male-female relationships and land disputes often for trespassing on others land to access sago and trees to make canoes. Most serious matters were referred to the village court for resolution.

Youths were hesitant to give detailed information about the kind of law and order issues they faced, however, they said stealing and fighting were common but not serious, while other issues such as domestic violence/sexual violence, alcohol abuse, land dispute and marijuana consumption were not so common because of the effective law enforcement in their village. Youths gambled almost every day, but did not see it as a problem.

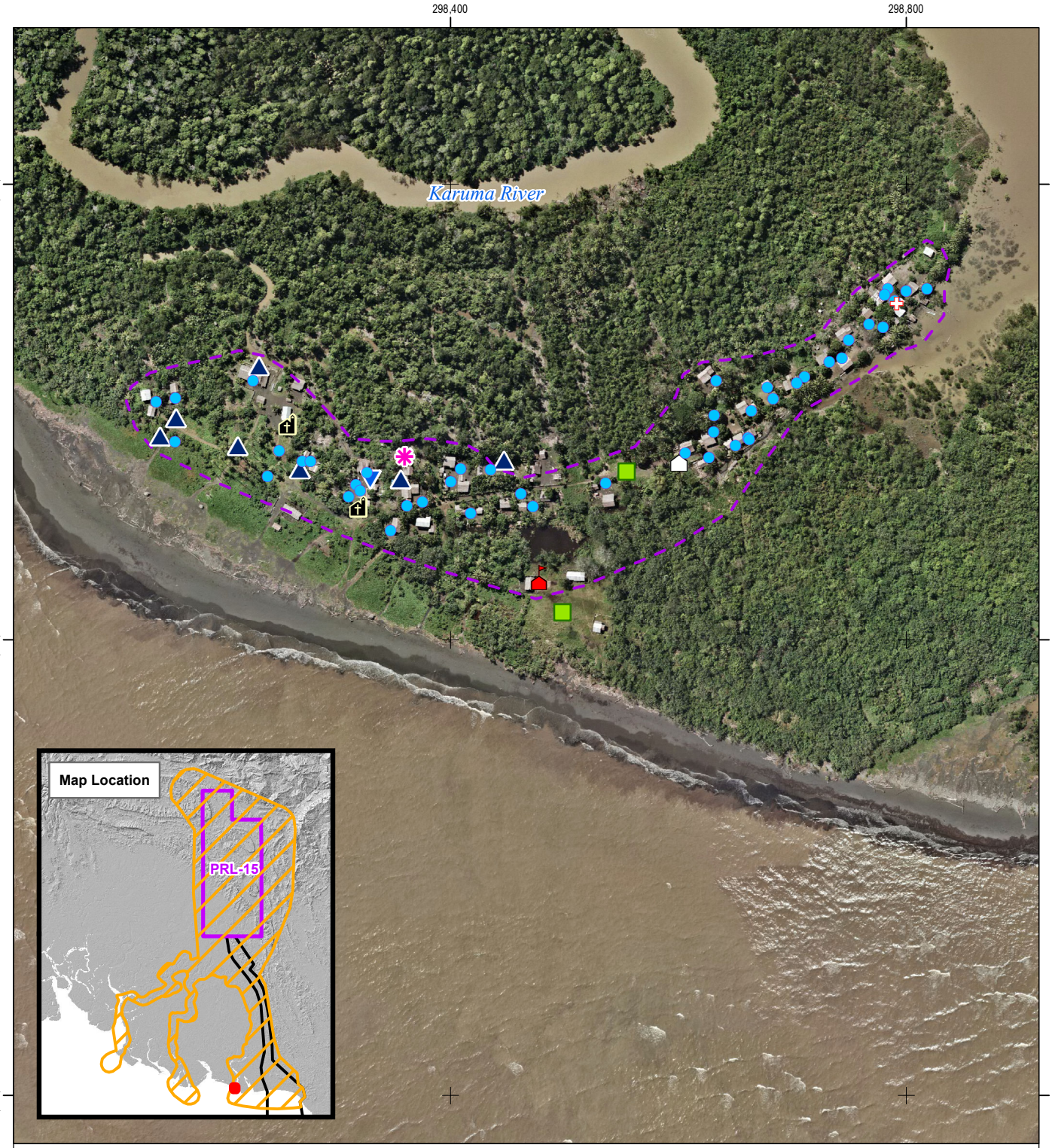
3.4.12 Cultural Heritage

Apiope was recently established (relocated due to storm damage) and there were no tangible cultural heritage sites close to the village. Apiope elders traced their history through 13 ancestral villages; the first village in the sequence was established in the mountains at a time that was well beyond genealogical reckoning. The nearest ancestral village was many kilometres inland from the coast. There was a women-only sacred site not far from the village called Vaea (not recorded); the site was inactive in the sense that details of it were not passed onto younger women. Nevertheless, men did not go near Vaea as they believed they would be attacked by

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spirits if they did. Villagers had heirloom shell valuables that were still exchanged as bride price. Traditional rituals related to hunting, fishing and sago production were no longer practiced. Knowledge about making sago processing tools and techniques used for making sago were taught to girls and were considered by elders to be critically important because sago was their staple food. When the school was open elders were regularly invited to provide children instruction on tradition sing-sing (song and dance) before major community celebrations. The practice ceased when the school closed. Knowledge of traditional ritual and spiritual practices appeared to have decreased over recent decades.

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SCALE: 1:5,000 @ A4

0 50 100 150 200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Aid Post, Partially Operating
- Church
- Community hall
- Sago processing
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Apiope Village Layout

FIGURE: 3.4

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-78371 **REVISION:** F

DATE: 17/02/2017

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.4 – Apiope Gallery



Photo 1 – School teacher in front of newly constructed double primary classroom



Photo 2 – Community health worker under his house where he treated patients



Photo 3 – Apiope elder sitting in the meeting area of the village



Photo 4 – Traditional fish trap



Photo 5 – Sago processing



Photo 6 – Sago processing tools

3.5 Ara'ava

3.5.1 Summary

Table 3.5 summarizes key social data for Ara'ava.

Table 3.5 – Ara'ava Summary

Thematic Area	Indicator	Description	
Location	**Description**	Purari River delta on the Wame River, the western tributary of the Purari River, approximately 39 km downstream from Herd Base	
	Coordinates	144° 56' 55.46" E	-7° 34' 51.36" S
	Physical setting	Located on the banks of the Purari River, surrounded by lowland swamp forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	8 (Ara'ava)	
Population and demography	**Population**	751	
	Gender ratio (M:F)	96 (368:383)	
	Ethnic group	Koriki	
	Affiliations	Kairimai, Kinipo, Ikinu and Akoma	
	Households	113	
	Household size	6.7	
	Language	Koriki	
	Other languages	Some Tok Pisin, Motu and English	
Settlement	**Year established**	1943	
	Name meaning	"Pundaun pinis" meaning already fallen	
	Land ownership	Land tenure was strictly patrilineal	
Subsistence and land use	**Subsistence base**	Main staple sago. Garden food including cooking bananas, kaukau, taro and cassava. Extensive hunting and fishing for a range of species including cassowary, monitor lizards, bandicoot, pig, and megapodes	
	Resources	Extensive sago woodlands (swamps) that varied from almost pure sago to sago with an overstorey of large trees. Towards the coast extensive stands of nipa palms occurred along the waterways	
Commercial activities	**Businesses**	Included in an agreement for the sharing of logging benefits for Baimuru Block 3, although logging had not commenced yet	

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Table 3.5 – Ara'ava Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	1% traditional 97% semi-improved 2% modern
	Floor type	100% raised
	Housing materials	Split black palm or split timber floors, woven sago panels on the walls and sago leaf roof
	Cooking	Inside using firewood
	Lighting	Some solar power
Health	**Facilities**	None
	Nearest facilities used	Kapuna Health Centre, approximately 1.5 km east along the Wame River
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	22-30 years
Education	**Facilities**	1 x elementary school, 1 x primary school
	Attendance	83 students at elementary, 160 students at primary
	Nearest facilities used	Kikori Secondary School, approximately 80 km west-northwest
Religion	**Churches**	United Church, Christian Revival Church, Christian Life Centre, Revival Fellowship.
Water and sanitation	**Drinking Water**	Sourced from individual household tanks, or from the Purari River when household tanks ran dry (dry season)
	Toilet facilities	Private pit toilets, river
	Waste disposal	Tin cans/batteries were buried, paper/plastics were burnt and food scraps were fed to pigs and dogs
Law and order	**Prevalent issues**	Fighting; stealing; domestic violence; alcohol abuse; marijuana
	Resolution mechanisms	Village court; village leaders; police
Cultural heritage	**Tangible cultural heritage sites**	A spirit tree (*Lavi*) and a spirit stone (*Mae*) were recorded at the village. Also an ancestral village (*Vaii Veruku*) was recorded on the opposite river bank
	Intangible cultural heritage	Song, dance and stories were taught mainly in the home but also at the local school

3.5.2 Settlement History

The village was reportedly settled in 1943. It was reported that the major clans of the Koriki tribe dispersed along the Purari River when their original location became overcrowded and experienced food shortages. The Ara'ara people settled in this location.

3.5.3 Social Organization

Ara'ava had a village chief, clan chiefs, councillor, pastor, village magistrate, ward councillor, village court magistrate and land mediator. There was an effective social control mechanism due

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to cooperation of leaders in the village court (magistrate and peace officers), local level government (ward councillor and village recorder), teachers, church elders and traditional leaders.

3.5.4 Land Ownership

Land ownership was determined by the paramount chief[10], despite each clan having its own chief. Beyond that, men decided who owned or distributed land or even who worked on land. Women did not have much say in land use, as they were expected to marry and live with their husbands and in-laws.

3.5.5 Women

Most of women understood Tok Pisin and English but could not speak either. They were responsible for most of the work in their community (in the church and homes).

Women generally felt safe and secure and felt that their sense of safety and security had stayed the same over time.

Marrying age was generally between 22 and 30.

The village had a trained village birth attendant and a traditional birth assistant, but almost all babies were born at Kapuna Health Centre (30 minutes by paddle canoe).

3.5.6 Youths

Five youth groups were functional in the village. One youth group was formed of young men interested in playing touch rugby. The other four youth groups represented the religious denominations within the village. The role of youth groups was reported as being playing sports, participating in the church choir and playing gospel music, and fellowship. They also undertook community work (such as helping building houses, gardening and cutting grass) and catching and selling fish. For recreation, youths played sports, made craft items (baskets, fans, mats, bilums) and sewed clothes.

3.5.7 Subsistence

The primary staple food was sago, which was harvested from extensive sago woodland (swamps). Some sago was planted particularly along riverbanks. Sago was supplemented by garden crops primarily banana, kaukau, taro and cassava. A range of ‘greens’ (e.g. aibika, tulip, aupa), other crops (e.g. pumpkin) and fruits/fruit trees (e.g. papaya) were also grown.

Extensive hunting was reported to occur in forests for wild pigs, cassowary, monitor lizards, bandicoots, megapodes and flying fox.

Extensive fishing was reported along the Purari River (from Nea Creek) down to the coast where a fishing camp was based. Aquatic resources included a range of fish, eels, crabs, shellfish (from the sago swamps and near the ocean), freshwater turtles, marine turtles that migrate from the ocean to lay eggs along the banks of the Purari River, and crocodiles.

[10] The Paramount Chief is the leader of the Orokolo clan leaders, nominated by the clans.

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3.5.8 Land and Natural Resource Use

Land resources included extensive sago swamps that varied from almost pure sago to sago with an overstorey of large trees. Further towards the coast extensive stands of nipa palms occurred along the waterways. Sago was the main material used for house walls and nipa palm was used for house thatch. Nipa palms were collected downstream approximately 1.5 hours' travel away by dugout canoe and kwila was the preferred tree species for house posts. Black palms were split for flooring and a range of rattans were harvested to use as rope as a replacement for nails. Erema was the main species used to make dugout canoes.

Drinking water was sourced from individual household tanks, but during the dry season tank supply quickly depleted and water was sourced from the Purari River.

Ara'ava was connected to Kapuna, Kairimai and Korovake by an existing walking track, however the Purari River was the primary transport route to visit riverside gardens and sago woodland to harvest sago, to source a range of forest products for house building and to harvest canoe trees.

3.5.9 Health

Malaria and poor nutrition were noted as the main reason for poor health. Most illnesses were treated at Kapuna Health Centre or in the village by a traditional healer. Women reported the main reason for their and their children's poor health was due to the consumption of sago, which they believed was made with dirty water from the river, causing them to become ill.

Women spoke openly about STDs, domestic violence and sexual assaults and gave an example of a recent rape attempt by another member of the village. At the same time, they agreed that many still needed to understand how STDS were contracted and treated.

Women reported that they all had access to and used some sort of family planning and were aware of different contraceptive methods. The decision to use contraceptives was mainly shared, but if husbands didn't support their decisions to use contraception, many women used them anyway.

3.5.10 Education

Elementary and primary schools existed in Ara'ava. The main secondary school was located at Kikori. Parents were required to pay K50 per child per year for project fees.

Ara'ava Elementary School had a total of 83 students (48 males and 35 females) across Prep, Grade 1 and Grade 2. It had three teachers and one vacant teaching position. The school was significantly run down and in need of repair. Most of the teachers' houses and classrooms were built by the community, demonstrating community cohesion as a key factor in why the school had managed without any form of support from the government or any other external agencies.

Ava'ara Primary School had 160 students (84 males and 76 females) and four teachers (with an additional four vacant teaching positions). Teacher housing and school facilities were considered in poor condition. They claimed to not have received any form of support from any agency since 1997 when AusAid built a classroom (which is now run down).

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3.5.11 Law and Order

Men described fighting, stealing and domestic violence as the main law and order issues. Serious cases were referred to the village court for compensation and restoration. They also noted alcohol abuse as an issue.

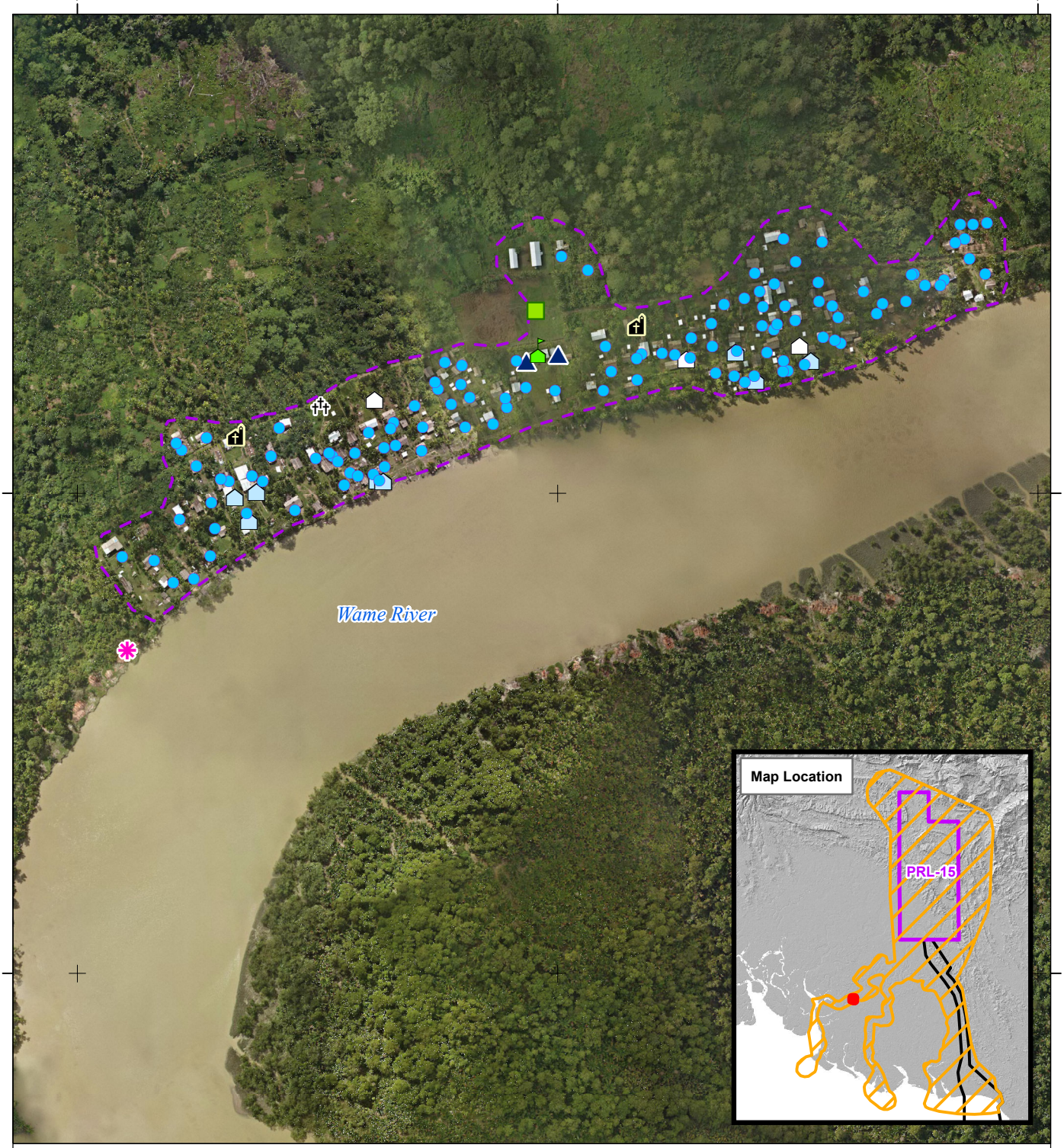
Women reported alcohol abuse, the use of marijuana and domestic violence as the main law and order issues. Cases were reported to the village leaders and serious cases to the Baimuru Police Station. Some men were reported to pay money for sex and this was confirmed by the women.

Youth noted theft from gardens as a main law and order issue, followed by fighting and alcohol abuse.

3.5.12 Cultural Heritage

A spirit tree (*Lavi*) and a spirit stone (*Mae*) were recorded at the village. In addition, an ancestral village (*Vaii Veruku*) occupied immediately before people settled at Ara'ava was recorded on the opposite riverbank. According to key informants most of the community's tangible cultural heritage was destroyed during the early part of the twentieth century and for that reason people highly valued knowledge encapsulated in intangible heritage (song, dance, stories). Intangible cultural heritage values were taught mainly in the home but some aspects were also taught at the local schools.

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SCALE: 1:6,000 @ A4

0 60 120 180 240 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary and Primary School
- Burial sites/cemetery
- Church
- Community hall
- Operating trade store
- Sago processing
- Sporting field
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Ara'ava Village Layout

FIGURE: 3.5

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77444 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total.
Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.5 – Ara'ava Gallery



Photo 1 – Family preparing garden foods



Photo 2 – Canoes and an over-water toilet



Photo 3 – Community members displaying recently-caught flying fox



Photo 4 – Ara'ava Primary School Grade 7 and 8 classroom



Photo 5 – Traditional fish trap used at Ara'ava



Photo 6 – School sports field

3.6 Arehava 2

3.6.1 Summary

Table 3.6 summarizes key social data for Arehava 2. An abbreviated version of the community survey was conducted at Arehava 2 and therefore no data is available on the topics of women, youths, subsistence, sanitation and cultural heritage.

Table 3.6 – Arehava 2 Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located inland of Orokolo Bay (Muro area) to the east of the Purari River, located approximately 51 km southeast of Herd Base	
	Coordinates	145° 17' 16.99" E	-7° 49' 0.843" S
	Physical setting	Set amidst lowland forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	4 (Arehava 2)	
Population and demography	**Population**	96	
	Gender ratio (M:F)	118 (52:44)	
	Ethnic group	Orokolo	
	Affiliations	Muro communities, Paevera and Orokolo coastal communities	
	Households	13	
	Household size	7.4	
	Language	Orokolo	
	Other languages	Motu and Tok Pisin	
Settlement	**Year established**	Unknown	
	Name meaning	N/a	
	Land ownership	N/a	
Subsistence and land use	**Subsistence base**	Garden food and sago	
	Resources	Lowland forest	
Commercial activities	**Businesses**	None. The main cash crop was betel nut sold from Port Moresby to Daru. People received royalties from Rimbunan Hijau (RH) Logging in 2012. There was uncertainty about ongoing payment of logging premiums	

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Table 3.6 – Arehava 2 Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	100% traditional
	Floor type	100% raised
	Housing materials	Traditional bush materials – sago leaf walls and nipa palm roofs
	Cooking	Inside using firewood
	Lighting	Limited solar
Health	**Facilities**	None
	Nearest facilities used	Muro Station aid post, approximately 3 km to the northwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	N/a
Education	**Facilities**	None
	Attendance	N/a
	Nearest facilities used	Paevera (1 x elementary school) approximately 3.5 km to the southeast
Religion	**Churches**	N/a
Water and sanitation	**Drinking Water**	Most families relied on shallow wells or catchment of water from houses using small drums, pots or other containers. Water was not boiled before drinking
	Toilet facilities	N/a
	Waste disposal	N/a
Law and order	**Prevalent issues**	Alcohol and marijuana abuse, and a general lack of discipline
	Resolution mechanisms	Law and order was reported as generally out of control and requiring external assistance
Cultural heritage	**Tangible cultural heritage sites**	N/a
	Intangible cultural heritage	N/a

Note: Due to time constraints, only an abbreviated version of community level surveying was conducted at Arehava 2.

3.6.2 Settlement History

The village had apparently been in its current location for many generations. However, many people left the village and settled in Port Moresby or other towns in the 1970s. It was estimated that the number of people that migrated was between 10 and 20 (plus their families). Some still visited when they could.

3.6.3 Social Organization

The councillor and village magistrates were located in Paevara but the Peace Officer was located in Arehava 2. The village had a catholic church. People in the village no longer practiced community work on a given day.

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3.6.4 Land and Natural Resource Use

The main cash crop was betel nut, which was sold anywhere from Port Moresby to Daru. Villagers also grew garden foods and made sago, which they sold in Kerema, Port Moresby or the Popo and Orokolo coast villages. People from the village received royalties from Rimbunan Hijau (RH) Logging operations in 2012. There was some uncertainty over payment of logging premiums.

Most families relied on shallow wells or catchment of water from houses using small drums, pots or other containers. Water was not boiled before drinking.

3.6.5 Health

The main health problems were identified as tuberculosis, leprosy, malaria and diarrhoea. Deaths from tuberculosis were, said to be, often linked to sorcery. Most women gave birth in houses in the village under the supervision of a traditional birth attendant. Medical attention was generally sought from Muro Aid Post or Orokolo Sub Health Centre. Rotary Against Malaria had distributed mosquito nets in the village. There were apparently no health patrols to the village.

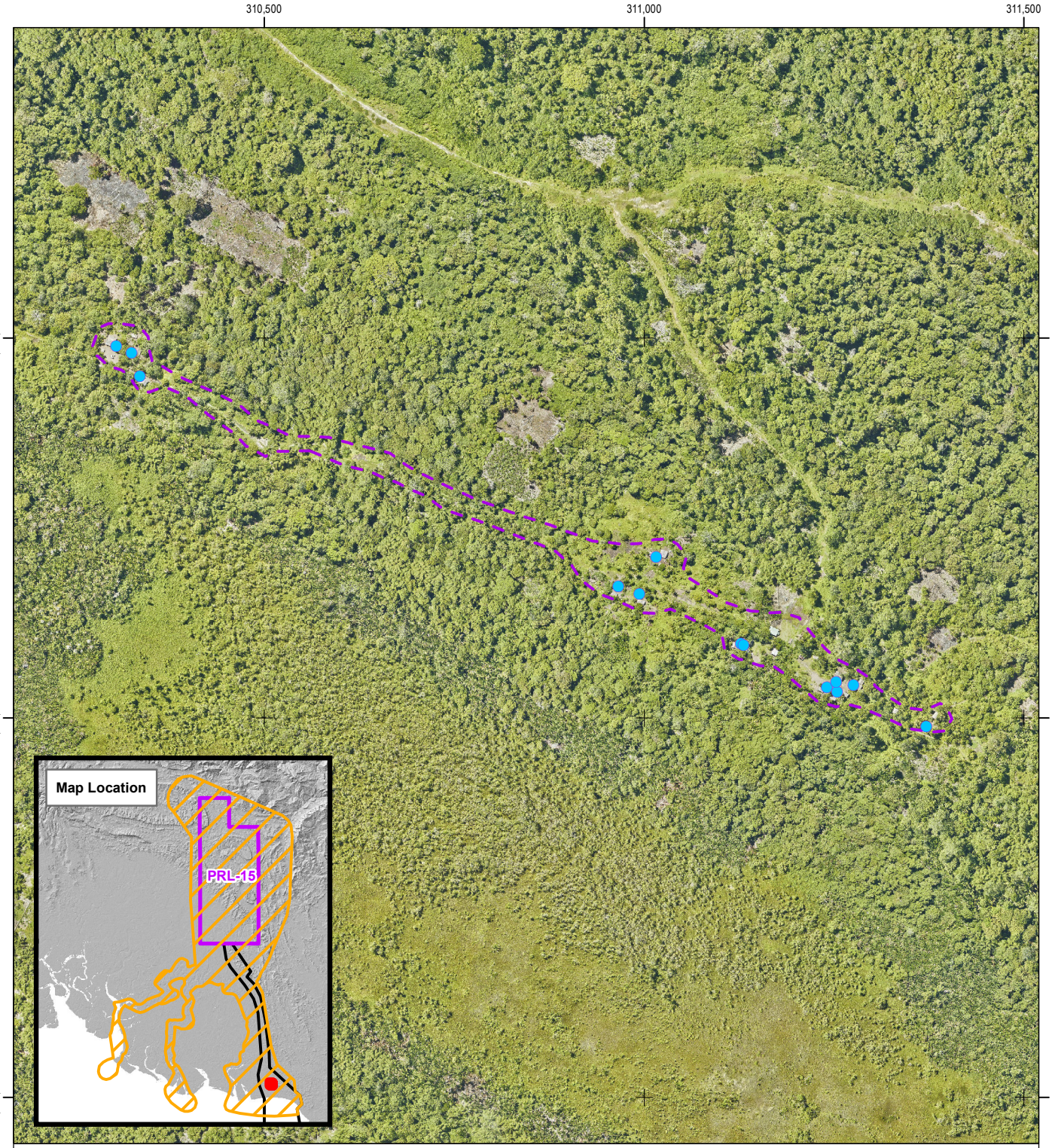
3.6.6 Education

An elementary school existed in Arehava 2 but hadn't been staffed for the last three years. Additional work had been undertaken by the community and the facility was reported to be imminently due to be inspected. If adequate, a teacher would be assigned to the school. Children who attended school did so in Paevera, at Muro Station or at the coast.

3.6.7 Law and Order

Village leaders indicated that law and order problems stemmed from drug and alcohol abuse, and a general lack of discipline in the village. While some small problems were resolved by the community, external assistance was sought to resolve the law and order problems that were thought to be out of the community's control.

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SCALE: 1:7,500 @ A4

0 75 150 225 300 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Arehava 2 Village Layout

FIGURE: 3.6

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77466 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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3.7 Aumu

3.7.1 Summary

Table 3.7 summarizes key social data for Aumu.

Table 3.7 – Aumu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Eastern bank of the Purari River, at Maea Purari Channel, located approximately 46 km downstream of Herd Base	
	Coordinates	145° 10' 35.90" E	-7° 46' 24.01" S
	Physical setting	Located on the eastern bank of the Purari River. Surrounded by mangroves, sago swamps, nipa palm swamps and alluvial forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	19 (Aumu)	
Population and demography	**Population**	244	
	Gender ratio (M:F)	85 (112:132)	
	Ethnic group	Iare	
	Affiliations	Maipenairu, Kapai, Old Iare, Mapaio, Aivai and Kaevaria	
	Households	31	
	Household size	7.9	
	Language	Iare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1922	
	Name meaning	Refers to the present location of the same name	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food. Some garden food such as cooking banana, cassava, and taro. Extensive hunting for wild pigs, cassowary, cuscus, bandicoots, monitor lizards and extensive fishing (main species catfish)	
	Resources	Mangroves, sago swamps, nipa palm swamps and alluvial forest	
Commercial activities	**Businesses**	One main store and one fuel seller	

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Table 3.7 – Aumu Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	100% traditional
	Floor type	100% raised
	Housing materials	Hardwood posts, sago leaf or grass roof, split timber or woven panel walls, split black palm floor
	Cooking	Both inside and outside using firewood
	Lighting	Kerosene lamp, battery operated torch, diesel (wick) lamp, solar and generator (petrol)
Health	**Facilities**	None
	Nearest facilities used	Community health worker at Apiope, approximately 8km to the south on the Aievi Passage
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	17 to 20
Education	**Facilities**	None
	Attendance	0
	Nearest facilities used	Maipenairu (1 x elementary, 1 x primary) approximately 12 km west-southwest, Muro Primary School approximately 10 km east-southeast and Ihu High School approximately 29 km southeast
Religion	**Churches**	United Church, Seventh Day Adventist, Catholic, Bahai, Christian Mission Fellowship
Water and sanitation	**Drinking Water**	Mostly sourced from the Purari River or from homemade tanks made from metal drums
	Toilet facilities	Bush, long drop toilets
	Waste disposal	All domestic rubbish (tin cans/batteries, paper/plastics, food scraps) was disposed in the river
Law and order	**Prevalent issues**	Domestic violence, land disputes, fighting and sorcery
	Resolution mechanisms	Village court, peace officers, mediation. If the judicial system was seen to result in a dissatisfactory outcome, some people reportedly resorted to the use of sorcery to resolve matters.
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Related to sago production, hunting, fishing and traditional medicine

3.7.2 Settlement History

Old Iare was the original place of the Iare tribe. Tribal warfare and disputes over land boundaries with other tribes and/or traditional enemies forced the people to disperse and resettle downstream in a place called Aea. But their fathers saw that it was very far from the main tributaries so they finally resettled in the present location. Government and mission services were later established nearby, making it a place where Aumu people remained.

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3.7.3 Social Organization

Aumu was represented by a ward councillor and village court magistrate but did not have a land mediator in the village. Traditional leadership was present in the form of chiefs. Each clan had a chief. Succession was strictly patrilineal, passed from father to son. Five religious denominations were active in the village.

3.7.4 Land Ownership

Land tenure was strictly patrilineal; ownership was passed from father to son. In the absence of a male heir, male family members of the clan could become custodians until a male heir from the blood line was reproduced to assume ownership. Female members of a clan were expected to marry outside of the clan so that they would produce the male heirs of their husbands, and vice versa. It was forbidden to marry within the clan as it was believed that such would create serious issues of ownership and inheritance of rights. Use of other clan lands was subject to the owner's permission. A nephew was only given user rights to grow food crops but he could not be granted land ownership.

3.7.5 Women

Women were responsible for executing most of the daily chores, including making sago, tending gardens, collecting seafood, collecting water and firewood and caring for children. Most women earned an income via sales of fish, shells, and sago at Muro Station, Orokolo coast villages, Baimuru, and Evara. Women often travelled to markets in groups accompanied by their husbands. Income from sales was often saved for school costs.

Although women reported feeling secure, they said they were afraid of sorcery associated with 'komara' (crocodile). As a result, women would often travel in pairs to the river.

Marrying age was generally between 17 and 20 years.

In the past year, all babies were born in the village, with the assistance of a trained birth attendant and/or a traditional birth attendant. There were two deaths, both of which were believed to have been caused by sorcery.

3.7.6 Youths

Youths had a group called Ivia, with an estimated membership of more than 100 (and more males than females). Typical age ranged from 15 to 36[11]. A membership fee of K10 applied. Apart from sports and church activities where the males and females worked together, there were other activities specifically allocated to males or females, including making canoes and paddles, and building houses for the males; and sewing the nipa leaves and cutting sago for the females.

For recreation, youths liked to play sport, relax, spent time with friends and make crafts such as nets, baskets, paddles and canoes.

3.7.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted along the small creeks that flowed into the Purari River (Maea Purari Channel) on the

[11] Older members of the youth group are often mentors or have helped establish the group.

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north bank. Wild sago was not harvested because of its high water content and because of the belief that if the wild ones were cut down, the decaying stems would reduce the quality of the planted sago. Nipa palm nuts were also harvested for food from stands of nipa palms that were at their upstream distribution limit near Aumu.

Garden food was grown in gardens along the smaller creeks and occasionally along the Purari River, but theft of garden food was common along the banks of the Purari. Small areas of garden food were also grown within the village but had to be extensively mulched to produce good crops. Gardens in the village and along the riverbanks were frequently subject to flooding and only a few garden plants thrived. The main garden foods planted were cooking bananas, cassava, taro, pitpit, and the greens aibika and aupa. In the dry season additional plants were planted including corn and pumpkin. Village food trees included coconuts, bread fruit (kapiak), laulau, lemons and okari nut.

Women reported that at high tide the river and creek water from which they depended on for drinking and cooking became salty therefore water was not fetched during high tides. During flooding periods, sago was the only food available for eating and therefore trade for other foods would occur with neighbouring villages of Kapai, Apiope and Maipenairu.

Extensive hunting was reported to occur in forests for wild pigs, cassowary (hunted upstream near Aivai), cuscus, bandicoots, wildfowl (eggs also collected), goura pigeon, bandicoots, python, monitor lizards and flying fox. Insect larvae were eaten including sago grubs and grubs that lived in dead mangrove trees. Mushrooms were harvested that grew on the processed sago and on dead wood. Children ate grasshoppers and it was believed that a child would not be able to learn to swim until grasshoppers had been eaten.

Extensive fishing was reported to occur along the Maea Purari Channel or if flooded along the Ainama and Karuma Rivers. A common fishing area existed about 45 minutes by paddle canoe towards the coast, accessed by both the Aumu and Apiope people. Catfish was the main species caught but also salmon, barramundi, black bass, mullet, eels, prawns and occasionally sharks during a king tide. Nets were used at low tide and fishing lines at high tide. Other aquatic resources included prawns and shellfish. One species was harvested from the mangroves and another from the rivers. Two species of turtle were also caught for their meat and their eggs were collected. These included a marine turtle and freshwater turtles. Saltwater and freshwater crocodiles were also hunted.

3.7.8 Land and Natural Resource Use

Land resources included mangroves, sago swamps, nipa palm swamps and alluvial forest. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants.

Land resources, particularly the low-lying village areas, were frequently affected by flooding from high tides and heavy rain events, resulting in extensive waterlogging and a high water table. Consequently, the village was traversed on a network of logs that connected most of the main buildings like a footpath.

Sago was the main material used for house walls and nipa palm was used for roofs. Kwila was the preferred tree species for house posts but muria and varakai (tok ples names) were also

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used. Kwila was also sold to coastal villages at about K50 per post. These species occurred in the sago swamps. House bearers were also made from muria and varakai. Cane was used to hold the nipa thatch in place. A black palm known as karara was split for flooring. A distinctive feature of the village was the extensive boardwalk comprising logs and small bridges. These were made from logs that had been pulled from the river and occasionally cut from the surrounding forest. Dugout canoes were made from a wild okari tree, ururu and erema. Paddles were made from kwila because of its strength.

Drinking water was mostly sourced from the Purari River or from homemade tanks made from metal drums. There was one community water tank.

There was no land-based access to the village. The Purari River was the primary transport route to visit riverside gardens, the nipa palm swamps and to harvest planted sago. The Purari River was also used to paddle the majority of the way to Ihu where they would walk the remaining distance to access a school, Kapuna to treat serious medical conditions, Evara logging camp to sell dried fish and to visit Baimuru Station, which took about 18 hours paddling. There was also a short cut from Aumu along a small creek that flowed to the south to the Ainama River. This route was used to access Muro Station to sell produce.

3.7.9 Health

An aid post was located at Aumu, constructed as an election promise prior to the 2012 elections, but it was never registered, nor a community health worker or supplies provided, so it had never operated. The previous aid post (which was registered and functioning) closed in 2007. Medical care was sought from the aid post at Apiope or Maipenairu, or for more serious cases, Kapuna Health Centre or Orokolo Sub Health Centre.

Malaria was reported as the most common illness. Often villagers resorted to using traditional herbs (‘ura’, lemon grass) to treat malaria, or they would travel to Apiope, Maipenairu or Kapuna Health Centre.

Women attributed their heavy workload to issues of poor health amongst them in the village, and for their children, it was drinking the (“dirty”) river water and poor diet.

Women had no knowledge of what STDs were, prevalence, transmission or treatment. STD knowledge amongst youth was also very poor and they were hesitant to talk about it.

Most to all women knew about family planning, understood about different methods, had access to contraceptives and reportedly used them. Decisions to use contraceptives were made jointly between husbands and wives.

3.7.10 Education

No elementary or primary schools were functioning. Elementary facilities and a teacher were present in the village but the teacher had reportedly not received any pay since 2012 and been instructed by the Director of Education in 2014 to cease classes. Classes ceased in the second half of 2014, meaning that the majority of elementary aged students no longer attended school. Older students travelled to Mapaio, Baimuru, Maipenairu, Orokolo, Muro Station and Ihu.

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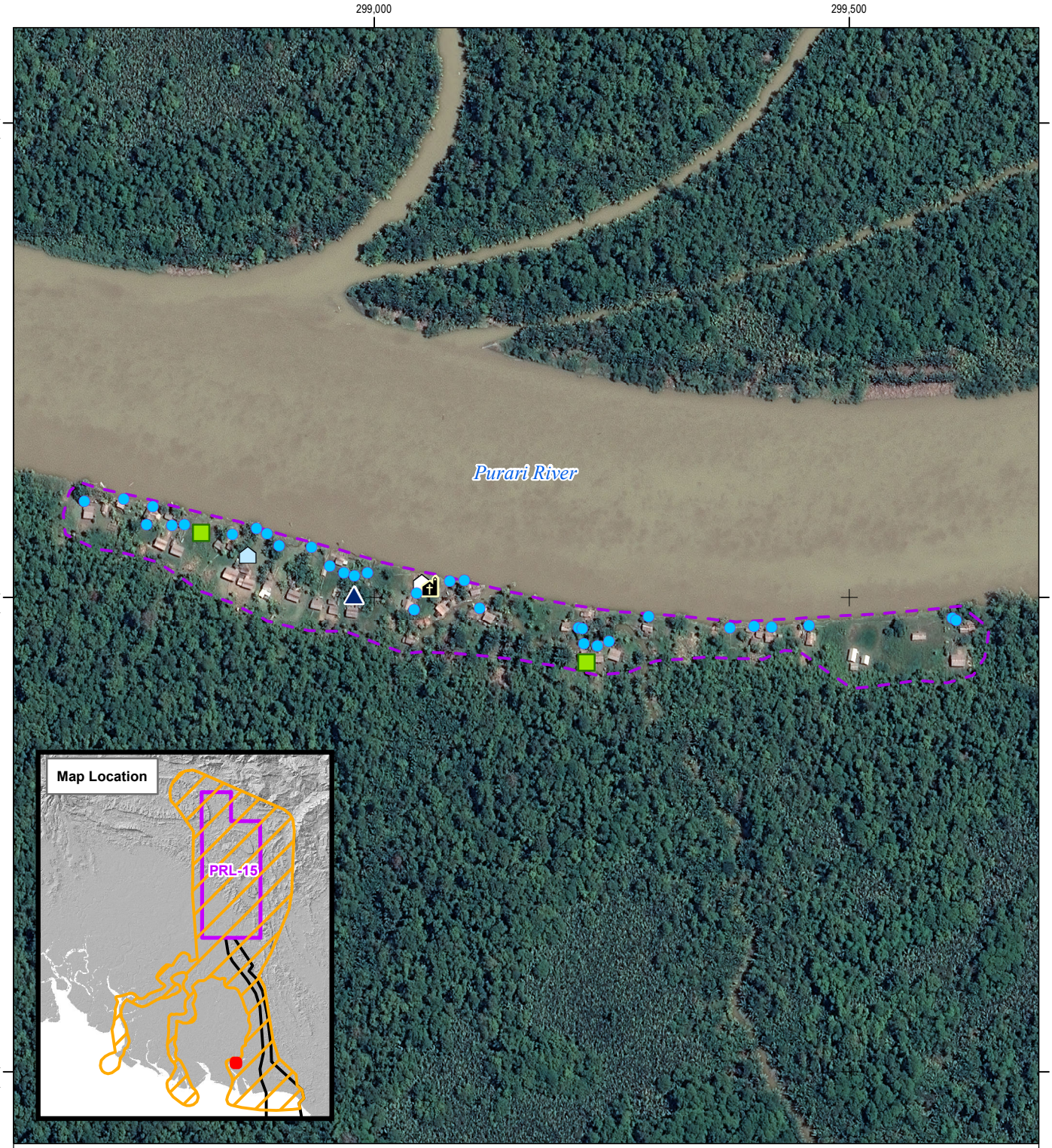
3.7.11 Law and Order

Men described the only law and order issue as domestic violence in which peace officers mediated where necessary. Women reported the most common problem as disputes over land, which often led to fights, and the use of sorcery. Often land disputes were referred to the village court and solved. Disputing parties would kill pigs and chickens and prepare a meal that was shared and peace was made. If either party remained disgruntled they were believed to resort to sorcery to obtain their view of justice. Youths identified the only law and order issue as fighting in relation to boy-girl relationship problems, especially when a boy ran away with a girl. Youths said cases of domestic violence, alcohol abuse, sexual assault, marijuana consumption and land disputes rarely occurred in their village which they attributed to the efficacy of their peace officer. Gambling was banned in the village.

3.7.12 Cultural Heritage

Aumu was an abbreviation of Aumu Iavi Kivau, elders also knew Aumu as 'Iare' as distinct from 'Old Iare', which was on the other side of the river upstream from Aumu. Old Iare was visited by anthropologist F.E. Williams in 1922 and his stunning photographic record of traditional life can be viewed on the Australian National Archive website. Iare was also visited by Tom Kabu under whose influence most tangible cultural heritage values were destroyed. Cultural heritage values were very important to the Aumu community however, there was a general concern that the declining use of Iare language was eroding the transmission of cultural knowledge between generations. The community maintained intangible cultural heritage values related to sago production, hunting, fishing and traditional medicine.

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SCALE: 1:6,000 @ A4

0 60 120 180 240 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Church
- Community hall
- Operating trade store
- Sporting field
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Aumu Village Layout

FIGURE: 3.7

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77445 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.7 – Aumu Gallery



Photo 1 – Disused aid post



Photo 2 – Children eating okari nuts



Photo 3 – Aumu is connected during high tide via a network of logs and boardwalks (1)



Photo 4 – Aumu is connected during high tide via a network of logs and boardwalks (2)



Photo 5 – Boys with bows and arrows



Photo 6 – Village elder using a Pii shell to call community members to a meeting

3.8 Avavu

3.8.1 Summary

Table 3.8 summarizes key social data for Avavu.

Table 3.8 – Avavu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Inland of Orokolo Bay (Muro area) on the Mura River, located approximately 48 km south-southeast of Herd Base	
	Coordinates	145° 15' 48.11" E	-7° 47' 19.71" S
	Physical setting	Set amidst lowland forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	1 (Avavu)	
Population and demography	**Population**	283	
	Gender ratio (M:F)	105 (145:138)	
	Ethnic group	Orokolo	
	Affiliations	Muro and Orokolo coastal communities	
	Households	42	
	Household size	6.7	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	The name is a symbolic reference to debris that swirls in a whirlpool after a flood	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago and coconuts were main staple foods. Some garden food such as cooking banana, cassava, kaukau and taro. Extensive hunting for wallaby, wild pigs, cuscus, cassowary and others. Extensive fishing (main species catfish inland and stingray coastal)	
	Resources	Sago swamps, nipa palm swamps alluvial forest and hill forests	
Commercial activities	**Businesses**	3 x fuel sellers	

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Table 3.8 – Avavu (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	82% traditional 18% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm floor and occasionally betel nut palm floors, kwila, rosewood and moiahae posts, sago leaf and sometimes nipa palm for roof and walls
	Cooking	Inside using firewood
	Lighting	Solar, battery, diesel (wick) lamp, generator
Health	**Facilities**	None
	Nearest facilities used	Muro Aid Post, approximately 1 km to the south-southwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	16-25 years
Education	**Facilities**	1 x elementary school, 1 x primary school (Muro Primary School)
	Attendance	29 students attending elementary school, 174 students attending primary school
	Nearest facilities used	Ihu High School, approximately 20 km to the southeast
Religion	**Churches**	Christian Mission Fellowship, Reform Church, Assemblies of God, Catholic
Water and sanitation	**Drinking Water**	Several small wells or from the Kilavi/Muro River
	Toilet facilities	Bush, private pit
	Waste disposal	Tin cans/battery were disposed into bush or river, paper/ plastics were disposed in the river or burnt, and food scraps where fed to livestock
Law and order	**Prevalent issues**	Stealing, fighting, domestic violence and land disputes, often as a result of marijuana abuse or gambling
	Resolution mechanisms	Village magistrates, a peace officer, a village court clerk and other village leaders
Cultural heritage	**Tangible cultural heritage sites**	Heve and Popo ancestral village sites
	Intangible cultural heritage	Song and dance. Most have abandoned because of church practices

3.8.2 Settlement History

Generally regarded as part of the Orokolo-speaking region in Ihu district, Avavu subjectively saw themselves as inland Popo following the migration history of their ancestors who migrated from the upper Purari. This distinction was needed in order to distinguish them from their kin who migrated southward to settle on the coast.

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3.8.3 Social Organization

There was a ward councillor and village court magistrate, as well as clan leaders of five clans who assisted to maintain social organization. Similar to Ere-Kilavi, the customary practice of showing respect for an uncle, often the mother's brother, was still recognised as important thus maintained within the village. The village had active church leaders and four religious denominations were active in the village.

3.8.4 Land Ownership

Land ownership was strictly patrilineal and was transferred from father to son from generation to generation. Women could be given user rights but not ownership rights. Under Orokolo system of land ownership, women who marry outside of the clan and tribe were expected to reproduce children who would inherit their father's land. Thus children may not go back to their mother's land to claim ownership although they may be given user rights to cultivate garden crops only. They were not allowed to plant permanent fruit bearing trees such as coconuts, breadfruit or sago. In extreme cases where a man was not able to have sons of his own, he may be compelled to adopt a male member of his clan or tribe as his own son in order to continue his land ownership rights.

3.8.5 Women

Sago making and gardening were regarded as the most important roles performed by women. If a man paid his wife's bride price, then she was allowed by her brothers to make gardens and collect sago on the father's and brother's land.

The most common problems within the village included land disputes, fighting, sexual assault, sorcery accusations and domestic violence. Domestic violence cases were rarely reported to the village court due to fear of retribution from offenders.

Despite this, women generally felt safe and secure within their villages however were fearful when travelling in the bush due to sorcery beliefs and the fear of snakes. Their overall sense of security had remained stable over the years.

Marrying age was between 16 and 25. The village had a traditional birth attendant and the majority of women delivered their babies in the village.

3.8.6 Youths

The youth group consisted of more than 100 members ranging from 15 to 32 years of age. The major role for the youth group was to do community work both free and paid, such as gardening and service work at the aid post and school. Outside of the group, youths' major roles were attending school, caring for family, making and tending gardens, raising livestock, fishing, and collecting water and firewood. For recreation, youths mainly participated in sporting activities, relaxing, socialising, and craft such as making canoes, baskets, nets and gardening.

3.8.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had been extensively planted in small drainage depressions and along the banks of creeks. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought. Rice was trialled but the threshing machine was inoperative so it had not been grown widely.

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Garden food was widely grown in large gardens, particularly in logging clearings and in small patches within the village. A very wide range of garden foods was grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Several food trees were grown including coconuts, guava, bread fruit (kapiak), laulau and okari nut.

Extensive hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), goura pigeon, bandicoots, python, monitor lizards, frogs and flying fox. Insect larvae are also eaten including sago grubs and grubs that lived in dead trees. There were few animal species that were not eaten apart from birds of paradise. Mushrooms were also harvested that grow on the processed sago waste and on dead wood.

Extensive fishing occurred along the Purari channels, the Aievi and Alele passages, and at the fishing camp close to the coast near Apiope where saltwater species were common. A range of catfish species were the main species caught but also tilapia (in the swamps), super tilapia, barramundi, black bass, mullet, microfish, mudfish, eels, prawns, sharks and sawfish. Fishing was not extensive on the Muro River as fish catches were considered low. Important saltwater fish included stingrays, red emperor, salmon, hammerhead and shovel head sharks, but stingrays were the most common species (the skin of stingrays was also used as sandpaper). Other aquatic resources included crabs and shellfish. Two species of turtle (marine and freshwater) were also caught but their eggs were not collected since there were no sand banks for laying eggs. Crocodiles were rarely hunted for meat and crocodile skins were rarely sold.

3.8.8 Land and Natural Resource Use

Land resources included sago swamps, nipa palm swamps alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Some of these resources, particularly hill forest and alluvial forest had been logged, resulting in substantial forest degradation, particularly the development of weed corridors, and less abundant fauna for hunting.

Sago was the main material used for house walls and for roof thatch, but nipa palm was also used. Kwila from the swamps was the preferred tree species for house posts, which was mainly sourced from Aievi Passage and associated creeks downstream, but rosewood and a species known as moiahae from the hill forests were also used. The same species were also used for house bearers. For rafters and joists, avare (a swamp/river bank species) and mahumahu (a lowland species) were used. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Some haeo palms were grown in the village but most occurred in the forest. Strips of bark from a tree (moroko) were widely used for tying thatch and a range of cane ropes were used instead of nails.

Forest resources were used for many everyday items and some cultural items including grass skirts, small billums and baskets made from new sago shoots, mats made from Pandanus leaves, and brooms made from the inflorescence of black palms or the rachis of sago palm leaflets.

Drinking water was mostly sourced from several small wells or from the Kilavi/Muro River.

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The village was connected to several other villages by walking tracks including Ere-Kilavi, Avavu, Muro Station, Arehava 2, Paevera, Huruta and Hepere. In the 1970s it was possible to drive to Kerema but the road was not maintained once Muro Station closed. Dugout canoes were used to paddle to the coastal fishing camps from Muro Station. Betel nut and mustard, which were very important cash crops were the main source of income. These were mainly sold at Kamusi logging camp in Western Province or at Evara logging camp. Motorised dinghies were used to travel to Kerema for onward transport to Port Moresby and to Kapuna for medical treatment.

3.8.9 Health

Males identified the main health problems as tuberculosis, malaria, childbirth, snake bite and head/body pains. According to the women the most common illnesses in the village included diarrhoea, respiratory infections, tuberculosis, backaches and headaches. The women attributed most illnesses to their workload especially sago making and carrying of the finished product. Often the aid post at Muro Station ran out of medical supplies thus villagers resorted to using traditional methods of healing. Despite the close proximity of the aid post, most women delivered babies in the village with assistance of traditional birth assistants.

3.8.10 Education

There was one elementary school with one teacher in Avavu. Children attended the primary school located at Muro Station. A secondary school was located in Ihu, four hrs walk away. Twenty-nine students (15 males and 14 females) attended the elementary school at Avavu. One hundred and seventy four students (96 males and 78 females) attended Muro Primary School from the Muro communities. The main issue affecting education was frequent unsafe weather conditions, which affected travel to and from the school.

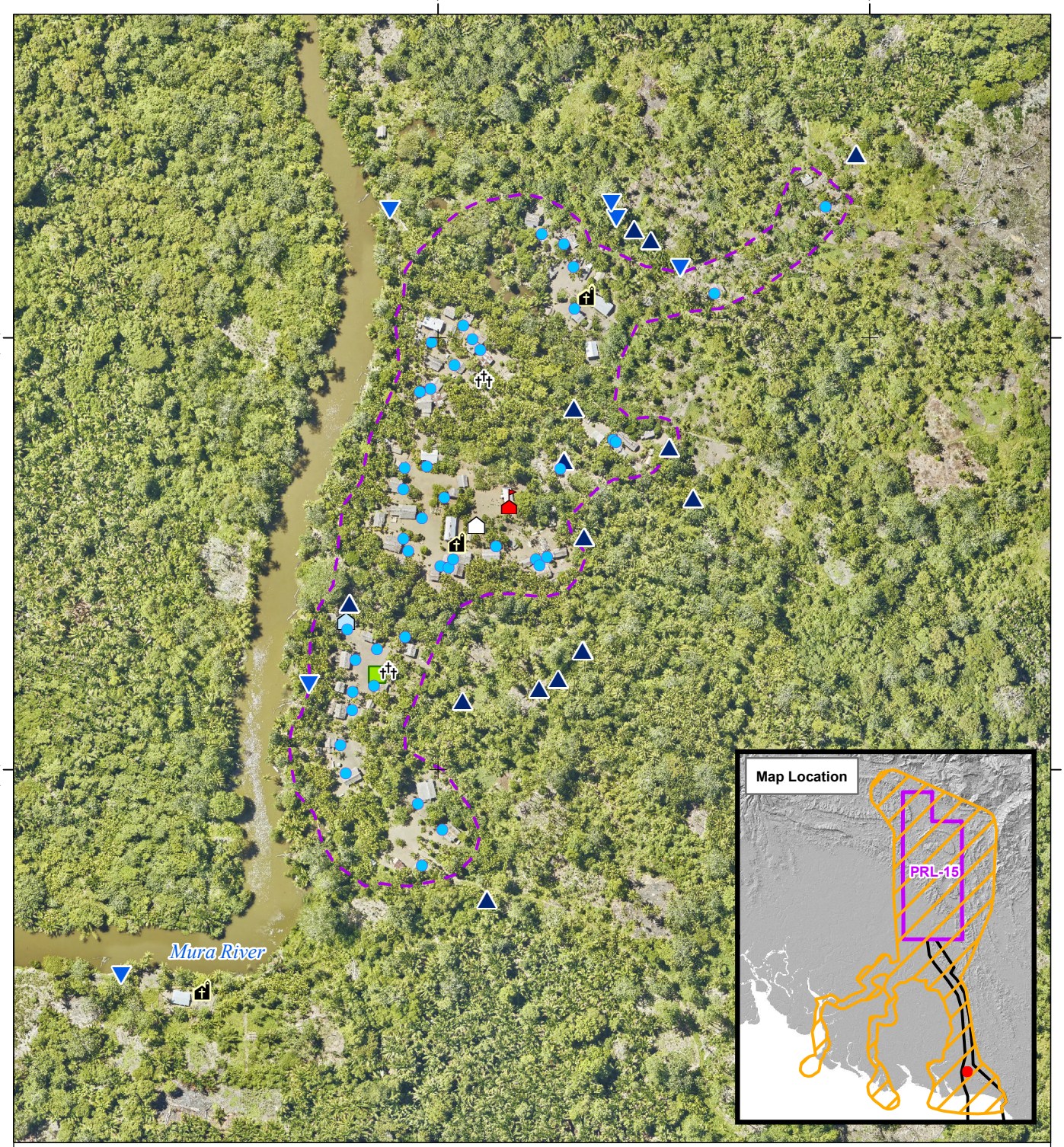
3.8.11 Law and Order

The village faced a range of law and order problems including stealing, fighting, domestic violence and land disputes, often as a result of marijuana abuse or gambling. Minor crimes were dealt with by village leaders such as a magistrate, peace officer or village court clerk. Sorcery was also a concern, particularly when there was an unexpected death.

3.8.12 Cultural Heritage

Avavu people identified with an ancestral village called Popo that was an ancestral village for all Orokolo speaking clans. One of the key spiritual and ancestral sites in the area was Heve Hill, which was an active spiritual and sacred site that was regularly the scene of supernatural occurrences. Oral traditions recalled an ancestral migration sequence that included Heve Hill and Popo. Archaeological materials were found on clan lands and such finds were considered to be important. Women only sites were present, and traditional knowledge about these sites was passed from mother to daughter. The community kept valued ancestral heirlooms. Intangible cultural heritage values were expressed in song and dance performed by men and women. Forms of traditional dress were used on community occasions. Knowledge about making tools and materials needed for hunting, fishing and sago processing were maintained. In addition, rituals used when hunting and fishing as well as for processing sago were also maintained. All 15 categories of intangible cultural heritage values that were discussed were important to the community.

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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Community hall
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Avavu Village Layout

FIGURE: 3.8

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77446 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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T:\Projects\ER\002 Elk Antelope LNG Project EIS-ESHIA\Work Requests\R_082 - SBS Mapping\DPAO\ER\002-R_082-77446-Avavu_RevD.mxd

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Plates 3.8 – Avavu Gallery



Photo 1 – Making house roof thatch from nipa palm



Photo 2 – Cooking bananas in the foreground and a family prepares a meal in the background



Photo 3 – Sago making tools, fishing net and canoe oars



Photo 4 – Close up of sage making tools and fishing net



Photo 5 – Pricelist for the sale of zoom petrol



Photo 6 – A large catfish caught nearby

3.9 Ere-Kilavi

3.9.1 Summary

Table 3.9 summarizes key social data for Ere-Kilavi.

Table 3.9 – Ere-Kilavi Summary

Thematic Area	Indicator	Description	
Location	**Description**	Inland of Orokolo Bay (Muro area) on the Mura River, located approximately 48 km southeast of Herd Base	
	Coordinates	145° 16' 39.01" E	-7° 46' 14.87" S
	Physical setting	Set amidst lowland forest. Ere and Kilavi differentiate themselves but function and consider themselves as one community	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	1 (Avavu)	
Population and demography	**Population**	396 (Ere 175; Kilavi 221)	
	Gender ratio (M:F)	114 (211:185); Ere 111 (92:83); Kilavi 117 (119:102)	
	Ethnic group	Orokolo	
	Affiliations	Muro and Orokolo coastal communities	
	Households	75; Ere (35), Kilavi (40)	
	Household size	5.3; Ere (5.0), Kilavi (5.5)	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Ere and Kilavi referred to themselves as inland Muro: the bush people/those who preferred to hide themselves	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with coconut and some garden foods such as cooking banana, cassava, kaukau, and taro. Extensive hunting for wallaby, cassowary, wild pigs, cuscus and extensive fishing (main species catfish)	
	Resources	Sago swamps, nipa palm swamps, alluvial forest and hill forests	
Commercial activities	**Businesses**	Betel nut and mustard were very important cash crops and the main source of income	

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Table 3.9 – Ere-Kilavi Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	93% traditional 1% semi-improved 1% modern material 5% unknown
	Floor type	96% raised 4% unknown
	Housing materials	Split black palm and occasionally betel nut floors, kwila and rosewood posts, sago leaf roof and walls
	Cooking	Inside using firewood
	Lighting	Battery, solar and generator (petrol)
Health	**Facilities**	None
	Nearest facilities used	Muro Aid Post, approximately 1.5 km to the southwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15 to 20 years
Education	**Facilities**	1 x elementary school
	Attendance	69 students at elementary school
	Nearest facilities used	Muro Primary School, approximately 1.5km to the southwest Ihu High School, approximately 19 km to the southeast
Religion	**Churches**	Salvation Army, Catholic, Reform Church
Water and sanitation	**Drinking Water**	Water wells shared by two or more households
	Toilet facilities	Shared pit, bush
	Waste disposal	Tin cans/batteries were disposed by burying and dumping in the bush. Paper/plastics were burnt or buried and food scraps were fed to the dogs and chickens
Law and order	**Prevalent issues**	Land use disputes, domestic violence
	Resolution mechanisms	Village court, District court
Cultural heritage	**Tangible cultural heritage sites**	Ancestral villages called *Popo* Spirit sites called *Heve Hill and Kaevaharu*
	Intangible cultural heritage	Traditional song and dance, material culture for processing sago, tools for hunting and fishing and an array of associated ritual performances

3.9.2 Settlement History

Ere and Kilavi were part of the larger migration of people from upper Purari who paddled downstream or trekked through the forests to the legendary Popo area. From there they moved to their present locations.

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3.9.3 Social Organization

A ward councillor, village court magistrate, land mediator and police officer, cooperated with church and clan leaders to contribute to social organization. There were two main churches in Ere-Kilavi; the Salvation Army and the United Reform church. The latter consisted of several smaller denominations including the Catholic, United churches.

3.9.4 Land Ownership

Land ownership was strictly patrilineal and was transferred from father to son from generation to generation. Women could be given user but not ownership rights to land. Under Orokolo system of land ownership, women who married outside of the clan and tribe were expected to reproduce children to inherit their father's land. Thus children may not go back to their mother's land to claim ownership although they may be given user rights to cultivate garden crops. They were not allowed to plant permanent fruit bearing trees such as coconuts, breadfruit or sago. In extreme cases where a man was not able to have sons of his own, he may be compelled to adopt a male member of his clan or tribe as his own son in order to continue his land ownership rights.

3.9.5 Women

Sago making and gardening were regarded as the most important roles performed by women. Other roles included collecting water (men were not allowed to collect water), seafood and firewood, raising children and livestock and cooking and cleaning on a daily basis. Most women sold a variety of garden produce including banana, kaukau, corn, beans, pumpkin, cabbages, and other edible greens such as aibika and tulip. Markets were held at Kavava and Kaivukavu villages along the Orokolo coast on Mondays and Thursdays. There was marketing at Muro Station on Saturdays; women would often start walking at 4am to arrive between 6 to 7am at Kavava and Kaivukavu villages for marketing. They often earned up to K15 and spent it on essential household items.

Women generally felt safe and secure and this sense of security had remained stable over the years. The women felt secure because they believed the males within the community respected them. Despite this, women did report that domestic violence from their husbands and other family members was an issue.

Marrying age was between 15 and 20.

Most women delivered their babies at Muro Aid Post with a traditional birth attendant.

3.9.6 Youths

Typical activities participated in by youths included selling fish, seafood, food crops, sago, wild fruits and animals and betel nut. Some of the selling activities at the markets were for an income, which the youths used to contribute to the household.

For recreation, youths mainly participated in sporting activities, relaxing, socialising, partying (prior to bride price ceremony) and craft work such as making baskets, fishing nets, bow and arrows and spears.

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3.9.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted along small creeks, particularly along the banks of the Kilavi River and associated creeks. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought.

Garden food was grown along the banks of the rivers, in large logging clearings from 2014, up to 3-4 km walk away and further downstream along the Kilavi River. Small areas of garden food were also grown within the village. A very wide range of garden foods was grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika and kalava were the main greens grown in gardens. Several food trees were grown including coconuts, guava, bread fruit (kapiak), laulau and okari nut. Wild nipa palm nuts and new shoots were also harvested as a food resource.

Extensive hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), goura pigeon, bandicoots, python, monitor lizards, frogs and flying fox. Insect larvae were also eaten including sago grubs and grubs. There were few animal species that were not eaten apart from birds of paradise. Mushrooms, that grew on the processed sago and on dead wood, were also harvested.

Extensive fishing occurred along the Kilavi/Moro River, the Alele Passage and at the fishing camp along the Arere River close to the coast where saltwater species were common. Several catfish species were the main species caught but also tilapia, super tilapia, barramundi, black bass, mullet, microfish, mudfish, eels, prawns and sharks and sawfish that occasionally entered the Kilavi River when the water levels were low. Important saltwater fish included stingrays, red emperor, salmon, diamond sharks and hammerhead sharks, but stingrays were the most common species. Other aquatic resources included prawns, crabs and shellfish. One species was harvested from the swamps and another from the coast. Two species of turtle (marine and freshwater) were also caught for their meat and their eggs were also collected. Crocodiles were not normally hunted but were occasionally caught by fishing nets, as locals believed that sorcerers used crocodiles to attack enemies.

3.9.8 Land and Natural Resource Use

Land resources included sago swamps, nipa palm swamps, alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. The local alluvial and hill forest areas were extensively logged in 2014 as part of Vailala Forest Management Area (FMA_Block 3), resulting in extensive damage and localised loss of resources.

Sago was the main material used for house walls and for roof thatch, but nipa palm was also used. Kwila and rosewood were the most preferred tree species for house posts, and a species known as moiahae from the hill forests was also used. Kwila was sourced from swamps and riverbanks, mostly upstream of Kilavi River but rosewood and other species were soured from alluvial forest and hill forest. Other hardwood species were used for house bearers (e.g. kavea and okari nut timber), but for rafters and joists avare (a swamp species) hapuru, pairi and porotoi (river side species) were used. A species of black palm known as haeo and occasionally betel nut

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palms were split for flooring. Some haeo palms were grown in the village but most occurred in the forest. Strips of bark from a tree (moroko) were widely used for tying thatch and a range of cane ropes were used instead of nails. Pandanus leaves were used for weaving floor mats which was only collected from a swamp known as Koaepea which was about three hours' walk and was reportedly an old village site. There were three main species of tree used to make dugout canoes – erema, taun and walnut. The forests also contained Eaglewood, which was harvested for its high valued dark aromatic resin. This was sold to traders in Port Moresby but the trees were reportedly becoming hard to find in the forest.

The primary source of drinking water was from wells shared by two or more households within the village. Water was collected by women. When it was wet season the water wells became muddy hence households resorted to filling drums, buckets and containers with rainwater to use for cooking and drinking. In the dry season, water was collected from the Kilavi River when most of the wells would dry up. There were several water tanks in the village but none of them were installed at the time of the SBS survey (May 2016).

Ere-Kilavi was connected to several other villages by walking tracks including Avavu, Muro Mission, Hepere, Huruta, Arehava 2 and Paevara. In the 1980s it was possible to drive to Kerema but the road was not maintained once the mission station closed. An abandoned logging road led to the north but was overgrown. Dugout canoes were used to paddle to the coastal fishing camp and Evara logging camp to sell betel nut and mustard. Motorised dinghies were used to travel to Kerema for onward transport to Port Moresby and to Balimo (near Daru). These trips were mostly made to sell betel nut.

3.9.9 Health

There was no health centre in Ere-Kilavi, but the Muro Aid Post was only 30 minutes' walk away. Ere-Kilavi had a traditional healer. The women perceived that most health issues faced by them were the result of a heavy workload and children's' health issues where from poor diet and climatic reasons. Men identified the main health problems as tuberculosis, malaria and skin infections. Often the aid post at Muro ran out of medical supplies thus villagers would resort to using traditional herbs (such as lemon grass) to treat malaria. If the illness did not improve they would travel to either the Kapuna Health Centre or Orokolo Sub Health Centre.

Very few people understood the prevalence of STDs or how they were transmitted or treated.

Some women in Ere-Kilavi used some kind of family planning and everyone had an understanding of contraceptive methods and where to access contraceptives. The decision to use contraceptives was most often a shared decision of both men and women.

3.9.10 Education

There was one elementary school with two teachers and three classes (Prep, Grade 1 and Grade 2) consisting of a total of 69 students (35 boys and 34 girls). According to the teacher most students went to school. Those that didn't were generally needed for gardens/work.

Primary aged school children attended Muro Primary School, a 30-minute walk away. A total of 174 students (96 males and 78 females) attended Muro Primary School from the Muro communities.

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3.9.11 Law and Order

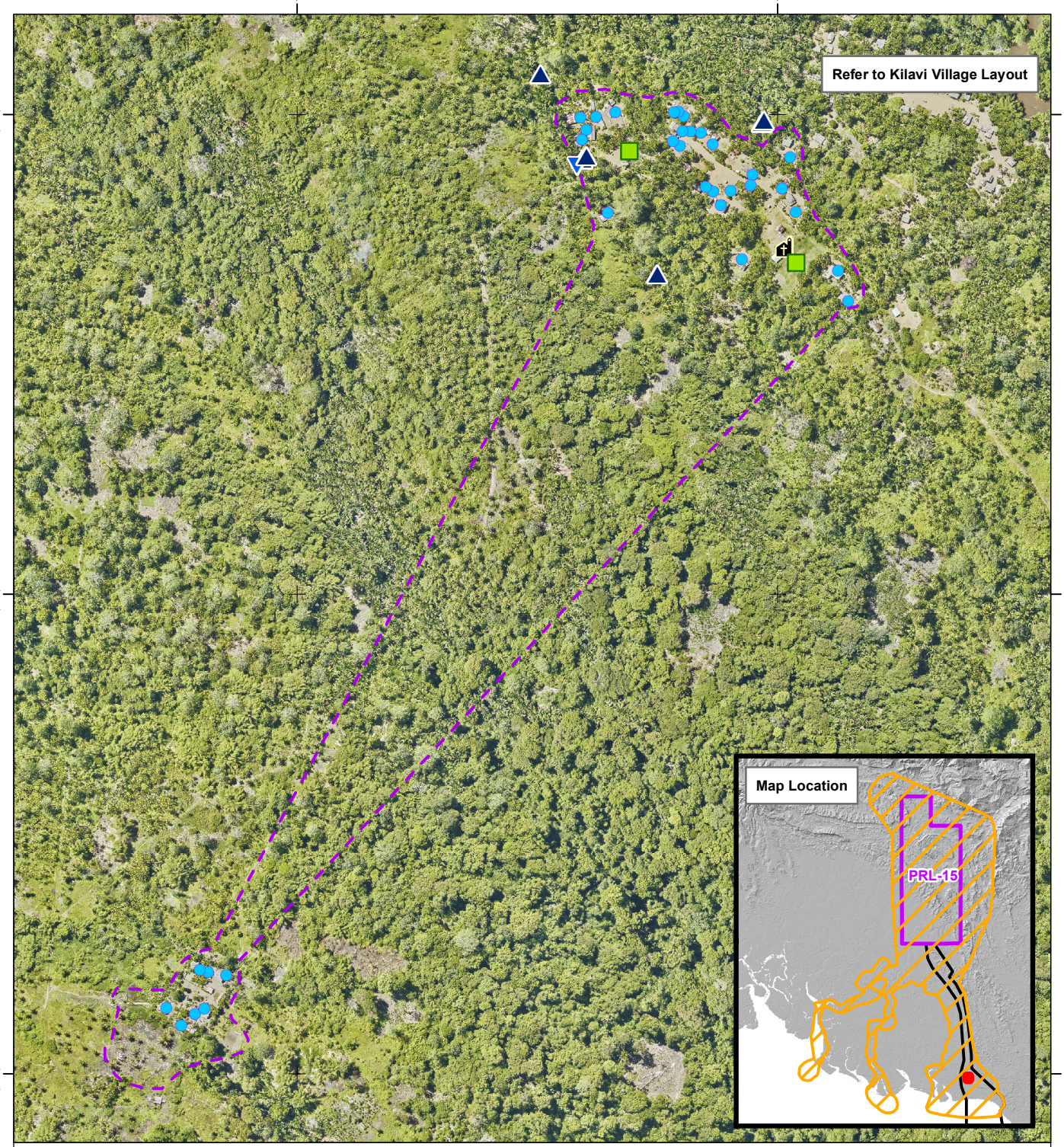
The most common law and order problem in the village was disputes over land, especially for gardening activities between clans. Often land disputes were referred to the village court and solved. If it was not solved it was referred to the Kerema District Court. The party at fault was ordered by the village court to pay compensation, often K100 or less, along with food to apologise and make peace with the other party.

Domestic violence cases occurred from time to time and serious matters were referred to the village court. Village leaders and women reported that some men (especially young men) consumed alcohol and used marijuana but only on special occasions. Women did not consume alcohol or use marijuana.

3.9.12 Cultural Heritage

Ere-Kilavi maintained strong intangible cultural heritage values that had been passed down from their ancestors. Intangible cultural heritage values included traditional song and dance, material culture for processing sago, tools for hunting and fishing and an array of associated ritual performances. People were ‘proud’ of the knowledge that had been passed down by their ancestors and considered their intangible cultural heritage values as being very important for the welfare of the community. A detailed but confidential ancestral story traced clan origins to the Purari delta. From the Purari delta people moved to a large village called Popo that was an ancestral village for all Orokolo speaking clans. One of the key spiritual and ancestral sites in the area was Heve Hill, which was an active spiritual and sacred site that was regularly the scene of supernatural occurrences. A swamp known as Kaevaharu with an island in the middle was a forbidden area to go to. It was believed that if a person in the village died his/her spirit could be seen around the swamp.

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SCALE: 1:6,000 @ A4

0 60 120 180 240 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Ere Village Layout

FIGURE: 3.9a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-78370 **REVISION:** E

DATE: 17/02/2017

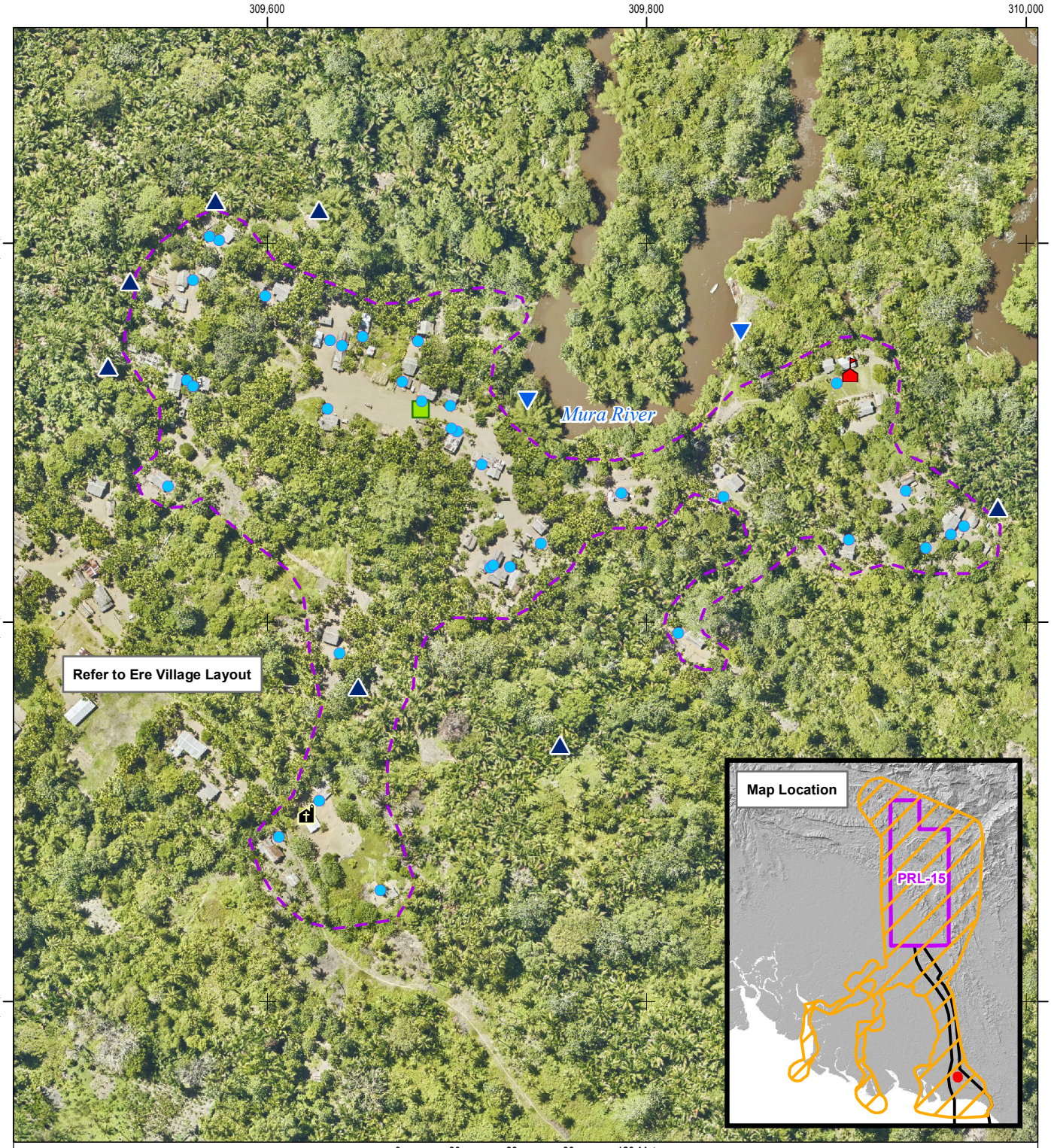
DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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SCALE: 1:3,000 @ A4

0 30 60 90 120 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Kilavi Village Layout

FIGURE: 3.9b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77474 **REVISION:** E

DATE: 20/12/2016

DATA SOURCES:
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Plates 3.9 – Ere-Kilavi Gallery



Photo 1 – Ere-Kilavi elementary school classroom



Photo 2 – Classroom at Muro Primary School



Photo 3 – Health worker at Muro aid post



Photo 4 – Traditional medicine having been applied to a person's lower leg



Photo 5 – Villagers pointing to a pottery sherd on a walking track



Photo 6 – Heve Hill site known as the well

3.10 Evara

3.10.1 Summary

Table 3.10 summarizes key social data for Evara.

Table 3.10 – Evara Summary

Thematic Area	Indicator	Description	
Location	**Description**	'Small Purari' arm of the Purari River (locally known as *Aivei*), located approximately 21 km downstream of Herd Base	
	Coordinates	145° 9' 48.65" E	-7° 32' 26.21" S
	Physical setting	Located on the banks of the Purari River, and surrounded by lowland swamp forest. Located above the tidal reach	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	14 (Mapaio)	
Population and demography	**Population**	542 (Including 120 from Evara logging camp)	
	Gender ratio (M:F)	99 (270:272); Logging camp 90 (57:63)	
	Ethnic group	Ahia	
	Affiliations	Orokolo, Muro and East Kerema villages	
	Households	67 (including 17 at Evara logging camp)	
	Household size	8.1 (Logging camp 7.1)	
	Language	Ahia	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Unknown	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food. Some garden food such as cooking banana, kaukau, taro, kang kong[12] and cassava. Extensive hunting for wild pigs, cassowary, monitor lizards, bandicoots and extensive fishing (black bass, catfish and tilapia)	
	Resources	Extensive sago woodlands (swamps), alluvial forests and hill forest	
Commercial activities	**Businesses**	None. Villagers buy items from the Rimbunan Hijau (RH) Logging Camp	

[12] Kang kong (*Ipomea aquatic*) is a type of water spinach that is cooked with other food. It is a semi aquatic vine that grows across the margins of wetlands and occasionally across logging tracks.

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Table 3.10 – Evara Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	13% traditional 77% semi-improved 10% modern material
	Floor type	97% raised 3% unknown
	Housing materials	Split black palm floor, sago used for house walls and roofs. A number of houses had tin roofs
	Cooking	Inside using firewood
	Lighting	Solar and generator
Health	**Facilities**	Evara Aid Post
	Nearest facilities used	Kapuna Health Centre, approximately 22.5 km west-southwest
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	12 to 20 years
Education	**Facilities**	None operating
	Attendance	N/a
	Nearest facilities used	Kikori Secondary School approximately 100 km west
Religion	**Churches**	Catholic
Water and sanitation	**Drinking Water**	Community water tanks and the Purari River during the dry season
	Toilet facilities	Shared pit, river, bush
	Waste disposal	Domestic waste was either disposed in the river or burnt
Law and order	**Prevalent issues**	Fighting, domestic violence, sexual violence, marijuana and alcohol abuse, extra-marital affairs and prostitution, stealing and fighting
	Resolution mechanisms	No action taken unless serious injury incurred then referral to magistrate, police
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Tools, the use of plants, diverse selection of cultural material, and traditional song and dance

3.10.2 Settlement History

Evara people were reluctant to describe their origin stories. They explained that the present location of Evara was selected after the village was encouraged to move closer to the river by the colonial government, in order to access services.

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3.10.3 Social Organization

Evara village comprised people from the Kauri tribe, one of the nine major tribes that make up the Baimuru district. It was represented by two chiefs, had a ward councillor, village court magistrate, land mediator and a catholic pastor.

3.10.4 Land Ownership

Land ownership and allocation was strictly by male descent. While determination and allocation of gardening land may be a communal exercise, only male members of a clan claimed authority, and that it passed from father to son. Females could assume exclusive use of their clan land but due to the presence of major resource developments recently appearing in the vicinity of the Kauri land, land allocation and ownership was being fully asserted by male clan members.

3.10.5 Women

Women from the village were allocated land purposely for gardening. Women from outside the village (who married local men) were only allowed to garden on their husband's clan land. Permission was required by these outside women to make gardens on other clan land.

Women reported that they did not feel safe and secure in their community (domestic violence and assault were commonplace) and that their feeling of safety and security had decreased since the commencement of logging activities nearby.

Taboos relating to food and drinks applied to women who gave birth and those who experienced their menstrual period (during which times they were not permitted to cook food for their husbands as they were believed to be unclean). Some women consumed alcohol and most gambled for money.

Marrying age was generally between 12 and 20 years.

The majority of babies were born in the village / bush with the assistance of a village birth attendant (no trained birth attendant). The few who travel, attended Kapuna Health Centre.

3.10.6 Youths

There was one youth group consisting of about 50 males and 50 females. Their main role was to participate in church activities such as playing music, assisting the women's group with their activities, playing sports and undertaking community service (for free) such as cutting grass, and cleaning the church ground. For recreation youths made gardens (particularly the females), played sport, relaxed and spent time with friends.

3.10.7 Subsistence

The primary staple food was sago, which was harvested from extensive local sago swamps. A range of garden food, primarily cooking banana, kaukau, taro and cassava, supplemented sago. A range of 'greens' (e.g., aibika and aupa), other crops (e.g., pumpkin, sweet corn, pitpit, sugar cane, breadfruit and peanuts) and fruits (e.g., papaya, and pineapples) were also grown. Coconuts, guava, okari nut trees, mangoes, laulau and oranges were also planted.

Extensive hunting was reported to occur in forests for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, wallaby, pythons, cuscus, frogs, rats and flying fox. Sago grubs and

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other insect larvae were also eaten. Hunting had reportedly been impacted locally by logging (since 2000) which had damaged forest habitat. The best hunting areas were reportedly now much further from the village where the forest had been less impacted by logging. The same also applied to some building materials such as kwila (used for house posts), which had become increasingly scarce locally.

Extensive fishing was reported to occur along the Purari River, associated creeks and swamps. Fish species caught included black bass, catfish, tilapia, and mullet. Other aquatic resources included eels, crabs, shellfish (from the sago swamps and near the ocean), freshwater turtles, saltwater turtles that migrated from the ocean to lay eggs along the banks of the Purari River, and freshwater crocodiles.

3.10.8 Land and Natural Resource Use

Customary land that was most frequently accessed for resources was characterized by extensive sago woodlands (swamps), alluvial forests and hill forest. Forest resources were reported to be extensive and extend along the east bank of the Purari River to north of the Purari airstrip.

Sago was the main material used for house walls and for roofs, however a number of houses had tin roofs. Kwila was harvested from the swamps for house posts. Other tree species were also used for posts when kwila was not available. Swamps and forests were used to harvest a range of timber and non-timber products including canoe trees and medicinal plants.

Drinking water was sourced from communal water tanks and from the Purari River in the dry season. When water was collected from the Purari River it was collected mostly from the centre of the river using a dugout canoe. There were no nearby creeks to collect water. When there was severe drought, water was also collected from the Purari River for washing sago. This was a particularly labor-intensive task due to the high volume of water required to wash the sago. The water was transported to the sago swamps at the back of the village.

There was land-based access (walking track) between Evara and the Evara logging camp from where logging roads spread across the customary land to the north. However, the Purari River was the main transport route that was used to access the health centre at Kapuna, and services at Baimuru, Ihu, Kerema and occasionally Kikori.

3.10.9 Health

An aid post was established in the late 1990s but at the time of the SBS surveying, it was operational only on an intermittent basis due to the often absence of the community health worker. The nearest health facility was a company run health clinic at Evara Logging Camp or patients would travel to Kapuna Health Centre or rely on traditional medicines. The more recent illnesses reported in the village were thought to be malaria and tuberculosis.

Women reported the main reason for their poor health to be the result of their heavy workloads, while for their children they felt poor hygiene and diet contributed to their poor health.

Women believed there to be no incidence of STDs in the village and they were unsure if many villagers understood how STDs were transmitted or treated. They believed all women were aware of family planning methods and had access to contraceptives (using such was a joint decision between husband and wife).

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3.10.10 Education

The school built in the 1990s and consisting of a primary and elementary school had been closed for almost a year because of the absence of teachers. Facilities were run down. The lack of education was thought to have contributed to the youths engaging in other activities such as gambling and was compounded by the influence of the Rimbunan Hijau (RH) Logging camp (where students would rather spend their time).

3.10.11 Law and Order

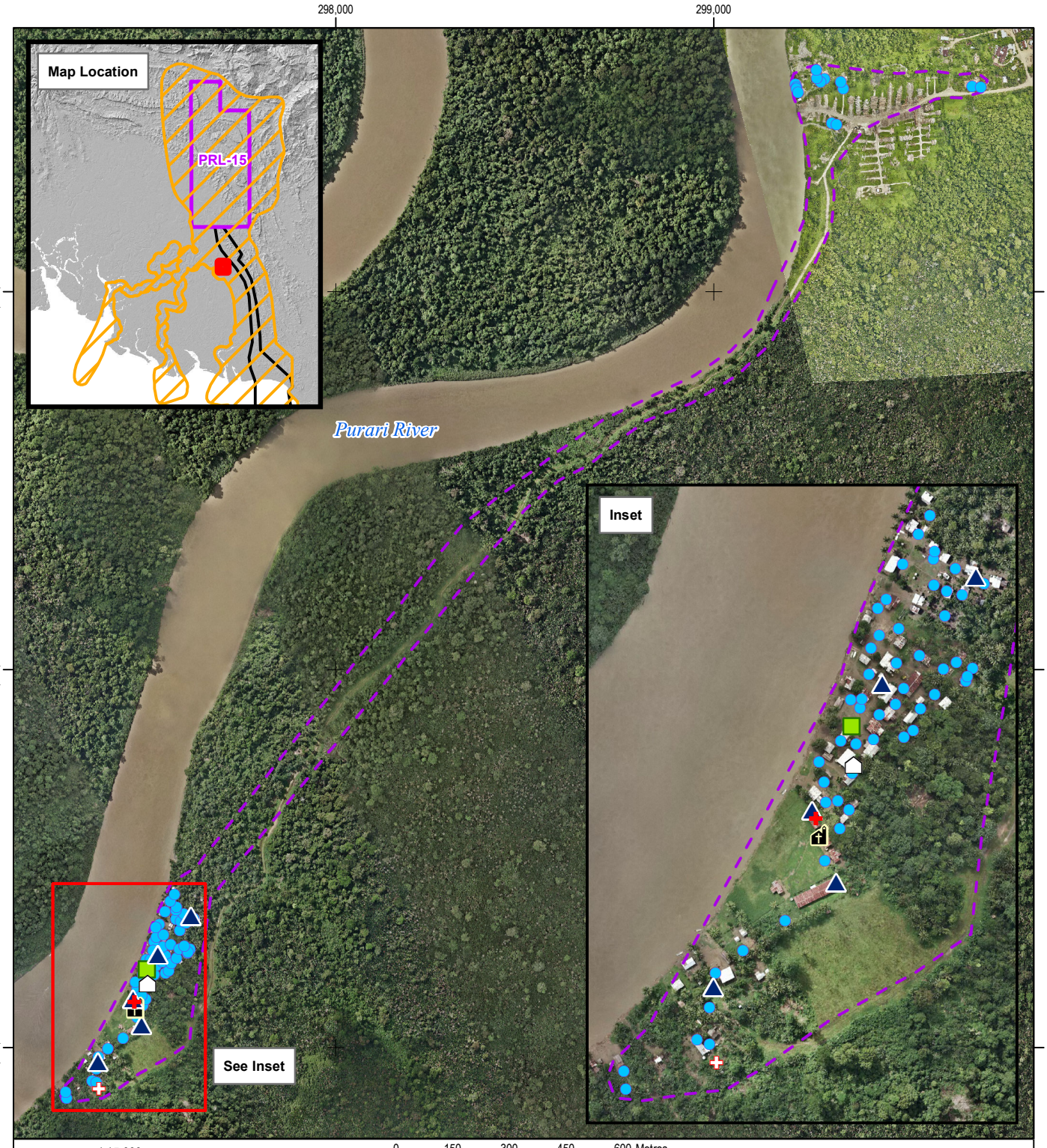
Due to economic pressure brought on by nearby logging operations, Evara villagers felt they were easily susceptible to social problems and external influences that were detrimental to their social harmony and cohesion. Prevalent social problems included drug abuse (marijuana), alcohol abuse, extra-marital affairs and prostitution. There was no permanent presence of a church in the village despite the fact that the villagers were predominantly Catholic.

The main law and order problem affecting women within the village was domestic violence. In most cases, no action was taken against offenders except where serious injury was sustained. In those cases, the matters were referred to police stationed at nearby Evara logging camp. Women reported their feeling of safety had deceased since the logging activities began. Youths reported that domestic violence/sexual violence were of concern and predominant among young couples. Also stealing, fighting, alcohol abuse, land disputes and gambling were common.

3.10.12 Cultural Heritage

Villagers presented a diverse selection of cultural material items. Some of the items had been passed down through many generations and some had been recently made. All items were still used today; ancestral artifacts were used in ceremonies and weddings, on Independence Day, and during Christmas celebrations. Villagers also showed tools and plants that they used, the knowledge about which formed part of their intangible cultural heritage values. There were no tangible cultural heritage sites at Evara village; all tangible cultural heritage sites known to village elders were some distance away. Clan elders provided precise details of ancestral migration routes naming six ancestral villages with an attached genealogy spanning seven generations. Although the names of ancestral villages and the names of ancestors themselves were known to clan elders this information remained confidential. The popular *Kero/Kiru* dance was one such traditional culture still embraced today and performed mostly during important communal celebrations like Independence Day, Christmas and marriage ceremonies. Other important occasions for the dance included thanking uncles and parents, trading partners and friends.

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SCALE: 1:15,000 @ A4

0 150 300 450 600 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Aid Post, Operating
- Aid Post, Partially Operating
- Households
- Church
- Community hall
- Sporting field
- Water source (drinking)
- Extent of dwellings
- Upstream project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Evara Village Layout

FIGURE: 3.10

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-79713 **REVISION:** E

DATE: 18/04/2017

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016). Upstream project area of influence digitised by Mipela GeoSolutions based on data supplied by ERIAS Group (2017).

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Plates 3.10 – Evara Gallery



Photo 1 – Houses on long posts at Evara village



Photo 2 – Community health worker inside the aid post



Photo 3 – Children play on the bank of the Purari River at Evara logging camp



Photo 4 – Logging site near Evara village



Photo 5 – Defunct elementary school classroom



Photo 6 – A water tank in the defunct Evara primary school

3.11 Harevavo

3.11.1 Summary

Table 3.11 summarizes key social data for Harevavo.

Table 3.11 – Harevavo Summary

Thematic Area	Indicator	Description	
Location	**Description**	Popo coast, Orokolo Bay, approximately 55 km southeast of Herd Base	
	Coordinates	145° 17' 8.333" E	-7° 51' 7.612" S
	Physical setting	Located at the western end of Orokolo Bay amongst mangroves, nipa palm swamps, beach vegetation, and alluvial forest and hill forests	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	2 (Harevavo)	
Population and demography	**Population**	651	
	Gender ratio (M:F)	94 (315:336)	
	Ethnic group	Orokolo	
	Affiliations	Coastal Popo communities	
	Households	100	
	Household size	6.5	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Unable to answer given its sacred nature	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with coconut and some garden food such as cooking banana, cassava, kaukau, and taro. Occasional hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and others and extensive fishing (marine and freshwater)	
	Resources	Mangroves, nipa palm swamps, beach vegetation and alluvial forest and hill forests	
Commercial activities	**Businesses**	5 x fuel retailers and 5 x dinghy operators	

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Table 3.11 – Harevavo Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	77% traditional 23% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm floor, nipa palm and sago leaves for house walls and for roofs. Kwila, rosewood and stem of coconut house posts.
	Cooking	Inside using firewood
	Lighting	Battery, kerosene, solar and generator (petrol)
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located at Kavava approximately 4.5 km to the east
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	14 to 19 years
Education	**Facilities**	1 x elementary (students attend primary school at Kaivukavu)
	Attendance	123 students at elementary school
	Nearest facilities used	Ihu High School, approximately 14 km to the southeast
Religion	**Churches**	United Church, Baptist, Reform Revival Church, Revival centre of Papua New Guinea
Water and sanitation	**Drinking Water**	Community well
	Toilet facilities	Bush
	Waste disposal	Tin cans/batteries and paper/plastics were disposed of by dumping in the sea/river, and food scraps were other
Law and order	**Prevalent issues**	Stealing, obscene language, marijuana and alcohol abuse, fighting and domestic violence
	Resolution mechanisms	Village court, police
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Fishing, hunting, sago production, song and dance

3.11.2 Settlement History

Harevavo people traced their history to the 'Upper Purari-to-Popo' series of migrations undertaken by their ancestors. Their eventual settlement at the coast was the result of new land being formed as a result of sedimentation build-up. Their ancestors at Popo left in fear after they killed a resident warrior 'giant' who raped one of their women.

3.11.3 Social Organization

Harevavo was represented by a traditional chief, ward councillor, village court magistrate and land mediator. The traditional chief was assisted by village elders. They worked closely with

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village court officials and other village elders to maintain law and order in the village. Church leaders were present in the village and represented four religious denominations.

3.11.4 Land Ownership

Harevavo people strictly observed the patrilineal system of land ownership and control over it. Power and control over land was passed from father to son, generation to generation. Women and in-laws were granted only user rights; they could not plant permanent fruit and food trees when given user-rights privileges.

3.11.5 Women

Women's most important roles were caring for children, tending gardens, making sago, collecting and cleaning. They also carried sand every morning up from the beach to pour in yards to fill in holes created in the ground especially during the wet season and made lime from kina shells. Most women engaged in income earning opportunities and often sold fish, bananas, sago, and other garden produce at Kaivukavu market on Mondays, Thursdays and Saturdays. There were also informal market stalls in front of households, which sold items such as betel nut and bananas.

Women generally felt safe and secure despite being afraid of sorcery and this sense of security had remained stable over the years.

Marrying age was between 14 and 19. The village had a traditional birth attendant and the majority of women walked to Orokolo Sub Health Centre to deliver their babies.

3.11.6 Youths

The youths of Harevavo village had a youth group with more than 100 members ranging in age from 15 to 30 years old. The main roles were helping the church, assisting community members and fundraising. Outside of the group, youth's main responsibilities were attending school, caring for family, making and tending gardens, raising livestock, fishing, and collecting seafood, water and firewood. For recreation, youths mainly participated in sporting activities, relaxed, socialised and used their phones. Girls also did craft work such as making baskets and mats.

3.11.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted along the banks of Mihamaa Creek close to the village. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought.

Garden food was grown mainly in the nearby forest areas north of the village and small areas of garden were also grown along the beach front towards the mouth of Mihamaa Creek and beyond towards the mouth of Aievi Passage. A wide range of garden foods was grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Fish and crustaceans were also exchanged for garden food with inland villages or purchased from the nearby market. Several food trees were grown including coconuts, guava, bread fruit (kapiak) and laulau.

Occasional hunting occurred in the forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), monitor lizards and

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flying fox. Insect larvae were also eaten including sago grubs and grubs that lived in dead trees. There were few animal species that were not eaten apart from birds of paradise and goura pigeon. Mushrooms were also harvested that grew on processed sago waste and on dead wood.

Extensive fishing occurred along Mihamaa Creek, Aievi Passage and associated creeks. Catfish was the main species caught but also salmon, red emperor, barramundi, three species of black bass, mullet, sawfish, shovel head and hammerhead sharks. Other aquatic resources included prawns, mud crabs, and three species of shellfish, including one collected from the beach sands in the intertidal zone. Two species of turtle were also caught for their meat. Crocodiles were not normally hunted but were occasionally caught accidentally in fishing nets. Unlike communities along the Purari River, crocodile and turtle eggs were not usually collected because there were no sand banks for turtles to lay eggs and the community was uncertain where the crocodiles laid their eggs.

Only women used traditional nets to fish, men were only allowed to use modern nets.

Gardening practices consisted of the women gathered seeds, suckers, and stems for planting and handed them over to the men to plant in a new garden. Only men were allowed to plant a new garden and tend it until after the first harvest when women were then allowed into the garden. Men cut sago trees and scraped the sago for the women to beat and carry home.

3.11.8 Land and Natural Resource Use

Land resources included mangroves, nipa palm swamps, beach vegetation, and alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants.

Nipa palm and sago leaves were the main material used for house walls and for roofs. Kwila was the most preferred tree species for house posts, which was mainly sourced from the Aievi Passage but rosewood and other species from the alluvial forest and hill forests were also used. The stems of coconuts were increasingly being used for house posts because of the depletion of kwila close to the village due to overharvesting. Other species such as mangroves were used for house bearers. A species of black palm known as haeo was split for flooring. Dugout canoes were made from rosewood, erema and sometimes the okari nut tree. Pandanus leaves for weaving mats were collected from the banks of Mihamaa Creek and other locations. Mats were sold for between K20 to K30 per mat depending on the size.

The primary source of drinking water in the village was a community well, which was thought to be of poor quality and possibly contaminated. There was also a secondary well about 5 to 10 minutes' walk away at Marea.

The village was connected to several other inland villages by walking tracks including Ere-Kilavi, Avavu, Arehava 2, Paevera, Huruta and Hepere. The beach was also used to access villages to the east in Orokolo Bay and particularly the Orokolo Sub Health Centre. The primary river transport route was via canoe to the Aievi and Alele passages, Apiope, and villages along the Purari River. The main ocean transport route was via motorised dinghies to travel to Ihu Station and Kerema for onward transport to Port Moresby by PMV.

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3.11.9 Health

There were no health facilities in Harevavo, but there was a traditional healer. The closest health centre was located in Kavava (Orokolo Sub Health Centre).

Men and women identified the main health problems as tuberculosis, malaria and asthma. The main reason for poor health for women was thought to be their workload and the main reasons for children's poor health were poor hygiene and poor diet. The youth identified that poor hygiene relating to water quality was the main reason for poor health.

Men were unaware of the prevalence of STDs and only a small, educated few had an understanding of how it was transmitted but were unsure how it was treated. None of the women had an understanding of the prevalence of STDs but reported that most knew how it was transmitted and treated.

Every woman in the village understood contraceptives and how to access them and most women used some kind of family planning methods. Those who did made the decision either on their own or it was a shared decision.

3.11.10 Education

There was one elementary school in Harevavo village, and primary students attended the primary school at Kaivukavu (five minutes' walk away). The nearest secondary school was located in Ihu (three hours' walk away). A total of 123 students (56 boys, 67 girls) attended the elementary school, taught by three teachers.

3.11.11 Law and Order

The main law and order problems according to the leaders included stealing, obscene language, smoking marijuana, alcohol abuse and sorcery. Stealing and obscene language were resolved by the village courts, the other (major) crimes were referred to the police.

The women regarded fighting, alcohol abuse, marijuana, and swearing as the most prevalent law and order issues within the village. Domestic violence cases were often regarded as a family matter and often resolved by immediate family. Fighting and swearing were often referred to the village court and perpetrators paid a fine.

The youths reported that using and selling marijuana was the most prevalent law and order issue, followed by domestic violence stealing and fighting.

Village leaders reported that some men consumed alcohol and used marijuana, but none of the women did.

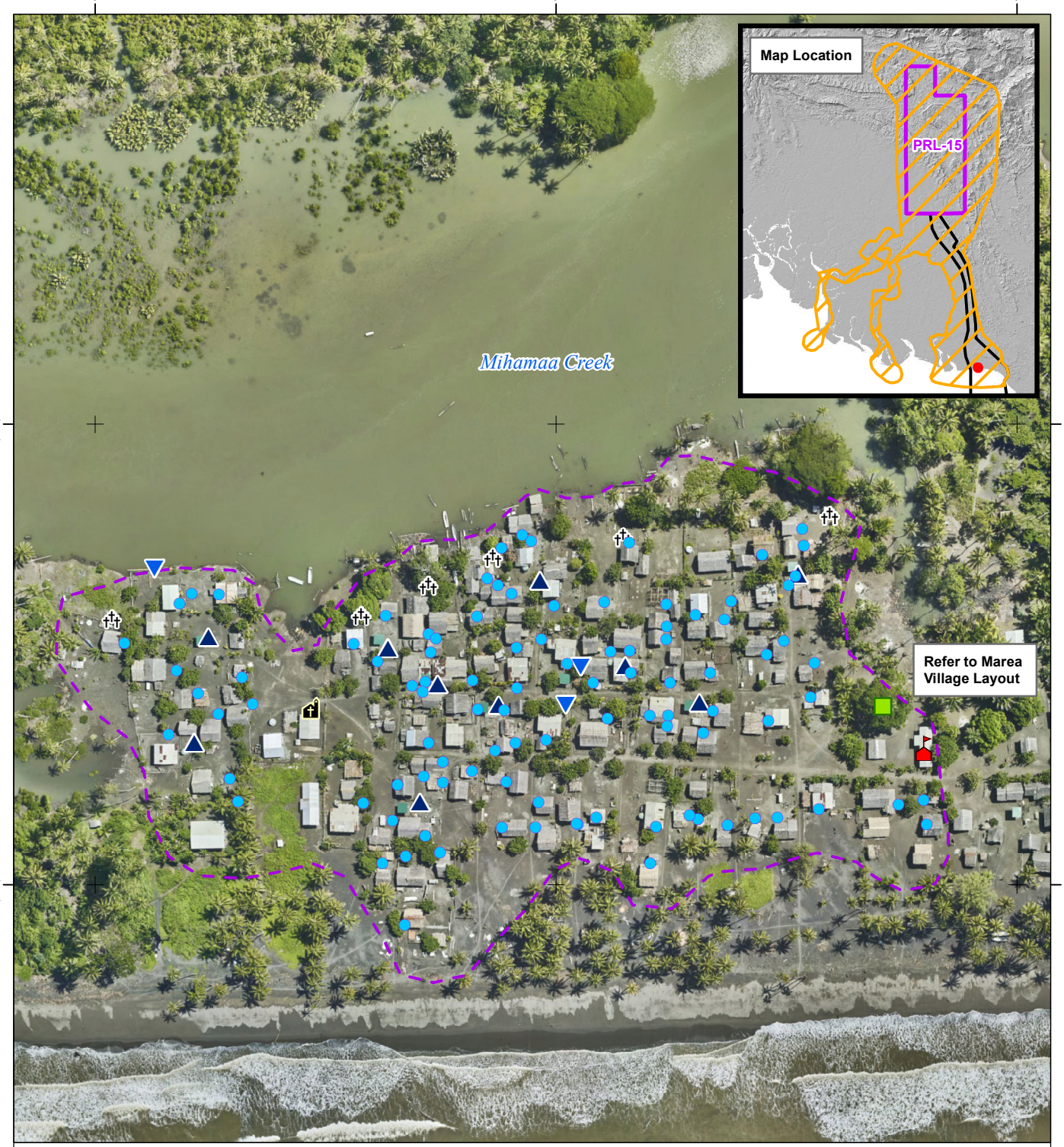
3.11.12 Cultural Heritage

At Harevavo, confidential details of oral traditions were passed from father to son with more themes recalled during community gatherings. Harevavo people no longer had any active spiritual sites. Many of the themes expressed in traditional sing-sing had been forgotten and thus intangible cultural heritage values had been eroded; particularly over recent decades. Although nylon fishing nets and metal sago cutting blades were used, intangible cultural heritage values related to fishing, hunting and sago production remained important and provided subsistence security. Traditional medicines were important and were considered more effective and more

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reliable than medicines obtained from the poorly equipped Orokolo Sub Health Centre. Intangible cultural heritage values were also important for maintaining good social order as ancestral stories taught children how to be good community members. Tangible cultural heritage items, such as a very important arm shell that was kept by elders, represented ancestral connections. Although the arm shell was an important ancestral heirloom in itself, it was much less important than the ancestral knowledge that the arm shell had come to represent. During special occasions women and men sang and danced to a traditional song called hekea. The song denoted their migration history.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Harevavo Village Layout

FIGURE: 3.11

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77470 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.11 – Harevavo Gallery



Photo 1 – Women collect firewood on the beach



Photo 2 – Village elder with arm shell



Photo 3 – Beachfront activity at Harevavo



Photo 4 – Pricelist for basic store items at a small 'black market' store



Photo 5 – Typical village scene, Harevavo village



Photo 6 – Typical house in Harevavo village

3.12 Hepere

3.12.1 Summary

Table 3.12 summarizes key social data for Hepere.

Table 3.12 – Hepere Summary

Thematic Area	Indicator	Description	
Location	**Description**	Inland of Orokolo Bay (Muro area) on the Heperi River, located approximately 46 km southeast of Herd Base	
	Coordinates	145° 16' 0.001" E	-7° 46' 0.001" S
	Physical setting	Set amidst lowland forest. Comprises the main village and the hamlets of Airava and Nova	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	1 (Avavu)	
Population and demography	**Population**	297 (Hepere 171; Airava 99; Nova 27)	
	Gender ratio (M:F)	117 (160:137)	
	Ethnic group	Orokolo	
	Affiliations	Muro and Orokolo coast communities	
	Households	51 (Hepere 26; Airava 18; Nova 7)	
	Household size	5.8	
	Language	Orokolo	
	Other languages	Motu, English and Tok Pisin	
Settlement	**Year established**	Unknown	
	Name meaning	Unknown	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts and some garden food such as cooking banana, cassava, *kaukau*, and taro. Extensive hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and others and extensive fishing (marine and freshwater)	
	Resources	Sago swamps, nipa palm swamps, alluvial forest, hill forests and a swamp	
Commercial activities	**Businesses**	None	

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Table 3.12 – Hepere Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	84% traditional 2% semi-improved 14% n/a
	Floor type	53% raised 12% other 4% dirt 31% n/a
	Housing materials	Split black palm and sometimes betel nut palm floors, sago and nipa palm walls and roofs, kwila posts
	Cooking	Inside using firewood
	Lighting	Solar, battery, generator (petrol)
Health	**Facilities**	None
	Nearest facilities used	Muro Aid Post, approximately 3.5 km to the southwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15-20 years
Education	**Facilities**	1 x elementary school
	Attendance	39 students
	Nearest facilities used	Muro Primary School approximately 34 km to the south-southwest and Ihu High School approximately 20 km southeast
Religion	**Churches**	Catholic
Water and sanitation	**Drinking Water**	Karao River
	Toilet facilities	Bush, River
	Waste disposal	Tin cans/batteries are disposed of in the bush. Paper/plastics are buried or disposed of in the bush and food scraps are disposed of in the bush or fed to animals
Law and order	**Prevalent issues**	Defamation, fighting, stealing, murder, domestic violence and sorcery, alcohol, marijuana and gambling
	Resolution mechanisms	Village leaders, police
Cultural heritage	**Tangible cultural heritage sites**	Kouava, an ancestral spiritual place
	Intangible cultural heritage	Traditional song and dance on special occasions, magic chants to help with gardening, fishing, hunting and building houses

3.12.2 Settlement History

Villagers were unsure about the origin of the village. Information collected from other inland Muro villages suggested that Hepere village was settled by the same group of people who also settled in other Muro villages. This would mean that Hepere was part of the general migration of people who came from upper Purari and established themselves in inland and coastal Muro.

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3.12.3 Social Organization

Four clans in Hepere were represented by four clan leaders, and a Catholic church leader, contributed to social organization. Hepere villagers claimed to have a ward councillor, village court magistrate and land mediator but none remained residing in Hepere (rather they had relocated to Ere-Kilavi or Kerema).

3.12.4 Land Ownership

Land ownership was strictly patrilineal and was transferred from father to son from generation to generation. Women could be given user but not ownership rights to land. Under the Orokolo system of land ownership, women who married outside the clan and tribe were expected to reproduce children who would inherit their father's land. Thus children could not go back to their mother's land to claim ownership although they could be given user rights to cultivate garden crops only. They were not allowed to plant permanent fruit bearing trees such as coconuts, breadfruit or sago. In extreme cases where a man was not able to have sons of his own, he may be compelled to adopt a male member of his clan or tribe as his own son in order to continue his land ownership rights.

3.12.5 Women

Sago making and gardening were regarded as the most important roles performed by women. Women were able to make gardens and get sago on their father's and brother's land as well as on their husband's land, possibly a similar system to Ere, Kilavi and Avavu villages. Most women sold a variety of garden produce at the Muro market on Saturdays.

Men helped women to make gardens, build houses, and go hunting. Women did most of the fishing; only a few men fished from time-to-time. Men were forbidden to fetch water as it was the responsibility of women and young girls.

Women generally did not feel safe and secure because they were afraid of their husbands and other men and this had remained constant over the years.

Marrying age was between 15 and 20. The village had a traditional birth attendant and the majority of women delivered their babies in the village.

3.12.6 Youths

A youth group called Hepere Sports Club consisted of more than 60 members ranging from 14 to 37 years of age. The major role for the youth group was to play sport and participate in community work both free and paid. Outside of the group, youths attended school, cared for family, made and tended gardens, raised livestock, fished and collected water. For recreation, youths mainly participated in sporting activities, relaxing, socialising and craft work.

3.12.7 Subsistence

The main staple food was sago that was harvested from sago palms that had been extensively planted in small drainage depressions, along the banks of the Karao River, associated drainage lines and along the Purari River. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought.

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Garden food was widely grown in large gardens, particularly in logging clearings and in small patches within the village. A very wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Several food trees were grown including coconuts, guava, bread fruit (kapiak), laulau, citrus and okari nut.

Extensive hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), goura pigeon, bandicoots, python, monitor lizards, green and brown frogs and flying fox. Insect larvae were also eaten including sago grubs and grubs. There were few animal species that were not eaten apart from birds of paradise. Mushrooms were also harvested that grew on the processed sago waste and on dead wood.

Extensive fishing occurred along the Purari channels, the Aievi and Alele passages, and at the fishing camp close to the coast near Apiope, where saltwater species were common. A range of catfish species were the main species caught but also tilapia (in the swamps), super tilapia, barramundi, black bass, mullet, microfish, mudfish, eels, prawns, sharks and sawfish. Fishing was not extensive on the local rivers, as fish catches were perceived to be low. Important saltwater fish included stingrays, red emperor, salmon, hammerhead and shovelhead sharks, but stingrays were the most common species (the skin of stingrays is also used as sandpaper). Other aquatic resources included crabs and shellfish. Two species of turtle (marine and freshwater) were also caught but their eggs were not collected since there were no sand banks for laying eggs. A tortoise was also present that was eaten. Crocodiles were rarely hunted for meat and crocodile skins were rarely sold.

3.12.8 Land and Natural Resource Use

Land resources included sago swamps, nipa palm swamps, alluvial forest, hill forests and a swamp known locally as a kanda (cane) swamp. The kanda swamp was a source of canes for use as ropes. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Some of these resources, particularly hill forest and alluvial forest had been logged, resulting in substantial forest degradation, particularly the development of weed corridors, and less abundant fauna for hunting. Clearing of forest for food gardens had also caused substantial forest degradation. Important medicinal plants included the strangling fig, which was used to treat asthma, rosewood leaves that were used to treat malaria, and a shrub known as karope that was thought to relieve the symptoms of tuberculosis.

Sago was the main material used for house walls and roofs, but nipa palm was also used. Kwila from the swamps was the preferred tree species for house posts, which was mainly sourced from Aievi Passage and associated creeks. Malas, a species from the hill forests was also used. For house bearer's avari, taun and malas was used. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Haeo was also used for roof frames. Some haeo palms were grown in the village but most occurred in the forest. Strips of bark from a tree (moroko) were widely used for tying thatch and a range of cane ropes were used instead of nails.

Forest resources were used for many everyday items and some cultural items including grass skirts, small billums and baskets were made from new sago shoots, mats made from pandanus

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leaves, and brooms made from the inflorescence of black palms or the rachis of sago palm leaflets.

For dugout canoes erema was the preferred tree species, but kiperi and talis were also used. Canoe paddles were made from kwila, rosewood, murito and ohau'u.

Drinking water was mostly sourced from the Karao River, which flooded during most wet seasons.

The village was connected to several other villages by walking tracks including Ere-Kilavi, Avavu, Muro Station, Arehava 2, Huruta and Paevera. In the 1970s it was possible to drive to Ihu Station from the nearby Muro Station, but the road was not maintained after the station closed. Dugout canoes were used to paddle to the coastal fishing camps from Muro Station. Betel nut and mustard, which were important cash crops, were the main source of income. They were mainly sold at Kamusi logging camp in Western Province or at Evara logging camp. Motorised dinghies were used to travel to Kerema for onward transport to Port Moresby and to Kapuna for medical treatment.

3.12.9 Health

There were no health facilities in the village so people travelled to Muro Aid Post (3.5 km southwest of Hepere or one to two hours' walk) for treatment or resorted to traditional methods.

Men and women identified the main health problems as malaria, snake bite and tuberculosis (they estimated that around 10 people had died of snake bite in the last 30 years). Tuberculosis patients often travel to Muro Aid Post approximately 3.5 km away to receive treatment. Cases of malaria were treated using traditional methods. The women attributed most illnesses to their workload especially sago making and carrying of the sago. All women delivered babies in the village with assistance of traditional birth assistants.

Women were not sure about STDs, how they were treated or transmitted. Most women were afraid of family planning methods thus they were generally not used. Most women used herbs and magical spells to prevent them from conceiving.

3.12.10 Education

There was one elementary school with one teacher and two classes consisting of a total of 39 students (17 boys and 22 girls).

Logging company, Rimbunan Hijau (RH), built a teacher's house, two classrooms, an office and, donated a water tank. However the teacher's house had been occupied by the landowners of the school grounds. The teacher therefore lived in one of the classrooms and taught two classes in one classroom. In 2003, the Education Department approved that Hepere elementary school would be upgraded to a primary school however this had not occurred.

3.12.11 Law and Order

The village faced a range of law and order problems, including defamation, fighting, stealing, murder, domestic violence and sorcery. The village magistrate was residing elsewhere, so village leaders resolved most minor crimes and disturbances. Serious crimes were referred to the police at Ihu and were taken to court in Kerema. Consumption of alcohol, marijuana and gambling were common among men. Young men often drank home brew and smoked marijuana. Domestic

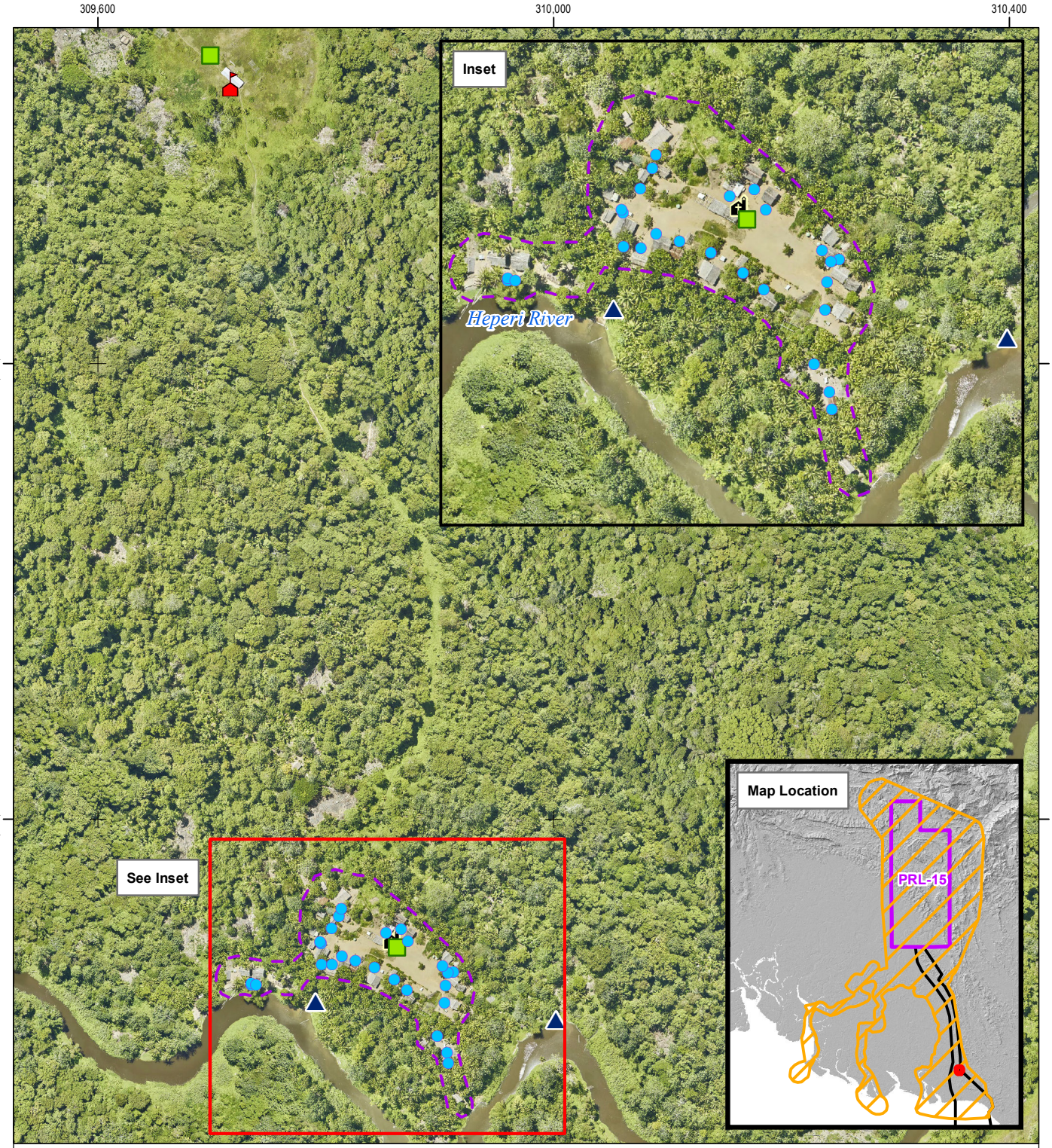
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violence cases were rarely reported to the village court due to wives fear of retribution from offenders. Sexual assault of females from other villagers was reported to occur from time-to-time.

3.12.12 Cultural Heritage

No cultural heritage information was recorded at Hepere. However, it is understood that Hepere people identified with an ancestral village called Popo that was an ancestral village for all Orokolo speaking clans. One of the key spiritual and ancestral sites in the area was Heve Hill, which was an active spiritual and sacred site that was regularly the scene of supernatural occurrences.

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SCALE: 1:5,000 @ A4

0 50 100 150 200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Church
- Sporting field
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Hepere Village Layout

FIGURE: 3.12

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77460 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.12 – Hepere Gallery



Photo 1 – Elders participate in focus group discussions with a member of the survey team

3.13 Herekela, Oru, Lariau, Miha Kavava and Hohoro

3.13.1 Summary

Table 3.13 summarizes key social data for Herekela[13], Oru, Lariau, Miha Kavava and Hohoro.

Table 3.13 – Herekela, Oru, Lariau, Miha Kavava and Hohoro Summary

Thematic Area	Indicator	Description	
Location	**Description**	Eastern part of the Orokolo coast, approximately 58 km southeast of Herd Base	
	Coordinates	145° 20' 57.100" E	-7° 52' 0.800" S
	Physical setting	Set amongst mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forests. The villages of Herekela, Oru, Lariau, Miha Kavava and Horoho differentiate themselves but function and consider themselves as one community	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	7 (Lariau)	
Population and demography	**Population**	856 (Herekela 331; Hohoro 70; Lariau 223; Miha-Kavava 88; Oru 144	
	Gender ratio (M:F)	107 (442:414); Herekela 99 (165:166); Hohoro 112 (37:33); Lariau 114 (119:104); Miha-Kavava 115 (47:41); Oru 106 (74:70).	
	Ethnic group	Orokolo	
	Affiliations	Orokolo coast communities	
	Households	161; Herekela 66; Hohoro 12; Lariau 38; Miha-Kavava 14; Oru 31	
	Household size	5.5; Herekela (5.0); Hohoro (5.8); Lariau (5.9); Miha-Kavava (6.3); Oru (4.7)	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Lariau was named after a male ancestor (Lariau Haela Apo). Herekela meant ‘calm’, ‘quiet’ or ‘peace’	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts and some garden food such as cooking banana, cassava, kaukau. Extensive hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and others and extensive fishing in freshwater and marine habitats.	
	Resources	Mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forests	
Commercial activities	**Businesses**	2 x trade stores, 4 x fuel retailers and 6 x dinghy operators. Many people sold products irregularly in table markets[14]	

[13] Information relating to Herekela in Section 3.13 also includes information relating to Hiloi.
[14] A table market is an informal market where produce (e.g., fruit, vegetables, betel nut, rice, tinned fish) is sold on a table or mat at the front of a house or central place in the village.

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Table 3.13 – Herekela, Oru, Lariau, Miha Kavava and Hohoro Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	Miha Kavava - 86% traditional, 14% semi-improved Oru - 72% traditional, 25% semi-improved, 3% modern Lariau - 58% traditional, 42% semi-improved Herekela - 67% traditional, 32% semi-improved, 1% unknown Hohoro - 100% traditional
	Floor type	100% raised
	Housing materials	Split black palm floor, kwila, rosewood, coconut and okari posts, sago leaf walls, sago and nipa palm roofs
	Cooking	Both inside and outside using firewood
	Lighting	Generators, batteries, solar power, kerosene lamps and hurricane lamps
Health	**Facilities**	Lariau Aid Post
	Nearest facilities used	Orokolo Sub Health Centre, approximately 3.5 km west-northwest of Lariau
	Community Health Worker	1
	Trained birth attendant	1
	Marrying age (women)	15 to 18 years
Education	**Facilities**	1 x primary school in Oru, 1 x elementary school in Lariau and 1 x elementary school in Herekela
	Attendance	114 students at St Anne's Primary School in Oru. 72 students at Herekela & 26 students at Oru-Lariau elementary schools.
	Nearest facilities used	Ihu High School, approximately 5 km southeast Hohoro
Religion	**Churches**	Catholic, United Church, Pentecostal
Water and sanitation	**Drinking Water**	Wells (primary) and rainwater (secondary)
	Toilet facilities	Private pit toilets, bush or sea/river
	Waste disposal	Cans/batteries are buried or disposed in the river/sea, paper/plastics are burnt or disposed in the river/sea, food scraps are fed to animals
Law and order	**Prevalent issues**	Murder, suicide, verbal abuse, fighting, often as a result of alcohol or marijuana abuse or gambling
	Resolution mechanisms	Village court, village leaders and serious crimes referred to police
Cultural heritage	**Tangible cultural heritage sites**	Spirit sites called Heve and Popo and Ape Ohoro. Cemeteries and burial places are also highly significant
	Intangible cultural heritage	Incantations to increasing fishing catches, promote sago growth and traditional medicines are important to the community

3.13.2 Settlement History

Ancestors of the five villages originally came down from the upper Purari to settle at Ivara Paere (which means kundu mouth). From Ivara Paere they settled at inland Popo, which they regarded as their own Tower of Babel because it was there that clans developed different dialects and

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began to disperse in search of new lands and sources of resources. As they moved, the ancestors left behind members of their clans. Today many inland clans shared the same clan names as the coastal clans.

3.13.3 Social Organization

These interrelated villages had traditional clan chiefs and church leaders representing three religious denominations. They were also represented by ward councillors and a village court magistrate. The closest land mediator was reported to be in Kerema.

3.13.4 Land Ownership

Oru, Lariau, Miha Kavava, Herekela and Hohoro strictly observed the patrilineal system of land ownership and control. Power and control over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees when given user-rights privileges.

3.13.5 Women

Sago making was regarded as the most important role of a woman. Gardening was largely a man's role, similar to other coastal Orokolo and Popo villages. However, more recently, some women reported making new gardens unlike in the past when it was strictly forbidden. Most women engaged in marketing to earn some income at Kavava market on Mondays, Wednesdays and Saturdays. Sago, fish and vegetables were the main food sold by women from Herakela, Lariau, and Oru.

Women reported feeling safe and secure.

Marrying age was reported to be between 15 and 18 years.

A trained village birth assistant and a traditional village birth attendant assisted women to deliver babies, however the majority of babies were reportedly delivered in the Lariau Aid Post (approximately five minutes' walk from villages) and the Orokolo Sub Health Centre (approximately 30 minutes' walk from the villages).

3.13.6 Youths

Youths contributed to community activities such as helping other community members carrying house posts down to the village, making canoes, building houses and cutting sago. Youths reportedly provided most assistance to widows, the elderly, young mothers and the sick and were typically repaid either with food (rice, tinned fish and sago) or with money.

Over the last two years the youths had participated in only one major project, which was the building of three bridges in their communities. They were recently embarking on installing 16 water tanks across the villages. For recreation, youths participated in sporting competitions between the villages.

3.13.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted in the sago swamps within close proximity of the village and to the north across the alluvial plains. Coconuts were also an important staple particularly when garden foods had been

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affected by flood. Frequent flooding was often experienced during the wet season (May to August). Garden food was mainly grown across the alluvial plains near the sago swamps and near the village. Small food gardens were also established along the beachfront. Some garden crops had been planted in the village however pigs tended to destroy the food gardens if not fenced with bamboo. A wide range of garden foods were grown but cooking bananas, taro, cassava and kaukau were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Additional garden food was purchased from markets. Several food trees were grown including coconuts, guava, bread fruit (kapiak), mango, and laulau.

Extensive hunting (with dogs and spears) in the forests for most animal species included wallaby, wild pigs, cassowary, cuscus, bandicoots, wildfowl (eggs also collected), monitor lizards and birds. As most animals had moved further inland because of logging and hunting during wet season was preferred when wildlife was forced to congregate around the higher ground when low-lying areas become inundated. Sago and dead mangrove tree grubs were eaten. Mushrooms were also harvested that grew on the processed sago and on dead wood.

Extensive fishing occurred in the sago swamps, and several mangrove and nipa palm fringed creeks – Herekela, Hohoro maa and Purari laka, and in the mangroves east of Kavava known as Pakovovu-Auma. Extensive fishing also occurred in the ocean. Catfish were the main species caught, but also caught were salmon, red emperor, barramundi, mullet, sharks, stingray, tuna (yellow fin and big eye). Other aquatic resources included prawns, two types of crab and shellfish. Turtles were rarely caught. Ocean fishing was limited to the period when the sea was calm (September – April).

3.13.8 Land and Natural Resource Use

Land resources included mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants.

Sago was the main material used for house walls but sago and nipa palm leaves were used for roofs. Kwila was the most preferred tree species for house posts, however it was hard to find close to the village. Instead rosewood, coconut, maea and okari were some of the commonly used species for house posts. Other hardwood species used included mangroves for both bearers and floor joists. A species of black palm known as haeo was split for flooring. Pandanus leaves were harvested and dried for weaving mats. The mats were typically sold for K20 to K50 each depending on the size.

Dugout canoes were made from erema, basswood and walnut. Erema was the favoured species since it was light and canoes made from this timber were manoeuvrable at sea, even after the timber had absorbed some water. The ocean canoes typically had outriggers for stability.

Drinking water was primarily sourced from wells; rainwater water was also collected as secondary resource.

The Hohoro River was reportedly the primary river transport route for the villages, however during the rainy season log and debris flowed in the river, which limited travel. The primary land transport route was reported between Ihu, Oru and Kavava, however this became muddy during

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the rainy season and was difficult to walk on. Primary ocean transport routes were between Kikori-Baimuru, Oru, Lariau, Herekela, Hohoro to Ihu-Kerema; these were affected by high seas/rough weather.

3.13.9 Health

The Orokolo Sub Health Centre was manned by nine staff (eight community health workers and one nurse) of which two were employed by the government and the rest were employed by the United Church. It provided health services to all seven wards of Orokolo area, as well as to nearby Baimuru villages such as Aumu, Apiope and Aivai.

Services provided included obstetrics (antenatal, labor, postnatal, family planning), outpatient treatment (both adults and children), disease control (tuberculosis, leprosy), and emergency. However, the buildings were in a state of disrepair and there was limited stock of consumable materials, shortage of equipment, no fridge, no toilets for patients, no incinerator, no water supply, no lights, limited stock and lack of range of medicines. Serious cases were often referred to Kerema Hospital. An aid post was located in Lariau. It was manned by one community health worker paid by the Catholic agency.

Men identified the main health problems as tuberculosis, eye problems, malaria, leprosy and ear problems. Women indicated that malaria, diarrhoea and tuberculosis were prevalent.

Only a few women were aware of how STDs were transmitted and treated. Most people were aware of family planning and most women used contraceptives. It was often a shared decision between men and women.

3.13.10 Education

There were three schools in Ward 7. One primary school called St Anne Primary located in Oru village and two elementary schools, located in Lariau and Herekela villages. St Anne Primary had 114 students, Herekela elementary had 72 students and Oru-Lariau Elementary School had 26.

Most children reportedly attended school, however where attendance was poor it was primarily because children were kept out of school to help their parents with gardens or because of poor conditions (i.e. heavy rainfall flooding the classroom or classes being run outside and being disrupted by rain); distance was also a factor in poor attendance, particularly at Oru-Lariau elementary.

3.13.11 Law and Order

Law and order problems included murder, suicide and verbal abuse and/or fighting, often as a result of alcohol (home brew), drug (marijuana) abuse or gambling. Serious crimes were reported to the police at Ihu. Minor crimes were dealt with by the village court magistrates and other village leaders. Reportedly, villagers sometimes gambled and prostitution occurred in secret. Although domestic violence was prevalent it was often regarded as a family problem and was therefore solved within families.

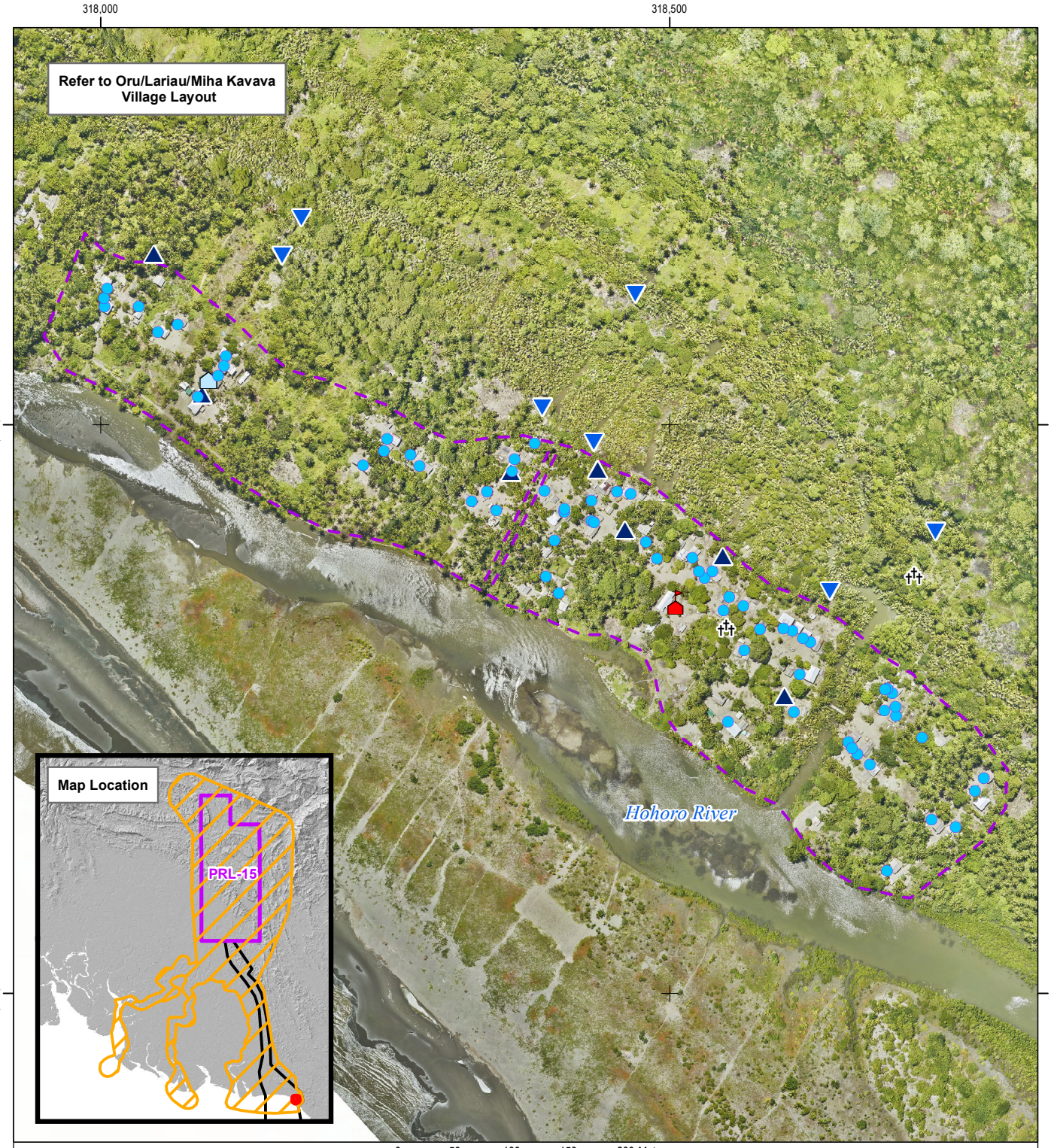
3.13.12 Cultural Heritage

Elders recalled ancestors coming down toward the coast from Purari. The two most important sites known in oral traditions were Heve and Popo. For elders these places were particularly

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important because they contained ancestral artifacts. Heve and Popo were also spirit sites however; oral traditions detailing spiritual significances were confidential and were not discussed. One spirit site was known in oral traditions, it was a section of a creek called Ape Ohoro. Cemeteries and burial places close to the village dating from after the introduction of Christianity were also highly significant ancestral places. Many intangible cultural heritage values used in everyday life such as incantations to increasing fishing catches, promote sago growth and traditional medicines were important to the community. During special occasions women and men at Oru and Lariau performed a traditional song and dance called opumiri. Women and men at Herakela performed two different songs and dances called lavura and meivaharo. These songs and dances were performed on special occasions such as Independence Day and school cultural days.

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SCALE: 1:5,000 @ A4

0 50 100 150 200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Operating trade store
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Herakela/Hiloi Village Layout

FIGURE: 3.13a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77473 **REVISION:** E

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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SCALE: 1:12,000 @ A4

0 125 250 375 500 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Primary School
- Aid Post, Operating
- Burial sites/cemetery
- Church
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Oru/Lariau/Miha Kavava Village Layout

FIGURE: 3.13b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77479 **REVISION:** E

DATE: 20/12/2016

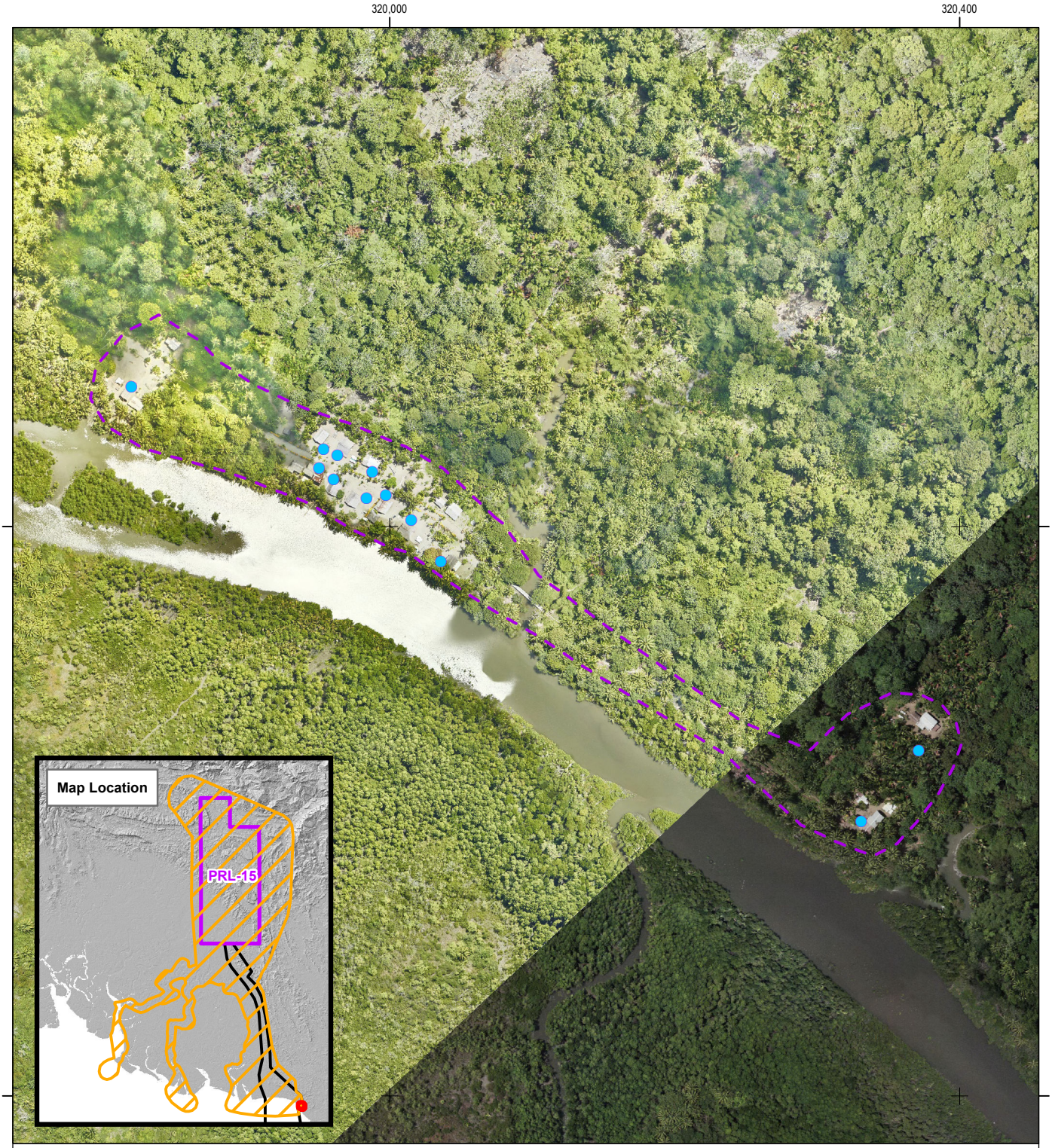
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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Hohoro Village Layout

FIGURE: 3.13c

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77467 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.13 – Herekela, Oru, Lariau and Hohoro Gallery



Photo 1 – Walking track linking the villages of Ward 7



Photo 2 – One of the bridges constructed by the youth group



Photo 3 – Herekela elementary school



Photo 4 – Lariau aid post (front)



Photo 5 – Lariau aid post (inside)



Photo 6 – 'Black market' offering fresh fish and vegetables at Herekela

3.14 Huruta

3.14.1 Summary

Table 3.14 summarizes key social data for Huruta.

Table 3.14 – Huruta Summary

Thematic Area	Indicator	Description	
Location	**Description**	Inland (Muro area) to the east of the Purari River, located approximately 50 km southeast of Herd Base	
	Coordinates	145° 16' 42.36" E	-7° 48' 48.55" S
	Physical setting	Set amidst lowland forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	1 (Avavu)	
Population and demography	**Population**	246	
	Gender ratio (M:F)	107 (127:119)	
	Ethnic group	Orokolo	
	Affiliations	Muro and Orokolo communities	
	Households	44	
	Household size	5.6	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1959	
	Name meaning	Unknown	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts, some garden food such as cooking banana, cassava, kaukau and taro. Extensive hunting for wallaby, wild pigs, cassowary cuscus, bandicoots, and more and extensive fishing (main species catfish)	
	Resources	Sago swamps, nipa palm swamps alluvial forest and hill forests	
Commercial activities	**Businesses**	2 x fuel sellers	
Housing	**Housing style**	84% traditional 7% semi-improved 9% n/a	
	Floor type	91% raised 9% n/a	
	Housing materials	Split black palm and sometimes betel nut palm floor, sago and nipa palm walls and roofs, kwila, rosewood and moiahar house posts and bearers.	
	Cooking	Inside using firewood	
	Lighting	Solar, generator and battery	

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Table 3.14 – Huruta Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Muro Aid Post, approximately 1 km to the northwest; Kapuna Health Centre approximately 42 km to the northwest
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	20 to 25 years
Education	**Facilities**	1 x elementary school.
	Attendance	52 students at elementary school
	Nearest facilities used	Muro Primary approximately 1 km to the northwest; Don Bosco secondary school, located at Araimiri.
Religion	**Churches**	Baptist
Water and sanitation	**Drinking Water**	A small spring fed creek, several wells and rainwater tanks
	Toilet facilities	Private pit
	Waste disposal	Tin cans/batteries were disposed of by burying, paper/plastics were burnt and food scraps were fed to the animals
Law and order	**Prevalent issues**	Fighting, stealing, domestic violence, verbal assault, growing and selling marijuana and alcohol abuse
	Resolution mechanisms	Village and church leaders, village magistrate
Cultural heritage	**Tangible cultural heritage sites**	Heve Hill and Popo ancestral village site
	Intangible cultural heritage	Traditional language and sing sing

3.14.2 Settlement History

Huruta was one of several villages in Muro that was settled after the migration of people from upper Purari. The migration by their ancestors could have taken place in the early 1900s since there are no written records of their history or that period by the early missionaries and government agents who first went into Orokolo. Elders maintained a detailed ancestral history that traced their origins to the Purari delta and from there to the Purari headwaters. The most significant ancestral places for Huruta villagers were Heve Hill and the Popo ancestral village site.

3.14.3 Social Organization

Clan leaders (from Huruta's five clans) and church leaders and a village magistrate, ward councillor and land mediator contributed to the village's social organization.

3.14.4 Land Ownership

Land ownership was strictly patrilineal and was transferred from father to son from generation to generation. Women could be given user but not ownership rights. Under the Orokolo system of land ownership, women who married outside of the clan and tribe were expected to reproduce children who would inherit their father's land. Thus children could not go back to their mother's

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land to claim land ownership although they could be given user rights to cultivate garden crops only. They were not allowed to plant permanent fruit-bearing trees such as coconuts, breadfruit or sago. In extreme cases where a man was not able to have sons of his own, he could be compelled to adopt a male member of his clan or tribe as his own son in order to continue his power of land ownership.

3.14.5 Women

Women's main role in the village was making sago, as well as caring for children, tending gardens, collecting firewood and water, cooking and cleaning on a daily basis. Making sago and gardening was considered vital as they depended on the food in times of food shortage which usually occurred in the dry season or when there were droughts. Women sometimes travelled a fair distance to fish, collect shells and catch prawns and crabs. This supplemented their usual diet of sago, coconuts, and garden produce. Most women sold a variety of garden produce at the Muro station market on Saturdays, earning around K10 to K20, which they spent on soap and other basic household items.

Women generally felt safe and secure because the men respected them and this sense of security had remained stable over the years.

Marrying age was between 20 and 25. The village had a traditional birth attendant and the majority of women travelled by dingy to Kapuna Health Centre to deliver their babies.

3.14.6 Youths

The youths of Huruta village had a youth group name called Mayavu, which consisted of over 200 members ranging from 15 to 30 years of age. The major role for the youth group was to do community work both free and paid. Outside of the group, youths' main roles were attending school, caring for family, making and tending gardens, raising livestock, fishing, and collecting water and firewood. For recreation, youths mainly participated in sporting activities, relaxing, socialising, and craft such as making baskets, mats, nets and canoes.

3.14.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted on the southern end of the village. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought.

Garden food was grown on the northern end of the village, towards Arehava 2 in the bush one to two kilometres walk away, further along the existing walking track towards Muro Station and towards the coast. Small areas of garden food were also grown within the village. A very wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Several food trees were grown including coconuts, guava, bread fruit (kapiak), laulau and okari nut.

Extensive hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), goura pigeon, bandicoots, python, monitor lizards, frogs and flying fox. Insect larvae were also eaten including

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sago grubs and grubs. There were few animal species that were not eaten apart from birds of paradise. Mushrooms were also harvested that grew on processed sago and on dead wood.

Extensive fishing also occurred along the Purari channels, the Aievi and Alele passages, and at the fishing camp close to the coast near Apiope where saltwater species were common. A range of catfish species were the main species caught but also tilapia (in the swamps), super tilapia, barramundi, black bass, mullet, microfish, mudfish, eels, prawns, sharks and sawfish. Fishing was not extensive on the Muro River as fish catches were perceived to be low. Important saltwater fish included stingrays, red emperor, salmon, hammerhead sharks, diamond sharks (possible shovel nose shark) with stingrays being the most common species. Other marine aquatic resources included crabs and shellfish. Two species of turtle (marine and freshwater) were also caught but their eggs were not collected since there were no sand banks for laying eggs. Crocodiles were rarely hunted for meat and skin for sales.

3.14.8 Land and Natural Resource Use

Land resources included, sago swamps, nipa palm swamps alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Some of these resources, particularly hill forest and alluvial forest had been logged, resulting in substantial forest degradation, particularly the development of weed corridors and less abundant fauna for hunting.

Sago was the main material used for house walls and roofs, and nipa palm was also used. Kwila from the swamps was the preferred tree species for house posts, which was mainly sourced from Aievi Passage and associated creeks downstream, but rosewood and a species known as moiahae from the hill forests were also used. The same species were also used for house bearers, but for rafters and joists, avare (a swamp/river bank species) and mahumahu (a lowland species) were used. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Some haeo palms were grown in the village but most occurred in the forest. Strips of bark from a tree (moroko) were widely used for tying thatch and a range of cane ropes were used instead of nails.

Drinking water was primarily sourced from a small spring fed creek known as Maiavu Creek. Several wells were also dug in 2015 because of the drought. Rainwater from tanks was used as a secondary source of water during the wet season.

The village was connected to several other villages by walking tracks including Ere-Kilavi, Avavu, Muro Station, Arehava 2 and Paevera. In the 1970s it was possible to drive to Kerema but the road was not maintained once Muro Station closed. Dugout canoes were used to paddle to the coastal fishing camps from Muro Station. Betel nut and mustard, which were important cash crops, were the main source of income. These were mainly sold at Kamusi logging camp in the Western Province or at Evara logging camp. Motorised dinghies were used to travel to Kerema for onward transport to Port Moresby and to Kapuna for further medical treatment.

3.14.9 Health

No health facilities existed in Huruta so people travelled to Muro Aid Post for treatment or resorted to traditional methods. Women also often travelled to Kapuna Health Centre to deliver their babies. Males identified the main health problems in the village as childbirth, diarrhoea,

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malaria and tuberculosis. Women indicated that common illnesses included respiratory infections, coughs and headaches. They reported that the main reason for their poor health was their workload and for children it was their poor hygiene. The youth reported that their main reason for poor health was not having toilets and water-related issues resulted in diarrhoea and malaria.

None of the men or many women knew of the prevalence of STDs and only a few had an understanding of how they were transmitted and treated. Most women were familiar with contraceptive methods and used family planning methods. It was often a women's decision or a shared decision between a woman and her husband to use family planning methods.

3.14.10 Education

There was one elementary school in Huruta with one teacher. Primary-aged students walked to Muro Primary School and secondary-aged students travelled by dingy to the Don Bosco secondary school at Araimiri. A total of 42 students (27 males and 25 females) attended Huruta elementary. The classroom was in good condition as the community built it in 2015 with money from the national government Tuition Fee Free (TFF).

3.14.11 Law and Order

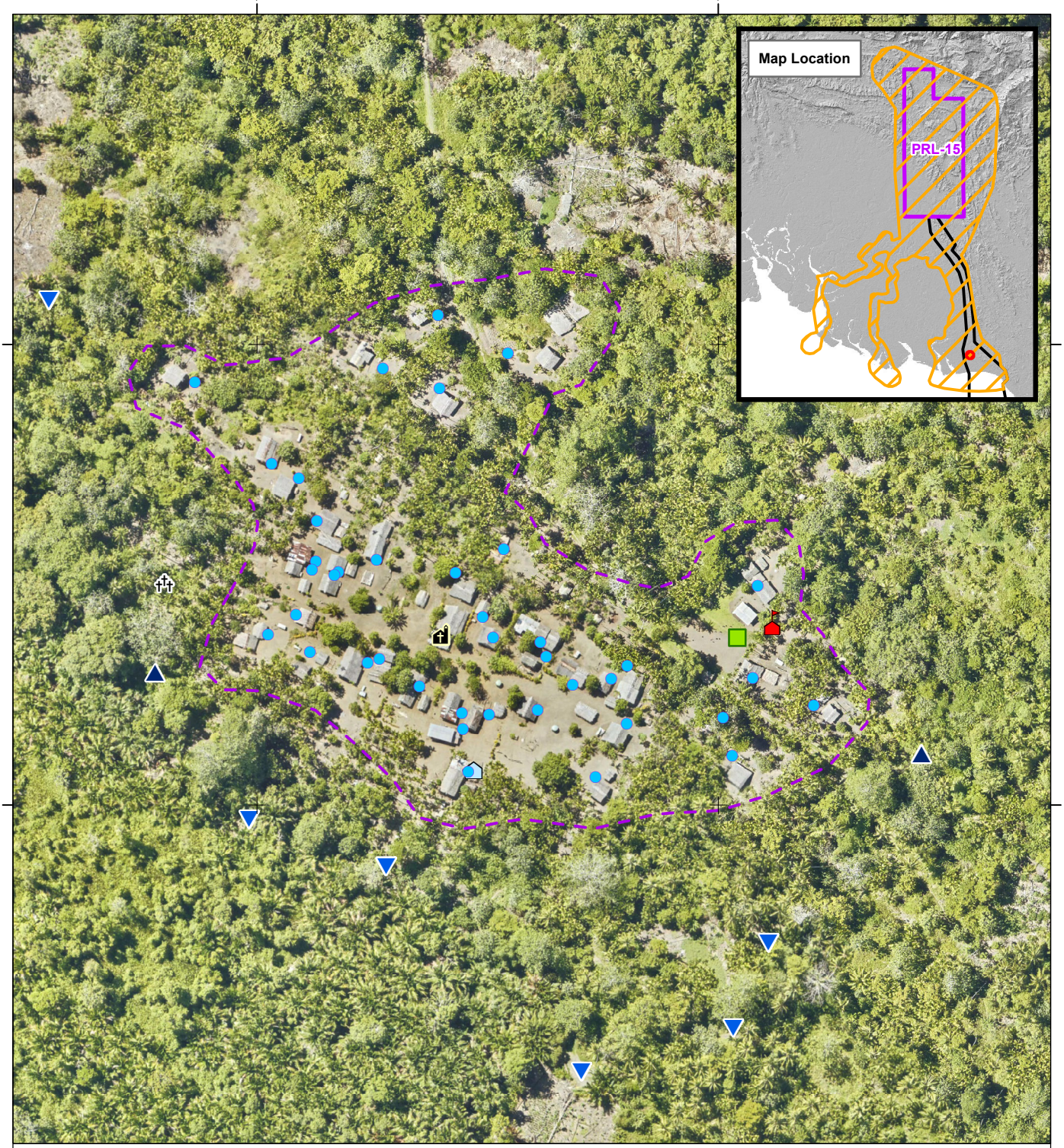
The village faced a range of law and order problems, including fighting, stealing, domestic violence and verbal assault/swearing. Youth reported that growing and selling marijuana was the biggest law and order issue followed by alcohol abuse, using marijuana, fighting and land disputes. Often the community leaders would intervene and stop fights. Some cases were referred to either one of three village magistrates or various church and village leaders to discuss and resolve most offences.

According to the leaders, some men consumed alcohol and smoked marijuana, but no women.

3.14.12 Cultural Heritage

Huruta villagers spoke Orokolo language and the elders were of the view that maintaining their language was essential to successfully passing intangible cultural heritage values on to the next generation. According to elders, knowledge about traditional spiritual places had been eroded however, although the stories may have been forgotten, the traditional spiritual places remained part of their physical and cultural landscapes. Many intangible cultural heritage values had also faded from everyday life although traditional sing-sing was still performed on special occasions even though many aspects of song and dance had been forgotten. People regularly found pottery sherds in their gardens and considered such finds to be important because these artifacts represented a material link to their ancestors. Ancestral heirlooms such as shell ornaments were kept as reminders of ancestral times but no longer changed hands as bride price.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Huruta Village Layout

FIGURE: 3.14

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77461 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.14 – Huruta Gallery



Photo 1 – Huruta family cooking sago mixed with crab



Photo 2 – Huruta family making tulip soup



Photo 3 – Huruta elder with shell valuables

3.15 Ikinu

3.15.1 Summary

Table 3.15 summarizes key social data for Ikinu.

Table 3.15 – Ikinu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the eastern entrance to the Urika River (the middle tributary of the Purari River), approximately 55 km southwest of Herd Base. It comprises the hamlets of Mirimailau (sometimes called Kakari) and Araueramiri	
	Coordinates	145.0054169	-7.7973528
	Physical setting	Located on the banks of a tributary of the Purari, and surrounded by lowland swamp forest. Tidal	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural LLG	
	Ward	12 (Ikinu)	
Population and demography	**Population**	294	
	Gender ratio (M:F)	109 (153:141)	
	Ethnic group	Koriki	
	Affiliations	Kairimai, Ara'ava, Akoma, Kairu'u, Kakari, Kinipo	
	Households	42	
	Household size	7.0	
	Language	Koriki	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1964	
	Name meaning	When someone asked where a previous leader named Ako was, they responded "ikinu", meaning 'he's already gone'	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food. Some garden food such as cooking banana, taro, kaukau, cassava, and greens. Extensive hunting for wild pigs, cuscus, bandicoots, monitor lizards and more and extensive fishing (main species catfish)	
	Resources	Sago swamps including mixed nipa and mangrove swamp areas	
Commercial activities	**Businesses**	3 x trade stores, 1 x fuel seller	
Housing	**Housing style ***	90% traditional 5% semi-improved 5% modern	
	Floor type *	100% raised	
	Housing materials	Split black palm floor, hardwood posts, rough sawn frame, woven sago leaf stem panels for the walls, some split timber walls, sago roof	
	Cooking	Both inside and outside using firewood	
	Lighting	Kerosene, solar, battery and some generators	

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Table 3.15 – Ikinu Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Akoma Aid Post, approximately 3 km to the east-southeast
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	15 to 20 years
Education	**Facilities**	None. Elementary students attended school at Kakari village approximately 1.5 km to the east-southeast
	Attendance	N/a
	Nearest facilities used	Akoma Primary School, approximately 3 km to the east-southeast
Religion	**Churches**	United, Christian Life Center, Bahai
Water and sanitation	**Drinking Water**	Rivers/creeks and rainwater
	Toilet facilities	Long drop
	Waste disposal	Tin cans/batteries and paper/plastics dumped into bush and sea/river, food scraps dumped into river or fed to animals
Law and order	**Prevalent issues**	Stealing; fighting; arguments; domestic violence; use of marijuana and drinking home brew
	Resolution mechanisms	Village leaders and village court
Cultural heritage	**Tangible cultural heritage sites**	2 x ancestral village sites
	Intangible cultural heritage	Sing sing and dance, sago processing, hunting, fishing, ancestral material culture, traditional medicines

*Data for housing style and floor type was only collected for 21 out of the 42 households. Percentages for these were calculated from 21 households only.

3.15.2 Settlement History

The people of Ikinu originated from a place called Barualavi, which was located upstream near Ara'ava. People left Barualavi in 1919 and settled in three or four different locations before settling in Ikinu in 1964. The main reason for moving downstream was to find more suitable land for the village, as flooding was a problem in most of the village sites. Two hamlets of Ikinu, Mirimailau and Araueramiri, were settled in 1964 and 2012 respectively. Mirimailau has also been referred to as Kakari in the past.

3.15.3 Social Organization

Ikinu (and the hamlets of Mirimailau and Araueramiri) had three village leaders, who kept the peace and guided behavior in the village. They received support from church leaders, the councillor, the village magistrates and others. Ikinu contained 14 clans, each with a leader that made decisions pertaining to land use. Ikinu was well organized, having a village recorder and a ward development committee that had made funding submissions to the LLG.

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3.15.4 Land Ownership

Each family within each clan was allocated land for their exclusive use. Men made decisions regarding land use and maintained ownership. Women used their husband's land. If the husband died, the wife would generally return to her clan to garden there. If a man married into the village the clan would be likely to allocate land to him and his wife.

Most land disputes occurred when someone was accused of harvesting produce from land belonging to another clan, or clearing land to make gardens on land owned by another clan. Such disputes were generally resolved by village leaders through mediation and compensation. If the dispute involved people from another village, the councillor would liaise with the councillor representing the other people, and initiate a process of mediation. Failing mediation, the dispute would be handed over to a village court comprising multiple village court magistrates.

3.15.5 Women

Most women engaged in marketing activities in various locations including Wabo, Baimuru, Kapuna, Kikori, Orokolo and Sirebi. They often travelled by canoe to sell their produce including sago, coconuts, crabs, fish, mats, baskets, and betel nut.

Women often made decisions about planting gardens and when to leave gardens fallow. Women often consulted with husbands or male members in the family then travelled with male companions, often husbands, upstream to find sago. There were some women who made sago on their own without the help of husbands.

Women generally felt safe and secure in the village and this sense of security had remained stable for some time. The marrying age was between 15 to 20 years of age, and most babies were born in the village. The remaining travelled to Kapuna Health Centre to deliver their babies.

3.15.6 Youths

There was a combined denomination youth group at Ikinu and Kakari with more than 70 members aged 13 to 25. The youth split into groups to participate in sports activities including basketball, touch, rugby, volleyball and soccer. All groups had appointed leaders that had regular meetings.

The youth group members participated in church youth rallies in other villages and regular community work such as building and maintaining houses, making canoes, (male youth roles) and making sago when there's a 'haus krai' in the village (female youth role). They were often paid for assisting. For recreation, the youths spent time with friends, relaxed, participated in craft, went to the beach and played sport.

3.15.7 Subsistence

The main staple food was sago mostly planted by their forefathers upstream of Urika and Purari Rivers. Most food gardens were established mainly in the nipa palm areas with main garden crops grown including cooking banana, taro, kaukau and cassava. A range of greens grown included aibika, tulip, and kalava and fruit trees coconut, okari nut, mango, laulau and kapiak (breadfruit).

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Extensive hunting was done mainly in the sago swamp forest for wild pigs, monitor lizards, bandicoots, megapodes, cuscus, bush rats, Victoria crown pigeon and flying fox. Various insect larvae including larvae from dead trees and sago grubs were also harvested.

Extensive fishing activities occurred mainly along the Urika River and associated creeks including the ocean for catfish, mudfish, barramundi, salmon, mullet and shark. Other aquatic resources harvested included prawns, shell fish, mud crabs. Freshwater and marine turtles were also caught for meat and eggs. Saltwater and freshwater crocodiles were hunted for meat and skin, which was sold.

3.15.8 Land and Natural Resource Use

Land resources included extensive sago swamps including mixed nipa and mangrove swamp forests. These forest types provided an array of essential timber and non-timber forest products including medicinal plants. Forest products were mainly harvested from along the Urika River banks and its associated creeks, sago swamp, nipa and mangrove forests.

Rosewood was the preferred house post while kwila was preferred to a lesser extent due to its scarcity in the area. Nipa was the main material used for house walls and roofs. Other building materials used for bearers, floor joists, studs and rafters were mainly sourced from the mangrove forest. Black palms were split for flooring and a range of rattan was used for as rope for replacement for nails. Erema was the main species for canoe making.

Drinking water was mostly sourced from the Urika River although there were two community tanks available in the village that were quickly depleted in the dry season.

The Urika River was the primary river transport route to visit riverside gardens, harvest sago and for fishing. It was also the main route for accessing government services like the health, education and for marketing of garden produce and other seafood products at Kapuna, Baimuru, Kikori and Evara logging camp.

3.15.9 Health

Ikinu Aid Post was a United Church run facility that had been closed since 2012 when the health worker left for treatment of his illness (later passing away). Since the beginning of 2016, a volunteer community health worker has treated patients at Kakari in an existing health facility that was run down, incomplete since construction (no ventilation, no sealed windows), had nil equipment and expired medical supplies. Some patients travelled to Akoma Aid Post, and if serious were referred to Kapuna.

Men identified malaria, tuberculosis and head/body pains as the main health problems. Men would treat themselves when they got sick (washing, eating well and resting), but sought medical attention at Akoma Aid Post or Kapuna Health Centre if serious. Men indicated that there was good knowledge of HIV/AIDS and other sexually transmitted diseases in the village because of the regular awareness activities undertaken by staff from Kapuna Health Centre.

Women reported that only a few people in the village had an understanding of how STDs were transmitted and treated. Although all women had an understanding of different contraceptive methods and where to access them, there were some women who still used traditional methods

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of family planning. Some men, especially young married couples, refused to let wives get family planning thus some women accessed family planning in secret.

3.15.10 Education

An elementary school existed in Ikinu, while the nearest primary school was at Akoma, a 20-minute paddle by canoe. It was reported by the teacher that 45 students attended the elementary school (20 males, 25 females).

3.15.11 Law and Order

Men identified the main law and order problems as stealing, fighting, arguments, domestic violence, and use of marijuana and/or drinking home brew. Some men and some women smoked marijuana, drank alcohol and gambled, although drinking and gambling were usually restricted to special occasions such as Christmas or birthdays.

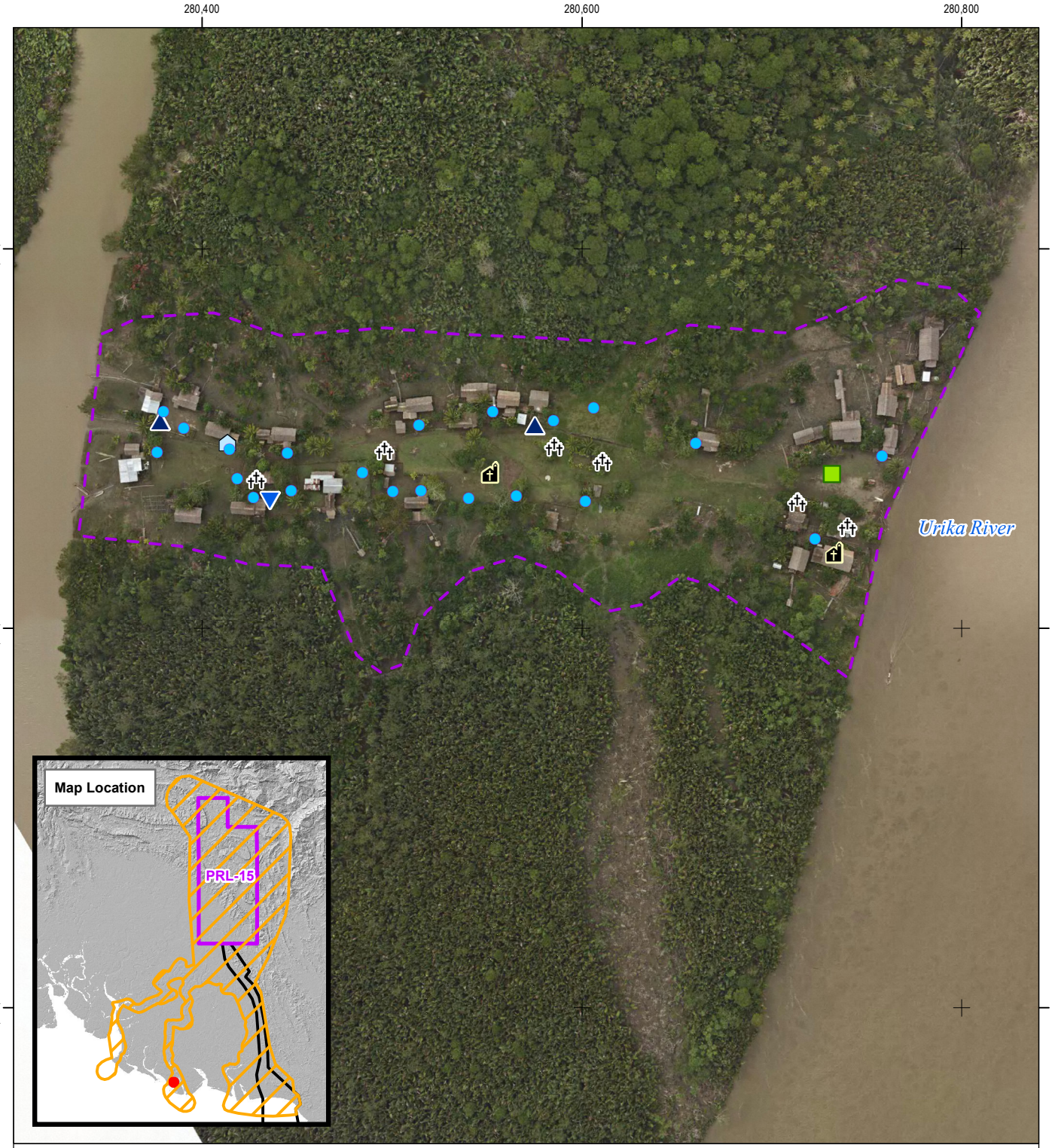
Village leaders attempted to resolve law and order problems through mediation. This could involve traditional leaders, church leaders and village court representatives. If this failed then the case could be heard by the village court and fines and/or compensation imposed.

3.15.12 Cultural Heritage

According to informants, Ikinu and Kakari were once one group of people who separated due to differences in the past. Both villages originated from one main village called Ikinu, which was established in 1919. From the original Ikinu, disagreements arose and so the village split resulting in two different migration routes. Although separate, both Ikinu and Kakari still settled side by side from each other. This saw the establishment of a second Ikinu and a Kakari village in 1922. After 12 years the build-up of the coastline encouraged the migration of people from inland to coast and so the establishment of a third Ikinu and second Kakari villages eventuated. The final migration leg of the journey concluded with the recent establishment of the fourth Ikinu village and the third Kakari village in 1964.

There were two tangible cultural sites indicated; Ikinu Village 4 and Barua Lavi (Men's House). There were no tangible cultural heritage sites found within the current day villages due to the fact that all tangible cultural heritage sites and associated rituals were discarded during the Tom Kabu movement during 1945-1950. Intangible cultural heritage values were still passed between generations, except for spirit/ritual and traditional ways of dress, which were absent.

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SCALE: 1:3,000 @ A4

0 30 60 90 120 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Ikinu Village Layout

FIGURE: 3.15

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77462 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
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Plates 3.15 – Ikinu Gallery



Photo 1 – Disused Ikinu aid post



Photo 2 – Inside the disused Ikinu aid post



Photo 3 – Community hall, known as ‘haus win’ (wind house)



Photo 4 – Headstones marking grave sites



Photo 5 – Traditional grave sites



Photo 6 – Water tank

3.16 Iuku

3.16.1 Summary

Table 3.16 summarizes key social data for Iuku.

Table 3.16 – Iuku Summary

Thematic Area	Indicator	Description	
Location	**Description**	Popo coast, central location in Orokolo Bay, located approximately 55 km southeast of Herd Base	
	Coordinates	145° 18' 12.784" E	-7° 51' 2.241" S
	Physical setting	Located on the palm fringed coast of Orokolo Bay, amongst Mangroves, beach vegetation, alluvial forest and hill forests	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	4 (Arehava)	
Population and demography	**Population**	514	
	Gender ratio (M:F)	104 (262:252)	
	Ethnic group	Orokolo	
	Affiliations	Coastal and inland of Orokolo Bay communities	
	Households	80	
	Household size	6.4	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Iuku was the name of a male ancestor. The village was also known as Hairy Maipi, which were the names of the two major clans in the village	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts, some garden food such as cooking banana, cassava, kaukau, and taro. Extensive hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and monitor lizards and other, and extensive fishing (main species catfish)	
	Resources	Mangroves, beach vegetation, alluvial forest and hill forests	
Commercial activities	**Businesses**	1 x trade store and 6 x dinghy operators	
Housing	**Housing style**	84% traditional 16% semi-improved	
	Floor type	100% raised	
	Housing materials	Split black palm floor, sago leaf for walls, sago leaf and nipa palm for roof thatch, kwila, rosewood, coconut and okari nut for posts	
	Cooking	Both inside and outside using firewood	
	Lighting	Kerosene, battery, solar and generator (petrol)	

Table 3.16 – Iuku Summary (cont'd)

Thematic Area	Indicator	Description

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Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, approximately 2.5 km to the east-southeast
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15 to 20 years
Education	**Facilities**	1 x elementary school. Primary aged students attend Arehava primary school (at Kaivukavu) approximately 1.5 km west
	Attendance	48 students enrolled at elementary school
	Nearest facilities used	Ihu High School, approximately 12 km to the southeast
Religion	**Churches**	United Church
Water and sanitation	**Drinking Water**	Four community water tanks recently donated by AusAid and Kapuna Health Centre. Well water during the dry season.
	Toilet facilities	Bush or a private pit
	Waste disposal	Tin cans/batteries were disposed by burning, burying and dumping in the mangroves. Paper/plastics were burnt and food scraps were fed to pigs
Law and order	**Prevalent issues**	Insulting words, fighting, stealing and sexual assault and marijuana abuse
	Resolution mechanisms	Village court
Cultural heritage	**Tangible cultural heritage sites**	Ancestral villages called *Unia Uku Pari, U'upu Akoma, Pana Poa, Old Akoma*. Spirit sites called *Alau Kaipu* and *Aua Euao*
	Intangible cultural heritage	Song and dance, and customary practices relating to food and drink

3.16.2 Settlement History

The upper Purari was the original source of the first series of migrations by their ancestors. The reasons for moving were many and the direction was usually southward or downstream along the Purari River, settling in several locations, while others took the forest route. At some point in time, all those ancestors converged at Popo, which at that time was the coastline, and built a vibrant settlement. Iuku informants pointed out that Popo at one time was the trading post of the famous Hiri trade system. Over time, further migrations took place that saw people mostly moving to the coast to claim new land being formed due to sedimentation build-up. The Popo exodus was attributed to increasing population pressure, which then caused intra-clan and family rivalry, land scarcity for gardening and other valuable resources, and warfare.

3.16.3 Social Organization

Iuku was represented by a ward councillor, village court magistrate and land mediator. Iuku did not have traditional chiefs, but they had elders who acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village.

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3.16.4 Land Ownership

Iuku strictly observed the patrilineal system of land ownership and control over it. Power and control over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees.

3.16.5 Women

Sago making was regarded as the most important role a woman performed, as it was one of the staple foods along with bananas. Women were also responsible for collecting firewood and water, fishing, caring for livestock, cooking and cleaning on a daily basis. Some women engaged in income earning opportunities and often sold sago, fish, and other garden produce at other markets such as Kaivukavu or within the village. They often earned between K15 to K20 and mostly spent it on basic items such as soap and sugar. Sometimes the women travelled in groups to as far as Evara and Poroi logging camps to sell betel nut.

Women generally felt safe and secure despite being afraid of sorcery once in a while and this sense of security had remained stable over the years.

Marrying age was between 15 and 20. The village had a traditional birth attendant and the majority of women walked to Orokolo Sub Health Centre to deliver their babies

3.16.6 Youths

The youths of Iuku village had a youth group name called Miurilavi, which was named after their tumbuna haus and comprised more than 130 youths ranging from age 17 to 30 years old.

The major roles for youth were gender specific. The males were responsible for gardening, fishing, making sago and general building activities. The women's roles were cutting firewood, cooking food, fishing, beating sago and carrying sand. Typical activities that the youths participated in included community work (both paid and free), and other support work they did for vulnerable groups such as the old, widows, the sick and single mothers. Youths were also involved in sports and church activities, which were seen as crucial parts of their lives. For recreation, youths mainly participated in sporting activities every Thursday and Friday, as well as relaxing, socialising, and craft such as making baskets, mats and hand bands.

3.16.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted close to the village and north of the village in swampy areas and creek banks across the alluvial plains. Coconuts were also an important staple particularly when garden foods had failed due to flooding or when sago was inaccessible when flood waters were deep.

Garden food was mostly grown close to the village across the alluvial plains to the north. A few food gardens occurred close to the beach on low-lying old sand dunes. A wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Fish and other crustaceans were also exchanged for garden food with other inland villages or purchased from village markets. Several food trees were grown including coconuts, guava, okari nut, bread fruit (kapiak) and laulau.

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Extensive hunting occurred (with dogs and spears) in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, wildfowl (eggs also collected), monitor lizards, flying fox, green frogs, hornbills and parrots. Sago grubs and grubs that lived in dead trees, particularly mangroves, were eaten. Edible mushrooms that grew on the processed sago and on dead wood were harvested.

There was extensive fishing along Miha Creek, Herekela Creek and Aievi Passage including the ocean. Catfish was the main species caught but also salmon, red emperor, barramundi, mullet, sharks (hammerhead and shovelhead), and stingrays. Other aquatic resources included prawns, mudskippers, two types of crab, and three types of shellfish including one collected from the beach sands in the intertidal zone. Shellfish were also collected from Herekela Creek. Three species of turtle (two from the sea – hard and soft skin and small size from sago swamps) were caught for their meat and eggs.

3.16.8 Land and Natural Resource Use

Land resources included, mangroves, beach vegetation, alluvial forest and hill forests. A corridor of holly mangroves separated one section of the village from the beach. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. A particularly important medicinal plant was kalava, which was grown in the village. Leaves of the plant were mixed with lemon grass and boiled. Women drank the mixture after giving birth to restore their strength. This was a particularly important plant throughout the lowlands of Gulf Province.

Sago leaves were the main material used for house walls, but sago and nipa palm leaves were used for roof thatch. Kwila was the most preferred tree species for house posts, however it was difficult to find within close proximity of the village although some kwila was sourced from Aievi Passage. Instead, coconut, rosewood and sometimes okari nut were the more commonly used species for house posts. Other hardwood species used included mangroves for both bearers and floor joists, and a species of black palm known as haeo was split for flooring. Dried pandanus leaves were used for weaving mats. The leaves were collected from the banks of local creeks. Mats were sold for between K20 – K30 each depending on the size.

Dugout canoes were made from erema, kepere, rosewood, okari nut, milky pine and swamp talis. Erema was the favoured species since it was light and canoes made from this timber were still manoeuvrable at sea, even after the timber had absorbed some water.

The primary sources of drinking water in the village were wells and rainwater tanks.

The village was connected to several other inland villages by walking tracks including Huruta, Muro Station, Ere-Kilavi, Avavu, Arehava 2 and Paevera. Beach tracks connected other coastal villages within Orokolo Bay including Mareke, Harevavo and Kaivukavu. The primary river transport route was via canoe from Miha Creek to Aievi Passage, Apiope, and villages along the Purari River while the main ocean transport route was via motorised dinghies to Ihu and Kerema for onward transport to Port Moresby. When the sea was calm travel by canoe to Aievi Passage also occurred. Dinghies also travelled to Baimuru to the west and to several logging camps including Kikori and Kamusi to sell betel nut and mustard.

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3.16.9 Health

There were no health facilities in Iuku, but there was a traditional healer. The closest health centre was Orokolo Sub Health Centre at Kavava.

The women perceived that most health issues faced by them were the result of poor diet and climatic reasons. Men identified the main health problems as tuberculosis, malaria and asthma. The youth identified workload and poor hygiene as the main health problems.

No one in the village knew about the prevalence of STDs and only a few had an understanding of how they were transmitted or treated. Some of the women had an understanding of contraceptives and how to access them and only a few used contraceptives. Most women resorted to using traditional family planning methods. For those few who used either type of birth control some women made the decision on their own and for some it was a shared decision.

3.16.10 Education

There was one elementary school in Iuku village comprising a Prep and Grade 2 class. There were 27 prep students (17 males, 10 females) and 21 Grade 2 students (6 males, 15 females), all taught by one teacher. The classroom was in good condition as it was recently built by the community in 2015 with money from the national government Tuition Fee Free (TFF). The school did not have a tank or toilet. Primary aged students attended Arehava Primary School in Kaivukavu.

3.16.11 Law and Order

Insulting words/ threats, fighting, steeling, marijuana use and sexual violence (rape) were the main law and order problems. Issues were dealt with by mediation first and if not resolved sent to the village court.

There had reportedly been four incidences of rape in the past year; two within the past month. Rape is reported to the Police at Ihu, but only one of the four cases had been investigated at the time of the SBS surveying (May 2016). Homebrew was sold at K5.00 within the village. Gambling activities ceased once basketball was introduced in the village. The fear of sorcery has increased over time.

3.16.12 Cultural Heritage

Elders from Iuku were confident in the durability of Orokolo language. They said this because Tok Pisin and English were rarely used in the village and Orokolo was the language used in the elementary school. Elders articulated a detailed and logical ancestral story that commenced with their ancestors moving out of the Southern Highlands. From there they moved to the Purari headwaters and followed the prograding coastline as new land emerged from under the sea. Oral traditions recalled a time when waves lapped beaches near Herd Base and a later time when Heve was also a beach-fronting village location. The time when Popo was on the beach was also recalled and based on genealogical reckoning that was some 230 years ago. Regardless of the actual rate of coastal progradation, oral traditions described changing coastal conditions in the Gulf of Papua consistent with what has been surmised by western researchers. Intangible cultural heritage values had faded in importance since the first missionary arrived in 1932. Traditional hunting had also waned in importance and fishing nets were now made of nylon. Elders lamented

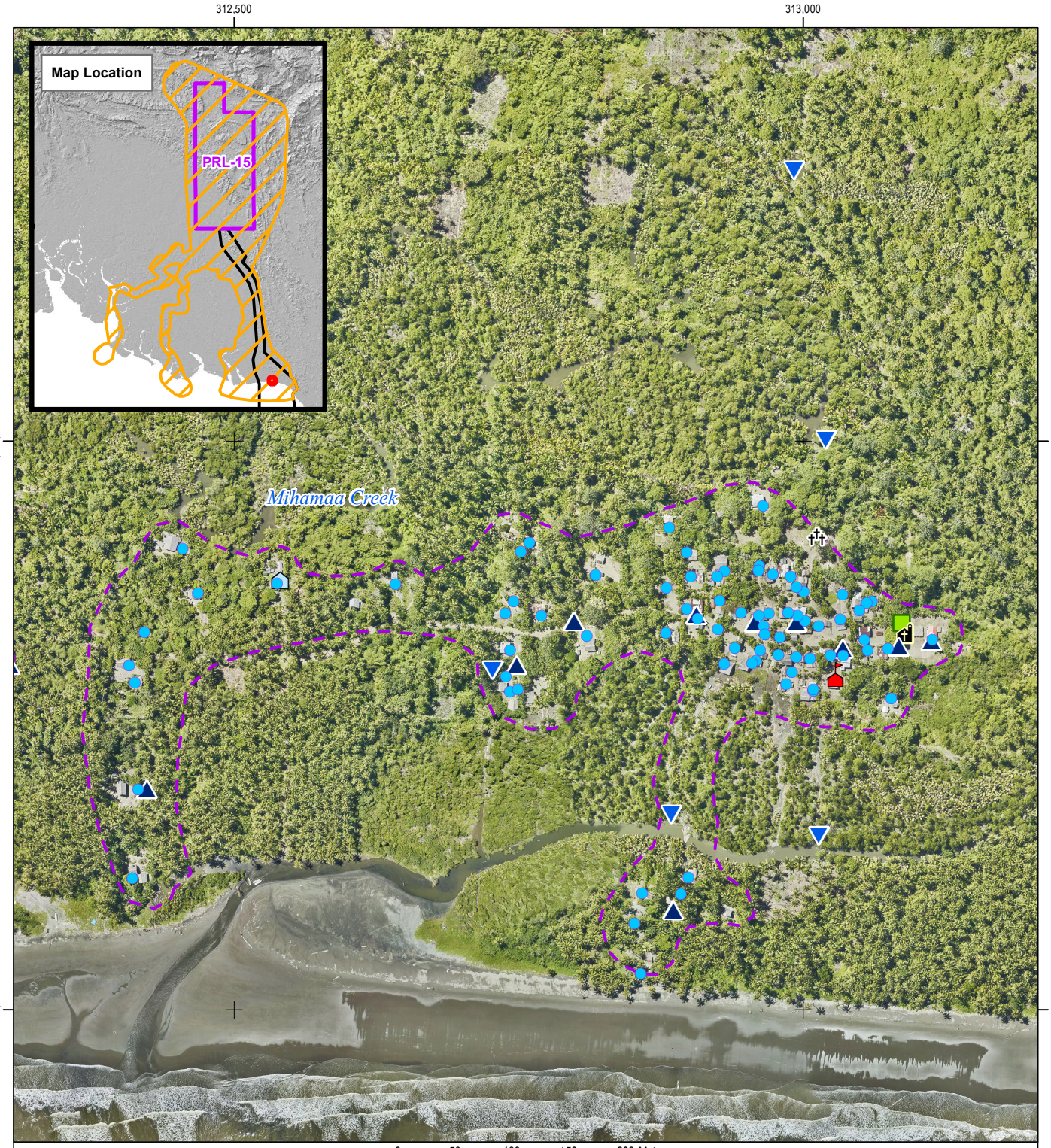
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the loss of cultural heritage values and blamed the loss on poor educational resources, which had produced a younger generation without the wisdom or capacity to appreciate their cultural heritage values.

During special occasions women and men sang and danced to a traditional song called lovori. The song and dance portrayed the story of two men and a turtle.

There were several special customary practices related to food or drinks that were still observed in the village. These included: women were not allowed to tend gardens after childbirth; it was forbidden to engage in sexual activities prior to making garden; it was forbidden to enter a garden after returning from sea; it was forbidden to enter a garden if he/she had eaten pig as this may allow pigs to go into gardens and destroy the food; after planting a sago tree it was forbidden to eat sago grubs as the planted sago may be eaten by sago grubs; and after childbirth a woman was not allowed to eat pig, fish, coconut, breadfruit seed, yam and taro until after the baby's umbilical cord had fallen off.

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SCALE: 1:5,000 @ A4

0 50 100 150 200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Iuku Village Layout

FIGURE: 3.16

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-78369 **REVISION:** E

DATE: 17/02/2017

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.15 – Iuku Gallery



Photo 1 – Elementary prep classroom



Photo 2 – Elementary school teacher

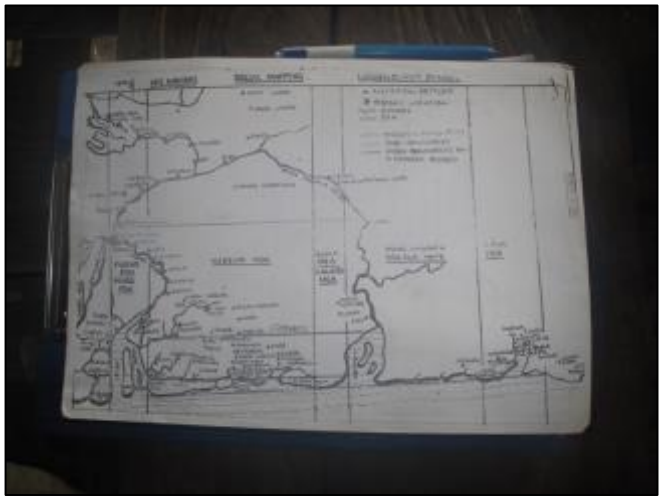


Photo 3 – Ancestral map

3.17 Kaevaria

3.17.1 Summary

Table 3.17 summarizes key social data for Kaevaria.

Table 3.17 – Kaevaria Summary

Thematic Area	Indicator	Description	
Location	**Description**	'Small Purari' arm of the Purari River (known locally as *Aivei*), approximately 21 km downstream from Herd Base	
	Coordinates	145° 8' 0.891" E	-7° 31' 32.44" S
	Physical setting	Located on the banks of the Purari River, and surrounded by lowland swamp forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	15 (Aikavaravi)	
Population and demography	**Population**	113	
	Gender ratio (M:F)	102 (57:56)	
	Ethnic group	Iare	
	Affiliations	Mapaio, Aikavaravi, Old Iare, Aumu, Kapai, Maipenairu and Aivai	
	Households	17	
	Household size	6.7	
	Language	Iare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1947	
	Name meaning	Kaevaria was the name of the female ancestor of the Iare tribe	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	The main staple food was garden food such as cooking banana, cassava and kaukau. Sago and coconut were also important. Extensive hunting for wallaby, wild pigs, cassowary and others, and extensive fishing (main species Tilapia)	
	Resources	Extensive alluvial forest and occasional swamps	
Commercial activities	**Businesses**	None	
Housing	**Housing style**	90% traditional 10% semi-improved	
	Floor type	100% raised	
	Housing materials	Split black palm floor, woven sago panels on the walls and sago leaf or nipa palm thatch, kwila and coconut house posts	
	Cooking	Inside using firewood	
	Lighting	Battery, kerosene	

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Table 3.17 – Kaevaria Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Kapuna Health Centre, approximately 19.5 km to the southwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	18 to 25 years
Education	**Facilities**	None
	Attendance	N/a
	Nearest facilities used	Mapaio (1 x primary, 2 x elementary schools) approximately 17 km to the southwest, Kikori Secondary School approximately 98 km west
Religion	**Churches**	Seventh Day Adventist, United Church
Water and sanitation	**Drinking Water**	Purari River
	Toilet facilities	Private and shared pits
	Waste disposal	All waste was burnt or dumped in river
Law and order	**Prevalent issues**	Steeling and domestic violence
	Resolution mechanisms	Mediation, counselling
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Young men demonstrated their knowledge of making pigments for decoration, painting techniques and traditional ways of making fire. Women performed sing sing wearing traditional dress and heirloom shell ornaments

3.17.2 Settlement History

Kaevaria was the name of the primary female ancestor of the Iare tribe. From the mountains upstream, she floated on a banana raft downstream and got stuck on a spot where the sea met the Purari River. She stepped off her banana raft, saw that it was land, and settled there, producing the Iare tribe. The current village location was thought to have been established in 1947. The village was bolstered in 1978 when government officials went to Mapaio and told people to move to present day Kaevaria to grow cash crops in order to participate in the modern cash economy.

3.17.3 Social Organization

The village did not have traditional leaders as such, as this role was reported to be undertaken by the religious leaders (pastors) of the Seventh Day Adventist and United Church denominations. A ward councillor and a land mediator were also present.

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3.17.4 Land Ownership

Clan leaders and their clan members, including women and children, collectively agreed on the use of clan land. At the death of a clan leader, the eldest son became the leader. Male in-laws could be allocated land for their families' uses. With the arrival of large-scale resource development projects, clans had decided to take stricter control over their land and not give portions away.

3.17.5 Women

Daily activities of women were reported to include caring for children, tending gardens, making sago, cleaning the house, fetching water and collecting firewood. Some women engaged in income earning activities. During flooding and drought periods, the villagers depended largely on sago and coconut; hence they were regarded as very important foods.

Women reported that they generally felt safe and secure (given they were all related and therefore reportedly lived in harmony) and this feeling has remained the same over time.

Marrying age was generally between 18 and 25 years.

It was reported that only 40% of the babies born in the past 12 months were born in the village/bush. Other women travelled to Kapuna Health Centre (two days' canoe paddling) to deliver.

3.17.6 Youths

Two youth groups existed. One consisted of about 20 males and nine females and was involved in sporting activities, doing community service such as cleaning the village and cutting grass, building houses, and cutting sago. In some instances they fundraised to support their youth programs. Another youth group was purposely for sports activities and participation during other events such as Christmas celebrations in the village. Youths earned income from the sale of betel nut, fish and other seafood products, food crops, sago and wild meat such as cassowary and pig.

For recreation, youths played sport, relaxed, spent time with friends, made crafts and cleaned house.

3.17.7 Subsistence

The main staple food was garden food, primarily cooking bananas, kaukau, taro and cassava. These were grown in large family gardens. Sago was also an important food source but it was not abundant/readily accessible locally, although it was planted along the banks of the Purari River. The planted sago was also an important famine food together with coconuts when garden crops failed due to flood or drought. Sago was also sourced by trading bananas with villages further downstream.

In addition, a wide range of foods were grown including a range of 'greens' (e.g. aibika and aupa), other crops (e.g. pumpkin, sweet corn, eggplant, cucumber, onion, ginger, Chinese cabbage, pitpit, sugar cane and peanuts) and fruits (e.g. papaya, and pineapples). Coconuts, breadfruit, guava, Okari nut trees, kumu mosong, laulau and to a lesser extent tulip were extensively planted.

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Extensive hunting was reported to occur in forests for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, goura pigeon (Victoria crowned pigeon), cuscus and flying fox. Various insect larvae were also harvested from dead trees and sago grubs.

Extensive fishing was reported to occur along the Purari River and associated creeks for tilapia, super tilapia, barramundi, black bass, mudfish, micro-fish, mullet and possibly carp. Other aquatic resources included prawns, shellfish and two species of turtles. Saltwater and freshwater crocodiles were also hunted.

3.17.8 Land and Natural Resource Use

Land resources included extensive alluvial forest and occasional swamps. Although sago swamps were present on the north side of the Purari River near the village, they were not readily accessible to harvest because of a high abundance of thorny rattans.

Sago was the main material used for house walls. Sago and nipa palm were used for house thatch although nipa palm was preferred since it lasted longer. Nipa palms were collected downstream closer to the ocean. Kwila was the preferred tree species for house posts but coconut palms were also used as they were more easily sourced within the village. Black palms were split for flooring and a range of rattans were harvested to use as rope as a replacement for nails. A range of tree species were also used for making dugout canoes but erema was most commonly used.

Forests were used to harvest a wide range of timber and non-timber products including medicinal plants.

Drinking water was sourced from the Purari River. No community water tanks were present.

The Purari River was also the primary transport route to visit riverside gardens and to harvest planted sago. The Purari River was also used to travel to medical services and the market at Kapuna, to visit the Rimbunan Hijau (RH) Logging camp near Evara and to visit Baimuru.

3.17.9 Health

No health facilities existed at Kaevaria. The nearest health centre was Kapuna (two days' paddle). Most health issues faced by women were attributed to heavy workload. The main reason for poor health of children was thought to be related to environmental factors when they followed parents into the bush and were exposed to mosquitos, and when they washed frequently in the river.

No women were aware of the prevalence of STDs, how STDs were spread or how they were treated. However, most women understood family planning and had access to contraceptive methods. Decisions to use contraceptives were most often a shared decision of both husbands and wives.

Some male and female youths reported to consume alcohol and marijuana, and gamble for money.

3.17.10 Education

No education facilities existed at Kaevaria. To attend school, some students stayed with their relatives at Mapaio and attended elementary and/or primary school there.

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3.17.11 Law and Order

Men reported only minor intra-family disputes that were resolved amongst the family.

Women reported that the main law and order problem was stealing and domestic violence. Neither issue occurred often. In stealing cases the perpetrator was obliged to cook a pot of chicken for the person he/she stole from and apologise. In domestic violence cases often the extended family intervened and provided counselling.

Youth felt that land disputes ranked as the main problem in the community, giving an example of a recent (November 2015) intra-clan land dispute that resulted in two houses being burnt to the ground, together with their belongings destroyed, and the bashing of the village chief. Domestic violence and fighting was attributed to alcohol consumption, but were reportedly not common. Youths thought gambling was a big problem in the village.

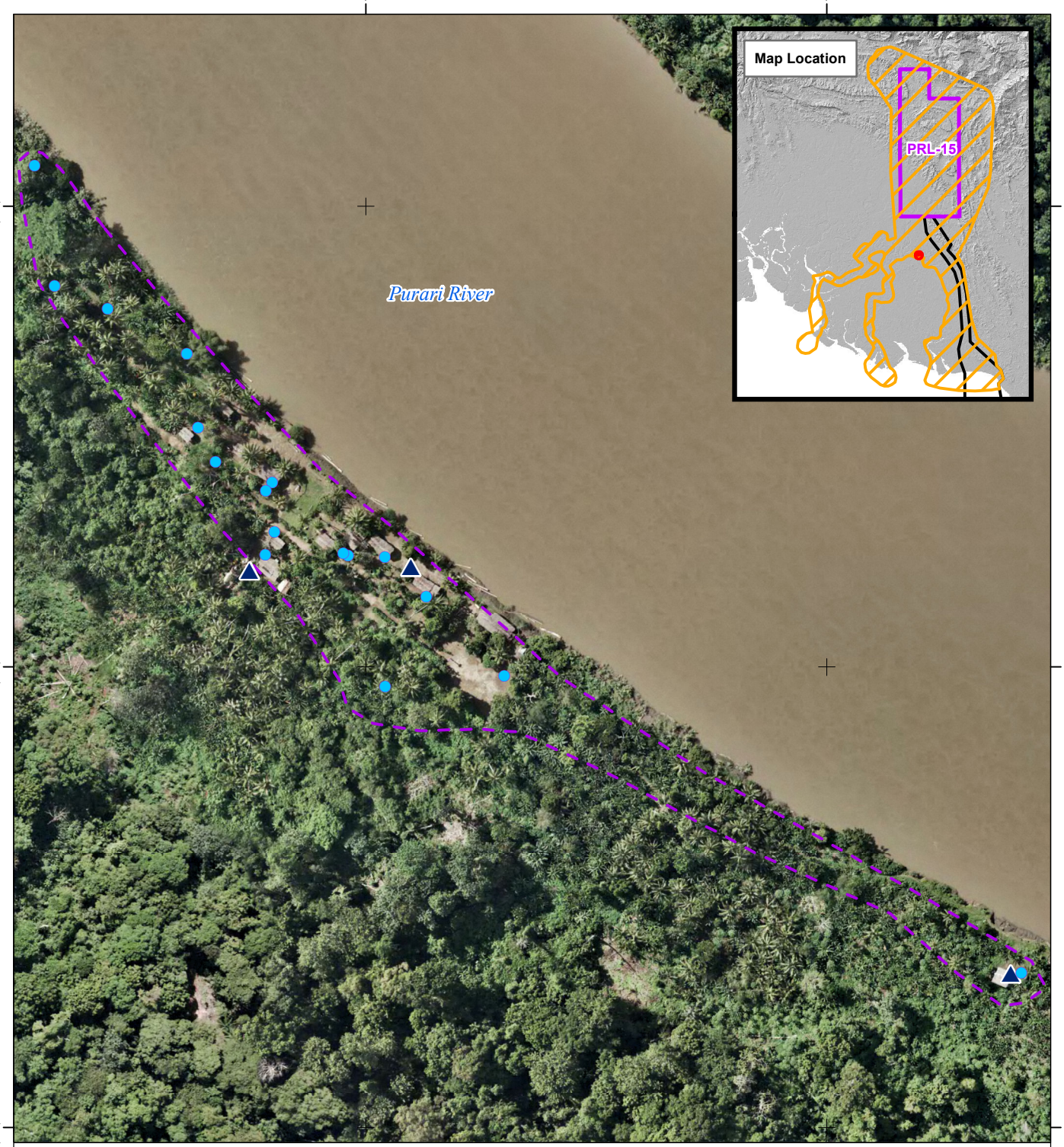
3.17.12 Cultural Heritage

Kaevaria was founded two generations before the present-day adult generation by the Avanairu clan (Iare tribe) when they left Mapaio and relocated to traditional clan lands. The Avanairu clan brought a rich array of ancestral cultural artifacts with them when they left Mapaio. These artifacts included a painted board (*Koa*), a drum (*Ara Vae*), head dress (*Kau Koua*), male traditional dress (*Ipi Orea*), kina shells (*Kina*), arm shells (*Mapua*), conch shells (*Pii*) and an edge-ground axe (*Punanaira*). These items were highly valued by clan members as they were still used today during traditional ceremonial occasions such as weddings, as well as celebrations at Christmas and on Independence Day.

No tangible cultural heritage sites were recorded at Kaevaria; the nearest Avanairu clan cultural heritage site was a three-hour walk from the village. The Avanairu clan maintain detailed intangible cultural heritage values that were passed from generation to generation. Now that there were no men's houses, intangible heritage values were taught in domestic situations. During discussions, young men demonstrated their knowledge of making pigments for decoration, painting techniques and traditional ways of making fire. Women performed sing sing wearing traditional dress and heirloom shell ornaments. According to male elders, the introduction of metal fish hooks, nylon fishing nets and increased river traffic had eroded knowledge about traditional fishing techniques, otherwise traditional knowledge about ceremonial and subsistence activities remained well preserved.

A traditional dance (*apa apa*) was performed on special occasions such as welcoming visitors. Taboos relating to food and drinks applied to women who experienced their menstrual period. Men were not allowed to assist women to scrape sago as this was thought to result in a low production of sago. Women were forbidden to sleep with their husbands or touch his gear prior to hunting or fishing trips, as this was though to bring bad luck.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Kaevaria Village Layout

FIGURE: 3.17

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77464 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.17 – Kaevaria Gallery



Photo 1 – Traditional housing style



Photo 2 – Village leader demonstrating ceremonial head dress



Photo 3 – Women performing traditional song and dance (sing sing)



Photo 4 – Men demonstrating painting with traditional pigments



Photo 5 – Elder painting traditional 'Koe' board



Photo 6 – Elevated pit toilet

3.18 Kairimai

3.18.1 Summary

Table 3.18 summarizes key social data for Kairimai.

Table 3.18 – Kairimai Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located in the Purari River delta along the Varoi River (the eastern half of the western tributary of the Purari River), approximately 39 km downstream from Herd Base	
	Coordinates	144° 59' 5.181" E	-7° 34' 43.22" S
	Physical setting	Located on the banks of the Purari River (this part known locally as Varoi-Purari). Tidal. Surrounded by lowland swamp forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	9 (Kaiarimai)	
Population and demography	**Population**	386	
	Gender ratio (M:F)	101 (194:192)	
	Ethnic group	Koriki	
	Affiliations	Ara'ava, Kinipo, Ikinu and Akoma and Kairu'u	
	Households	62	
	Household size	6.2	
	Language	Koriki	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1942	
	Name meaning	'Father' or 'head' as all Koriki clan were thought to have migrated out from this location	
	Land ownership	Patrilineal; ownership passed from father to son, but tended to be flexible	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, kaukau, taro, cassava. Extensive hunting for wild pigs, cassowary, bandicoots, monitor lizards megapodes and flying fox, and extensive fishing (for fish, eels, and crabs)	
	Resources	Extensive sago woodlands (swamps) that varied from almost pure sago to sago with an overstorey of large trees	
Commercial activities	**Businesses**	None	
Housing	**Housing style**	97% semi-improved 3% modern	
	Floor type	100% raised	
	Housing materials	Split black palm or split timber floor, woven sago panels on the walls and sago leaf roof, kwila posts. Modern homes had milled timber walls and floors, and iron roofs	
	Cooking	Inside using firewood	

Table 3.18 – Kairimai Summary (cont'd)

Thematic Area	Indicator	Description

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Housing	**Lighting**	Some solar, battery torch, kerosene lamp
Health	**Facilities**	None
	Nearest facilities used	Kapuna Health Centre, approximately 2 km to the west along the Varoi and Wame rivers
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	16-40 years
Education	**Facilities**	1 x elementary school. Primary aged students attend Ara'ava Primary School
	Attendance	39 students attend elementary school
	Nearest facilities used	Ara'ava Primary School approximately 3.5 km west-southwest along the Wame River, Kikori Secondary School approximately 83 km west-northwest
Religion	**Churches**	Christian Revival Crusade, Christian Life Centre, United Church
Water and sanitation	**Drinking Water**	European Union donated water tanks to most houses, but tanks were depleted in the dry season when water was drawn from the Purari River
	Toilet facilities	Private pit
	Waste disposal	Tin cans/batteries and paper/plastics were disposed by burning or dumping in the bush or river, and food scraps were fed to animals
Law and order	**Prevalent issues**	Domestic violence and fighting
	Resolution mechanisms	Village court, village magistrate, councillor, family members and village leaders
Cultural heritage	**Tangible cultural heritage sites**	A spirit tree (*Vaukaea*) associated with the use of sorcery
	Intangible cultural heritage	Oral traditions, song and dance

3.18.2 Settlement History

Kaevaria people originated from north of their current location, then moved to a location in the lower part of the Purari Delta, before settling in their current position around 1945.

3.18.3 Social Organization

Strong leadership from a village chief, clan chiefs, councillor, pastor, village magistrate, peace officer and other community members.

3.18.4 Land Ownership

As with other Koriki clans, land ownership was patrilineal but tended to be flexible according to personal circumstances – if there were no male offspring, women could have exclusive rights over it. Koriki women who married out of the tribe were expected to go and live with the husband and his kin. In cases where a woman was widowed and without children, she may be allowed to return and live and make gardens on her clan land.

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3.18.5 Women

Caring for children, tending gardens, fishing, collecting firewood and water and cleaning house were the primary roles for women.

Most women generally felt safe and secure in the village. Marrying age was between 16 – 40 years of age. Most births occurred at Kapuna Health Centre despite a traditional birth attendant being present in village.

3.18.6 Youths

There was one youth group that consisted of three sub-groups (or teams called Stacin, Moalgabu and Countryside). Total membership was approximately 30 and the number of males was greater than females. Their main role in the community was to do community service (paid or not paid) such as cutting grass, cleaning the church and participating in sporting activities.

3.18.7 Subsistence

The primary staple food was sago, which was harvested from extensive sago woodland (swamps). Some sago was planted particularly along riverbanks. Sago was supplemented by garden crops, primarily banana, kaukau, taro and cassava. A range of 'greens', other crops and fruits/fruit trees were also grown.

Extensive hunting in forests for wild pigs, cassowary, monitor lizards, bandicoots, megapodes and flying fox was reported to occur.

Extensive fishing was reported along the Purari River and down to the coast where a fishing camp was based. Aquatic resources included a range of fish, eels, crabs, shellfish (from the sago swamps and near the ocean), freshwater turtles, saltwater turtles that migrated from the ocean to lay eggs along the banks of the Purari River, and crocodiles.

3.18.8 Land and Natural Resource Use

Customary land was characterized by extensive sago woodlands (swamps) that varied from almost pure sago to sago with an overstorey of large trees. Further towards the coast, extensive stands of nipa palms occurred along the waterways.

Sago was the main material used for house walls. Nipa palm was used for roofing thatch. Kwila was harvested from the swamps for house posts. Swamps and forests were used to harvest a range of timber and non-timber products including medicinal plants.

The main source of drinking water was from water tanks, or, when tanks were dry, from the Purari River.

Kairimai was connected to Kapuna and Ara'ava by an existing walking track, however the Purari River was the primary transport route to visit riverside gardens, and harvest sago and other forest products.

3.18.9 Health

The aid post had not operated since 2010 and people accessed health services at Kapuna Health Centre. Malaria and workload were noted as the main issues affecting health. AusAid-funded malaria patrols were occurring at the time of the SBS visit (May 2016).

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Decision making about family planning and the use of contraceptives was a shared responsibility of husbands and wives. Most villagers understood what STDs were and how they were contracted, but they were unsure about treatments for STDs.

3.18.10 Education

There was one elementary school in the village. Primary students attended school at Ara'ava. Kairimai elementary school was a feeder school for students from nearby Kaialavi village. A total of 19 students (10 males and 9 females) attended Elementary Grade 1 and 20 students (11 males and 10 females) attended Elementary Grade 2. There were two teachers (both from the village) and no vacant teaching positions.

3.18.11 Law and Order

The leaders reported only minor domestic arguments that were resolved with the intervention of the village magistrate, councillor, family members and village leaders, as required.

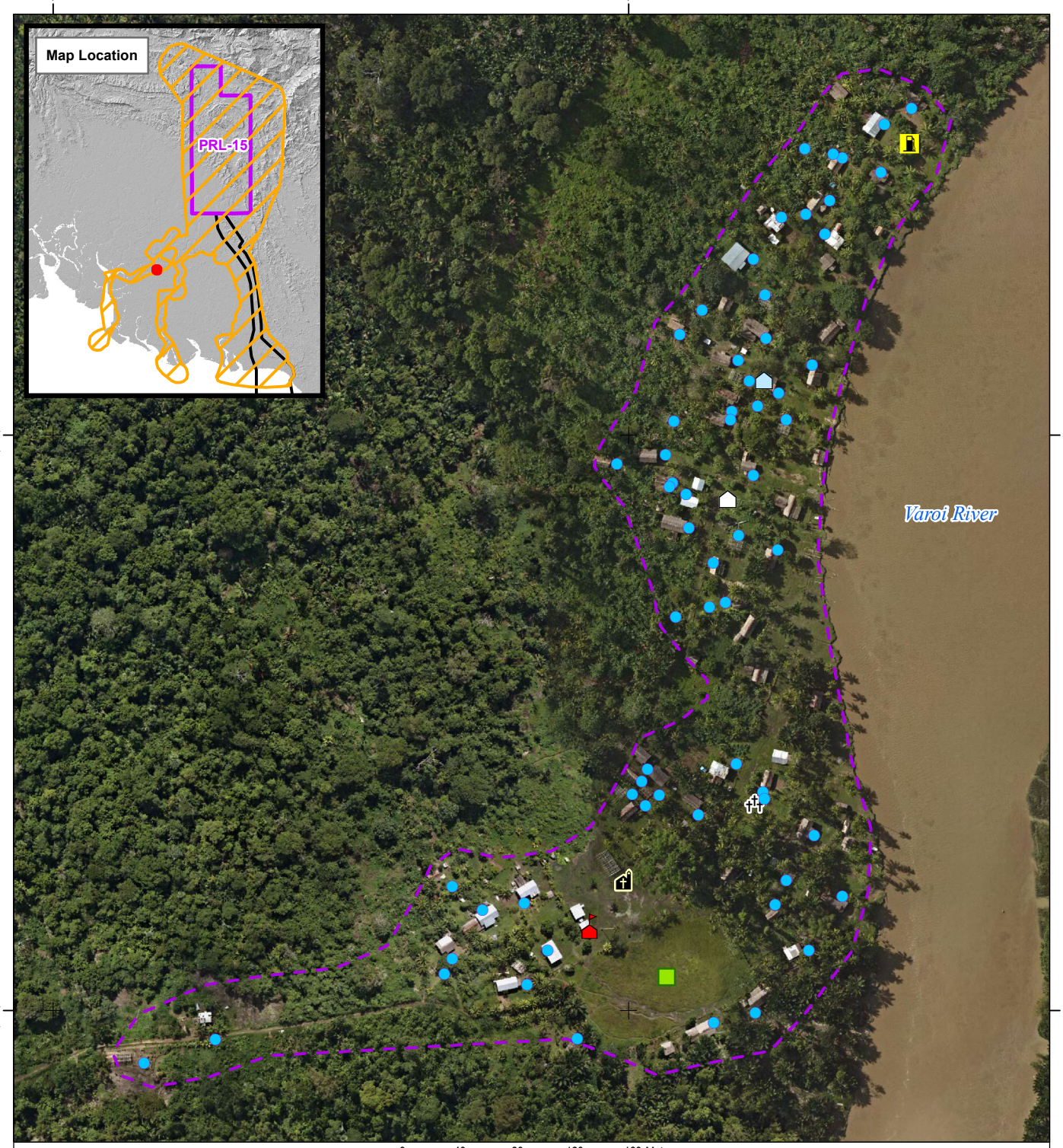
Women reported issues of domestic violence (but not sexual violence). Serious cases were referred to the village court – a process that involved the whole community.

For youths, main law and order concern was fighting. They however, were hesitant to talk about sexual assaults, domestic violence or alcohol or drug abuse.

3.18.12 Cultural Heritage

According to key informants, Kairimai was first occupied in the 1940s, some two to three generations before the present-day adult generation. As a consequence of relatively recent settlement, almost all tangible cultural heritage sites are found at ancestral villages. One cultural heritage site was recorded in the village, a spirit tree (*Vaukaea*) associated with the use of sorcery. Possibly as a consequence of the near absence of tangible cultural heritage at Kairimai, detailed oral traditions recalling clan origins are extremely important to the community. The community considers that teaching intangible cultural heritage values to young people through oral traditions, song and dance is critical to maintaining their cultural identity. Intangible cultural heritage values are learnt by children at home and through community based activities.

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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Community hall
- Fuel seller
- Operating trade store
- Sporting field
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Kairimai Village Layout

FIGURE: 3.18

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77465 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.18 – Kairimai Gallery



Photo 1 – Kairimai village, located on the banks of the Purari River



Photo 2 – Kairimai elementary school



Photo 3 – Kairimai church



Photo 4 – Spirit tree



Photo 5 – Villages travelling via canoe on the Purari River



Photo 6 – A cassowary kept in an enclosure

3.19 Kaivukavu

3.19.1 Summary

Table 3.19 summarizes key social data for Kaivukavu.

Table 3.19 – Kaivukavu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Popo coast, Orokolo Bay, approximately 55 km south of Herd Base	
	Coordinates	145° 17' 28.429" E	-7° 51' 7.638" S
	Physical setting	Set amidst coconut trees on the western half of Orokolo Bay, surrounded by mangroves, nipa palm swamps, beach vegetation, alluvial and hill forests	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	3 (Kaivukavu)	
Population and demography	**Population**	640	
	Gender ratio (M:F)	107 (330:309)	
	Ethnic group	Orokolo	
	Affiliations	Coastal and inland of Orokolo Bay communities	
	Households	101	
	Household size	6.3	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	'Kavu' meant shade; 'Kaivu' meant coconut. When their ancestors first settled on the coast they found the coconut tree which provided shade and a cool drink	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts, some garden food such as cooking banana, cassava, kaukau and taro. Occasional hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and others. Extensive fishing occurred in the rivers and ocean. The main species caught was catfish but salmon, red emperor, barramundi, black bass, sawfish and shark were also caught. Prawns and shellfish were also collected.	
	Resources	Mangroves, nipa palm swamps beach vegetation, alluvial forest and hill forests	
Commercial activities	**Businesses**	3 x trade stores, 6 x fuel sellers and several people who operated dinghies on a commercial basis	

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Table 3.19 – Kaivukavu Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	60% traditional 33% semi-improved 7% modern
	Floor type	100% raised
	Housing materials	Split black palm floor, kwila, rosewood and coconut stem house posts, sago walls and roofs
	Cooking	Inside using firewood
	Lighting	Battery, kerosene, solar, generator and hurricane lamp
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located in Kavava approximately 3.5 km to the east
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	16 to 20 years
Education	**Facilities**	1 x elementary school, 1 x primary school
	Attendance	49 students attended elementary school, 294 students attended primary school
	Nearest facilities used	Ihu High School, approximately 13 km southeast
Religion	**Churches**	Seventh Day Adventist, United Church, Baptist, PNG Revival Church
Water and sanitation	**Drinking Water**	Wells and rainwater tanks
	Toilet facilities	Bush, sea/river or long drop
	Waste disposal	Tin cans/batteries were disposed by burying and dumping in the bush and sea/river. Paper/plastics were burnt, buried and dumped in the bush and sea/river, and food scraps were fed to pigs
Law and order	**Prevalent issues**	Stealing, fighting, domestic violence, consumption of alcohol and marijuana, adultery
	Resolution mechanisms	Village court. Domestic violence cases were often regarded as a family matter and often resolved by immediate family
Cultural heritage	**Tangible cultural heritage sites**	Heve Hill and Popo ancestral villages
	Intangible cultural heritage	Oral traditions of secret magic chants and invocations to hunt, catch fish, do gardening and create social relationships

3.19.2 Settlement History

Kaivukavu people were descendants of the 'Upper Purari-to-Popo' series of migration. The specific historical dates of those famous migrations could not be established. Their settlement on the coast was also motivated by the fact that they could claim new land being reclaimed as a result of sedimentation build-up.

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3.19.3 Social Organization

Kaivukavu was represented by a ward councillor, village court magistrate and land mediator. Kaivukavu did not have traditional chiefs, but they had elders who acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village.

3.19.4 Land Ownership

Kaivukavu strictly observed the patrilineal system of land ownership and control over it. Power over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees.

3.19.5 Women

Carrying sand every morning to top up gardens beds affected by rain was regarded as the most important role a woman performed. Women were also responsible for making sago, fishing, collecting water and firewood and carrying out daily household chores. Another common responsibility was making lime from kina shells.

Most women engaged in income earning opportunities and often sold fish, bananas, sago, and other garden produce at Kaivukavu market on Mondays, Thursdays, and Saturdays. There were also informal market stalls in front of households, which sold items such as betel nut and bananas.

Women generally felt safe and secure despite reporting domestic violence as an issue and being afraid of sorcery from other villages. The fear of sorcery had increased overtime because they believed that sorcery activities were increasing.

Marrying age was between 16 and 20. The village had a traditional birth attendant and about half the women would deliver their babies in the village while the remainder walked to Orokolo Sub Health Centre to deliver their babies.

3.19.6 Youths

Kaivukavu village had a youth group called Muvu Youths comprising more than 50 people between the ages of 14 to 36 years old. The main role of the youth group was to help out around the village. Outside of the group, typical activities of youths included caring for family, making and tending gardens, raising livestock, fishing, hunting and collecting water and firewood.

Fundraising activities were mainly done upon requested such as cutting sago, building house, and making canoes and the rate was usually less than K50. In 2009 to 2011 the youths of Kaivukavu were involved in a rice-farming project. The project, funded by the Ihu LLG, involved the harvesting and milling of rice. The National Agriculture Research Institute (NARI) provided seedlings and advised on planting techniques for the project however the project failed reportedly due to lack of community management.

For recreation, youths mainly participated in sporting activities, relaxing and socialising. Almost everyone had a phone so they could text, ring and surf the net.

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3.19.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted along bank of Mihamaa Creek and close to the village. Coconuts were also an important staple particularly when garden foods had failed because of drought and salinity.

Garden food was mostly grown in the nearby forest areas north of the village. Small gardens had also been established along the beach front towards the mouth of Mihamaa Creek and beyond towards the mouth of Aievi Passage. A wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Fish and other crustaceans were also exchanged for garden food with other inland villages, or purchased from the village market held on Mondays, Thursdays and Saturdays. Several food trees were grown including coconuts, guava, bread fruit (kapiak), and laulau.

Occasional hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), monitor lizards and flying fox. Insect larvae were also eaten including sago grubs and grubs. There were few animal species that were not eaten apart from birds of paradise and goura pigeon. Mushrooms were also harvested that grew on processed sago and on dead wood.

There was extensive fishing with nets and fishing lines along Mihamaa Creek, the Aievi Passage and associated creeks, and in the ocean. Catfish was the main species caught but also salmon, red emperor, barramundi, three species of black bass, mullet, sawfish and hammerhead sharks. Other aquatic resources included prawns and shellfish. Crocodiles and turtles were not normally hunted although occasionally they were accidentally caught in nets. Crocodile and turtle eggs were not normally collected.

Gardening practices involved women gathering seeds, suckers, and stems to hand over to the men to plant in new gardens. Only men were allowed to plant a new garden and tend it until after the first harvest, and then women were allowed into the garden. Men cut sago trees and scraped the sago for the women to beat and carry home.

3.19.8 Land and Natural Resource Use

Land resources included, mangroves, nipa palm swamps beach vegetation, alluvial and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Land areas for gardens were divided by clan, but all members of the community were able to fish at any location within the customary fishing grounds.

Sago was the main material used for house walls and for roof thatch. Kwila was the preferred tree species for house posts, which was mainly sourced from the Aievi Passage. Kwila was also sourced from the forest about 4 - 5 km inland. Rosewood and other species were sourced from the alluvial and hill forests. Coconut stems were also used for house posts. Other hardwood species were used for house bearers including mangrove cedar, but for rafters and joists, avare (a swamp species), hapuru, pairi and porotoi (river side species) were used. A species of black palm known as haeo was split for flooring. Pandanus leaves were collected from the banks of

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Mihamaa Creek, and dried for weaving into mats. Mats were sold for between K20 – K30 each depending on the size.

The primary sources of drinking water were wells located at the back of the village, and rainwater tanks (two per clan).

The village was connected to several other inland villages by walking tracks including Huruta, Ere-Kilavi, Avavu, Arehava 2 and Paevera. Beach tracks connected other coastal villages within Orokolo Bay. Primary river transport route was via canoe to the Aievi Passage, Apiope, and villages along the Purari River. The main ocean transport route was via motorised dinghies that travelled to Ihu and Kerema for onward transport to Port Moresby.

3.19.9 Health

There were no health facilities at Kaivukavu, but there was a traditional healer. The closest health centre was Orokolo Sub Health Centre at Kavava, and the closest hospital was in Kerema.

The women perceived that the reason for health issues in the village was poor hygiene and poor diet and that most health issues faced by them were caused by workload. Men identified the main health problems as malaria and tuberculosis. Sorcery was also highlighted as the main cause of illness or death.

Neither men nor women knew of the prevalence of STDs in the village and only some knew how they were transmitted and how they were treated. Most women understood contraceptives and how to access them but only a few used contraceptives. Some women made the decision to use birth control on their own and for some it was a shared decision.

3.19.10 Education

There was one elementary and one primary school (Arehava-Harevavo Primary School) in Kaivukavu. Arehava-Harevavo Primary School educated students from the villages of Harevavo, Marea, Kaivukavu, and Larihairu. There were also some students that came from inland villages such as Huruta and Arehava 2. There were seven teachers and 294 students at the primary school.

A total of 49 students (29 males and 20 females) attended the elementary school.

3.19.11 Law and Order

Leaders of the village reported that the main law and order problems were stealing, fighting, domestic violence (mainly amongst newly married couples), alcohol abuse and drug use (marijuana). Women reported that domestic violence, stealing of garden food and other items, adultery and extra marital affairs and swearing were the most prevalent law and order issues within the village. Domestic violence cases were often regarded as a family matters and often resolved by immediate family. Fighting and swearing were often referred to the village court and perpetrators pay a fine.

Village leaders reported that some men consumed alcohol only on special occasion, and some used marijuana, but none of the women consumed alcohol or used marijuana.

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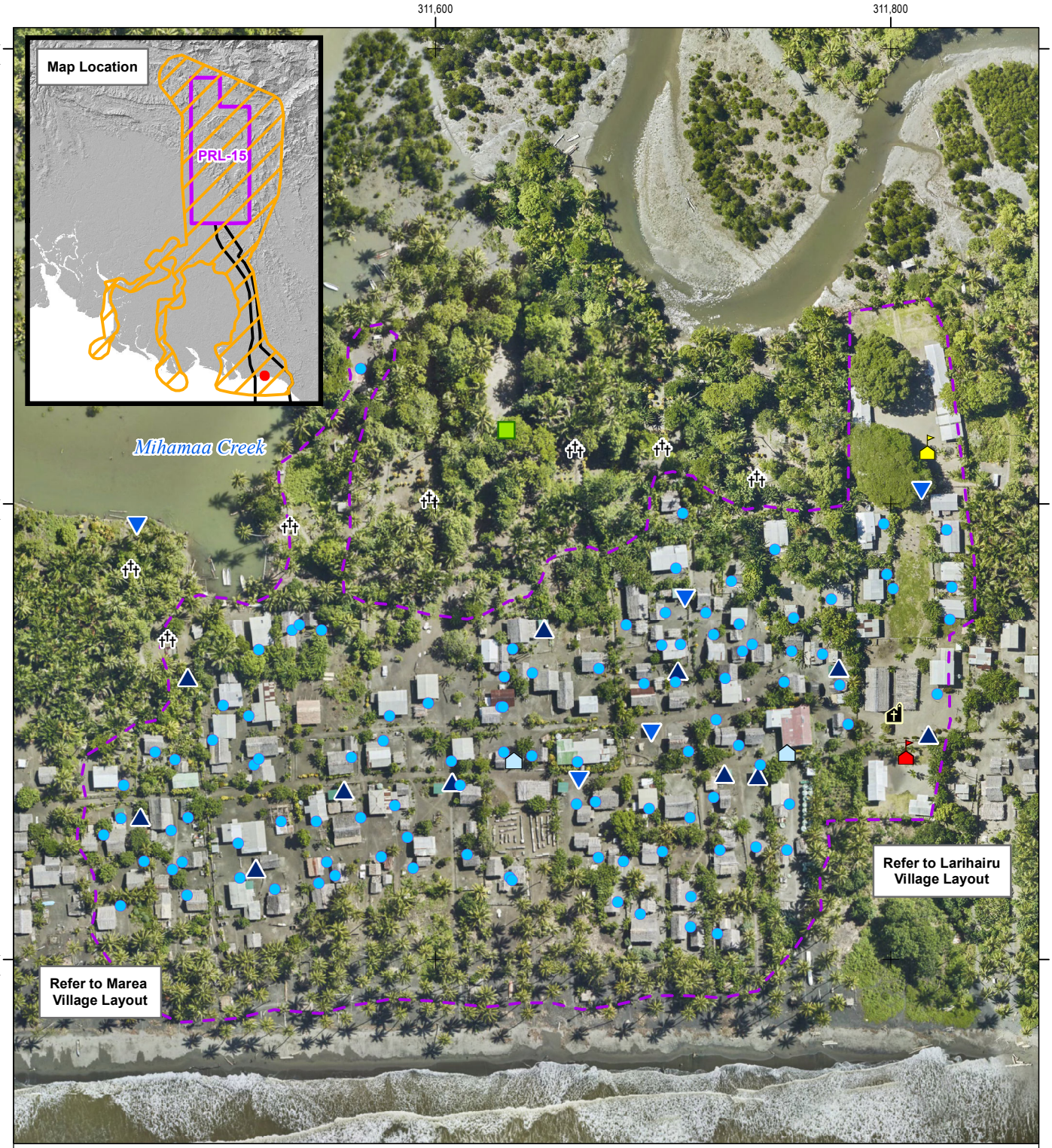
3.19.12 Cultural Heritage

Elders at Kaivukavu traced their ancestral history from the upper Purari area westward to Lake Kutubu. Heve Hill and Popo were the sites of later ancestral villages and elders were firm in their view that both these areas must be protected from development. Ancestral stories told of beach-fronting conditions at Heve at the time that there was an ancestral village there. Over time the coast moved southward and people relocated to Popo when the land there emerged from the sea to become a newly formed beach-fronting location.

When ancestors were living at Popo, the coast continued to move southward and people followed the coastline during a gradual migration process establishing short-term villages as they adapted to the changing coastal environment. It was only following social disruptions at Popo that people went their own ways and established separate villages along the coastline of Orokolo Bay. Oral traditions also recalled linguistic shifts and the emergence of the Eravo (men's houses) thus signalling a cultural and linguistic transition moving toward the social organization described in ethnographic literature about traditional life in Orokolo Bay.

Elders considered Orokolo language to be very important for passing cultural heritage values on to younger generations.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Primary School
- Burial sites/cemetery
- Church
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Kaivukavu Village Layout

FIGURE: 3.19

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77481 **REVISION:** E

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.19 – Kaivukavu Gallery



Photo 1 – Market held at Kaivukavu on Mondays, Thursdays and Saturdays



Photo 2 – Elementary school classroom



Photo 3 – Inside the elementary school classroom



Photo 4 – Primary school classrooms



Photo 5 – Inside the primary school classroom



Photo 6 – Woman fishes using a traditional Y-net

3.20 Kapai 2

3.20.1 Summary

Table 3.20 summarizes key social data for Kapai 2. Due to time constraints only an abbreviated version of the community survey was conducted at Kapai 2 and therefore no data is available on the topics of women, youths, subsistence, sanitation and cultural heritage.

Table 3.20 – Kapai 2 Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the mouth of the Panaroa River, approximately 52 km southwest of Herd Base	
	Coordinates	145.1089935	-7.8147879
	Physical setting	Surrounded by large areas of mangrove and nipa swamp	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural LLG	
	Ward	17 (Kapai)	
Population and demography	**Population**	326	
	Gender ratio (M:F)	94 (158:168)	
	Ethnic group	Iare	
	Affiliations	Old Iare, Mapaio, Aumu, Aivai, Maipenairu	
	Households	52	
	Household size	6.3	
	Language	Iare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1967	
	Name meaning	The preferred name was Kapai Aikavalavi. Aikavalavi meant the leader of the house	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	The main staple food was sago, along with cooking banana, taro, kaukau, pitpit and cassava, and coconut, okari, mango, breadfruit and other fruits, along with fish, other seafood, and wild animals	
	Resources	Extensive sago swamps including mixed nipa and mangrove swamp areas, rivers and the ocean	
Commercial activities	**Businesses**	1 x fuel seller	
Housing	**Housing style**	88% traditional 8% semi-improved 4% modern	
	Floor type	100% raised	
	Housing materials	Split black palm floor, hardwood posts, rough sawn frame, woven sago leaf stem panels for the walls, sago roof	
	Cooking	Inside using firewood	
	Lighting	Battery and solar	

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Table 3.20 – Kapai 2 (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Maipenairu Aid Post located approximately 4 km to the west-northwest, and Kapuna Health Centre located approximately 31 km to the northwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	Unknown
Education	**Facilities**	1 x elementary school
	Attendance	N/a
	Nearest facilities used	Urika Primary School at Maipenairu approximately 4 km northwest
Religion	**Churches**	United Church, Seventh Day Adventist
Water and sanitation	**Drinking Water**	Communal tanks, wells and rivers/creeks
	Toilet facilities	Bush, sea/river
	Waste disposal	Tin cans/batteries and paper/plastics were disposed by dumping in the bush or burnt, and food scraps were fed to animals
Law and order	**Prevalent issues**	Alcohol abuse and fighting
	Resolution mechanisms	Village leaders, including the councillor and church leaders

A composite survey was conducted at Kapai 2, thus only a selection of information was collected.

3.20.2 Settlement History

Kapai 2 was established on 11th August 1967 when settled by some residents of Old Iare. They moved to Kapai 2 to be closer to health and education services provided at Urika Mission (Maipenairu) and to escape siltation at Old Iare.

3.20.3 Social Organization

The village leaders played a key role in leadership, including the resolution of law and order problems (even though village court officials had been appointed, they were not being paid). The village had two main churches. The United Church supported the aid post (not functioning at the time of the SBS survey in May 2016), while the Seventh Day Adventist (SDA) Church assisted the elementary school. The village also had women' and youth groups, which provided community services such as school maintenance and cleaning.

3.20.4 Land Ownership

Each clan owned its own land and distributed it to families according to individual and family needs. Clan leaders were male and land was passed down from father to son.

3.20.5 Health

Malaria, diarrhoea and respiratory problems were the main health issues in the village. Kapuna Health Centre conducted health clinics at Kapai 2; the most recent in July 2016.

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Drinking water was sourced from tanks, and when necessary, from wells or rivers/creeks.

3.20.6 Education

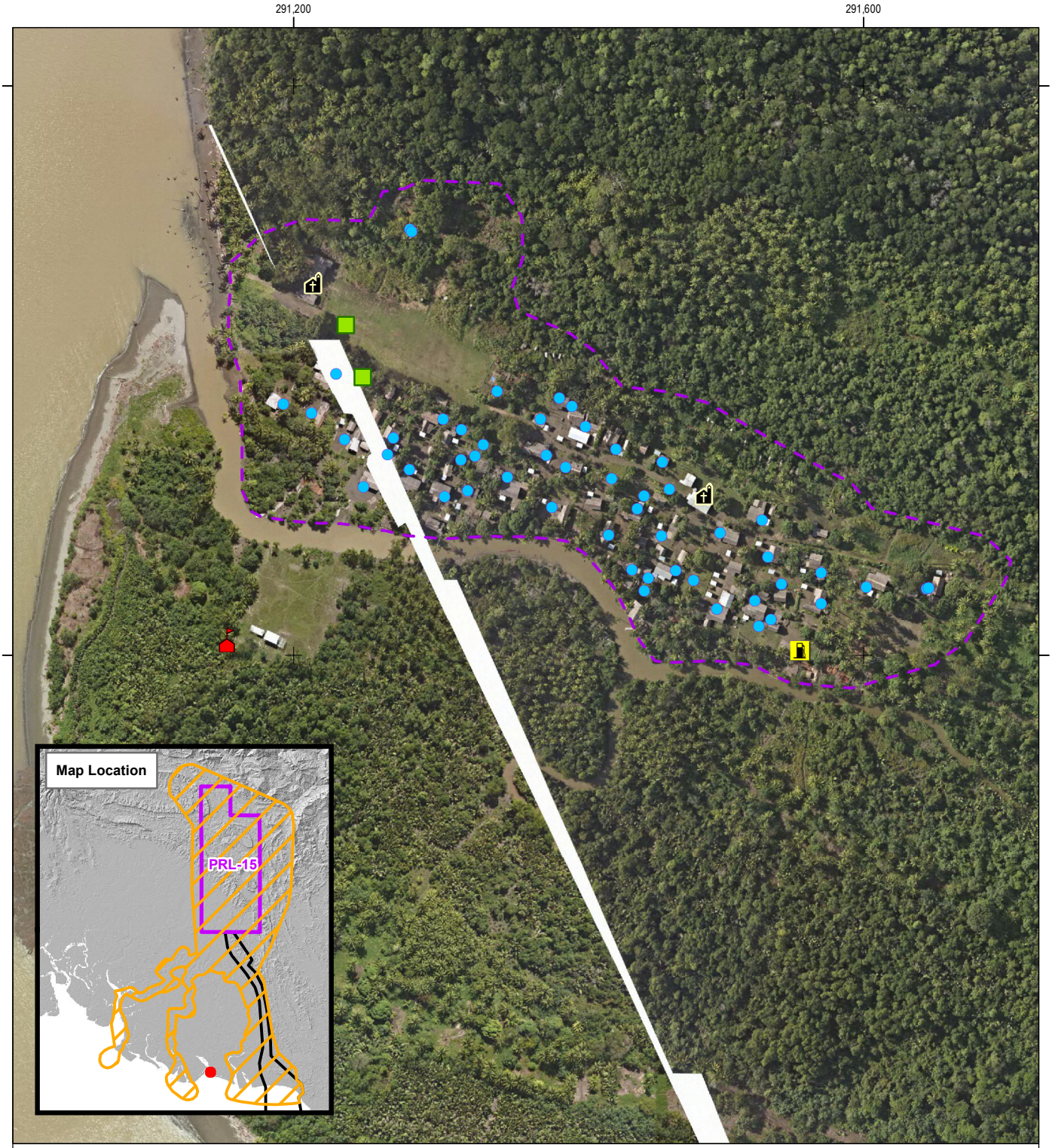
The elementary school in Kapai 2 was operational, and the primary school at Urika Mission (Maipenairu), a 30-minute paddle away, was also operational. However, approximately half of the boys and girls aged 6 to 15 years of age did not attend school. Some of the issues affecting education included the distance to travel to primary school (particularly when the weather was bad and seas rough), facilities not open, poor quality school infrastructure, and safety concerns.

3.20.7 Law and Order

Alcohol abuse and fighting occurred, but generally only during celebrations. Village leaders, including the councillor and church leaders, assumed responsibility for resolving law and order issues, generally through discussion and mediation with both parties. Sorcery remained a concern in the village.

There had been no land disputes since the 1980s, when people from Apiope (Maipua tribe) disputed the ownership of land where Kapai 2 is located.

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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Church
- Fuel seller
- Sporting field
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Kapai 2 Village Layout

FIGURE: 3.20

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77447 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.20 – Kapai 2 Gallery



Photo 1 – Kapai 2 Seventh Day Adventist church



Photo 2 – Kapai 2 United church



Photo 3 – Looking towards elementary school

3.21 Kavava

3.21.1 Summary

Table 3.21 summarizes key social data for Kavava.

Table 3.21 – Kavava Summary

Thematic Area	Indicator	Description	
Location	**Description**	Orokolo coast, approximately 57 km southeast of Herd Base. Three interrelated villages comprised Kavava village: Hururu, Mirimurua and Kavava	
	Coordinates	145° 19' 35.271" E	-7° 51' 20.003" S
	Physical setting	Set on Orokolo Bay amidst mangrove forest, nipa palm swamps, beach vegetation, alluvial and hill forests.	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	5 (Kavava)	
Population and demography	**Population**	962	
	Gender ratio (M:F)	105 (492:470)	
	Ethnic group	Orokolo	
	Affiliations	Orokolo coast communities	
	Households	178	
	Household size	5.4	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Hururu meant “to spread/straddle”; Mirimurua meant “to darken”; Kavava meant “to lighten/bright light. “Kereva hihi” was the term used to refer to Kavava as being the centre or middle of Orokolo: the centre was believed to hold the sun and allow people to work until they were complete for the day. The sun was then released so that it could set	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconut, some garden food such as cooking banana, cassava, kaukau and taro. Limited hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and monitor lizards, wildfowl and birds and extensive fishing for both inland and coastal species	
	Resources	Mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forests, rivers and the ocean	
Commercial activities	**Businesses**	3 x trade stores, 6 x fuel sellers and 10 x dingy operators	

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Table 3.21 – Kavava Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	73% traditional 27% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm floor, hardwood posts, sago leaf walls, nipa and sago roof thatch
	Cooking	Both inside and outside using firewood
	Lighting	Hurricane lamps, battery, solar, generator
Health	**Facilities**	Orokolo Sub Health Centre
	Nearest facilities used	Lariau Aid Post
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	15 to 20 years
Education	**Facilities**	1 x elementary school and 1 x primary school
	Attendance	93 students attended elementary school 271 students attended primary school
	Nearest facilities used	Ihu High School approximately 10 km to the southeast
Religion	**Churches**	Seventh Day Adventist, United Church
Water and sanitation	**Drinking Water**	Wells, water tanks
	Toilet facilities	Private pits or bush
	Waste disposal	Paper and plastics were burnt, disposal of tin cans, batteries and food scraps was not specified
Law and order	**Prevalent issues**	Marijuana use, alcohol abuse, domestic violence, land disputes, stealing and gambling
	Resolution mechanisms	Village court. Domestic violence was often regarded as a family problem and was therefore solved within families
Cultural heritage	**Tangible cultural heritage sites**	Heve and Popo ancestral villages
	Intangible cultural heritage	Song and dance and several special customary practices related to food or drinks that are still observed in the village

3.21.2 Settlement History

The upper Purari was the original source of the first series of migrations by their ancestors. The reasons for moving were many and the direction usually southward or downstream along the Purari River, settling in several locations, while others took the forest route. At some point in time, all those ancestors converged at Popo, which at that time was the coastline, and built a vibrant settlement. Over time, further migrations took place that saw people mostly moving to the coast to claim new land being formed due to sedimentation build-up. The Popo exodus was attributed to increasing population pressure which then caused intra-clan and family rivalry, not enough land for gardening and other valuable resources, and warfare.

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3.21.3 Social Organization

Kavava was represented by a ward councillor, village court magistrate and land mediator. Kavava did not have traditional chiefs, but they did have elders who acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village. Although much of their material culture was destroyed at the beginning of the last century, Kavava still embraced and practiced a vibrant oral tradition of secret magic chants and invocations to hunt, catch fish, do gardening and create social relationships. They could not reveal these secrets to outsiders, and may or may not pass these traditions to their younger generations

3.21.4 Land Ownership

Kavava strictly observed the patrilineal system of land ownership and control. Power and control over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees. Despite these structures, it was noted that dishonest sons might not inherit land from their fathers.

3.21.5 Women

Daily activities included caring for children, making sago, fishing and collecting seafood, cleaning house and collecting water and firewood. Gardening and sago making practices were similar to other coastal Popo and Orokolo villages (women only gardened sometimes as responsibility for the garden primarily fell to men; women played an important role in sago making).

Only some women engaged in marketing to earn some income at either Kavava or Kaivukavu markets on Mondays, Wednesdays, Thursdays, and Saturdays. Vegetables and sago were the main food sold by Kavava women.

Women reported feeling safe and secure, that feeling having stayed the same over time.

Marrying age was reported to be between 15 and 20 years.

The village had a trained village birth assistant and a traditional village birth assistant, however it was reported that all babies were born at Orokolo Sub Health Centre.

3.21.6 Youths

There was one youth group (church group called Kavava Youths, with approx. 200 members) that engaged in both sports and church related activities.

Youths participated in general community work and assisted other community members when manpower was needed with cutting sago, canoe, carrying house posts or building houses. Unlike other villages, Kavava youths said most of the work was done for free as community service. Their main means of raising money was through the sale of food or marketing.

For recreation, youths played sports on Fridays and Saturdays, carried out church activities, relaxed, spent time with friends, surfed the internet and made crafts (female youths: mats, baskets; male youths: canoes or paddles).

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3.21.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted in the sago swamps close to the village and to the north across the alluvial plains. Coconuts were also an important staple particularly when garden foods had been affected by flood. Frequent flooding was often experienced during the wet season (May to August).

Garden food was mainly grown near the sago swamps and near the village. Small food gardens were also established along the beach front. Some garden crops had been planted in the village, however pigs tended to destroy the food gardens if not fenced with bamboo. Cooking bananas, taro, cassava and kaukau were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens. Additional garden food was purchased from markets. Several food trees were grown including coconuts, guava, bread fruit (kapiak), mango, and laulau.

Few people hunted. Those that did hunted with dogs and spears in the forests for wallaby, wild pigs, cassowary, cuscus, bandicoots, wildfowl (eggs also collected), monitor lizards and birds. Most animals were thought to have moved further inland because of disturbance from logging and clearance for gardens. It took between one to two hours' walk to reach the hunting area. Sago grubs and grubs that lived in dead trees including mangroves were eaten. Mushrooms were harvested that grow on the processed sago and on dead wood.

Extensive fishing, especially in the sago swamps and tributaries of Miha Creek - Mirimurua and Emae Creek about 30 minutes' walk from the village and in the mangroves east of Kavava known as Pakovovu-Auma. There was also extensive fishing in the ocean, particularly near Hohoro Point and in front of the village. Main species caught in rivers included harova, karai, eels and prawns. In the ocean and mangroves catfish were the main species caught, but also salmon, super tilapia (big floods only), red emperor, barramundi, mullet, sharks (hammer and shovel head), stingray, saw fish, tuna (yellow fin and big eye). Other aquatic resources included prawns, crab and shellfish. Turtles were rarely caught. Ocean fishing was limited to the period when the sea was calm (September to April).

3.21.8 Land and Natural Resource Use

Land resources included, mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. A particularly important medicinal plant was kalava, which was grown in the village. Leaves of the plant were mixed with lemon grass and boiled. The mixture was drunk by women after giving birth to restore their strength. This was a particularly important plant throughout the lowlands of Gulf Province.

Sago was the main material used for house walls, but nipa and sago leaves were used for roof thatch. Kwila was the most preferred tree species for house posts however it was difficult to find within the close proximity of the village. Instead rosewood, coconut, maea (local name) and okari were some of the commonly used species for house posts. Other hardwood species used included mangroves for both bearers and floor joists. A species of black palm known as haea was split for flooring. Pandanus leaves for weaving mats were collected from the banks of Herekela Creek and from the sago swamps. Mats were sold for K20 – K30 per mat depending on the size.

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Dugout canoes were made from erema, rosewood and harave. Erema was the favoured species since it was light and canoes made from this timber were still manoeuvrable at sea, even after the timber had absorbed some water. The ocean canoes typically had outriggers for stability.

Drinking water was mostly sourced from wells and, more recently, from tanks.

The village was connected to several other inland villages by walking tracks including Huruta, Muro Station, Ere-Kilavi, Avavu, Arehava 2 and Paevera. Beach tracks connected other coastal villages within Orokolo Bay including Mareke, Harevavo and Kaivukavu. There was no transport along waterways using dugout canoes. The main ocean transport route was via motorised dinghies to travel to Ihu and Kerema for onward transport to Port Moresby. Dinghies were also used to travel to the Purari River and Baimuru to the west and to several logging camps including Kikoro and Kamusi to sell betel nut and mustard.

3.21.9 Health

The Orokolo Sub Health Centre in Kavava is the primary health center for the villages along Orokolo Bay. The facility is not always staffed and provides an unreliable service.

Women indicated that malaria and tuberculosis were the most common illnesses in the village. In the first instance, villagers often went to Orokolo Sub Health Centre for medical attention, or used traditional methods to treat ailments. Youths reported that a lack of doctors and nurses at Orokolo Sub Health Centre meant that patients were often referred to Kerema (at their own cost).

Few women were aware of how STDs were transmitted or treated. Most people were aware of family planning and most women used contraceptives (either the women decided to use contraceptives or it was a shared decision between a husband and wife).

3.21.10 Education

There is a primary and elementary school in Kavava village (Orokolo Primary attended by 271 students across Grades 3-9) and Miri-Murua Elementary attended by 93 students across grades Prep-3). There were six teaching staff. Both schools lacked toilet facilities and teaching and student learning materials.

3.21.11 Law and Order

Alcohol abuse, marijuana consumption, gambling domestic violence and land disputes were common law and order activities reported. Often serious cases were referred to the village court and solved. Although domestic violence was prevalent it was often regarded as a family problem and was therefore solved within families. Female youths described rape as being an issue and emphasized that most of the fights in their village were alcohol, marijuana or stealing related.

3.21.12 Cultural Heritage

Cultural heritage values at Kavava had been eroded by missionary activities and cultural continuity had faltered during the past 40 years. Younger people have had very limited exposure to information about their ancestral pasts. The knowledge that remained resided in the memories of a few old men. Heve and Popo were remembered as significant ancestral locations; however, details of other ancestral locations were unclear.

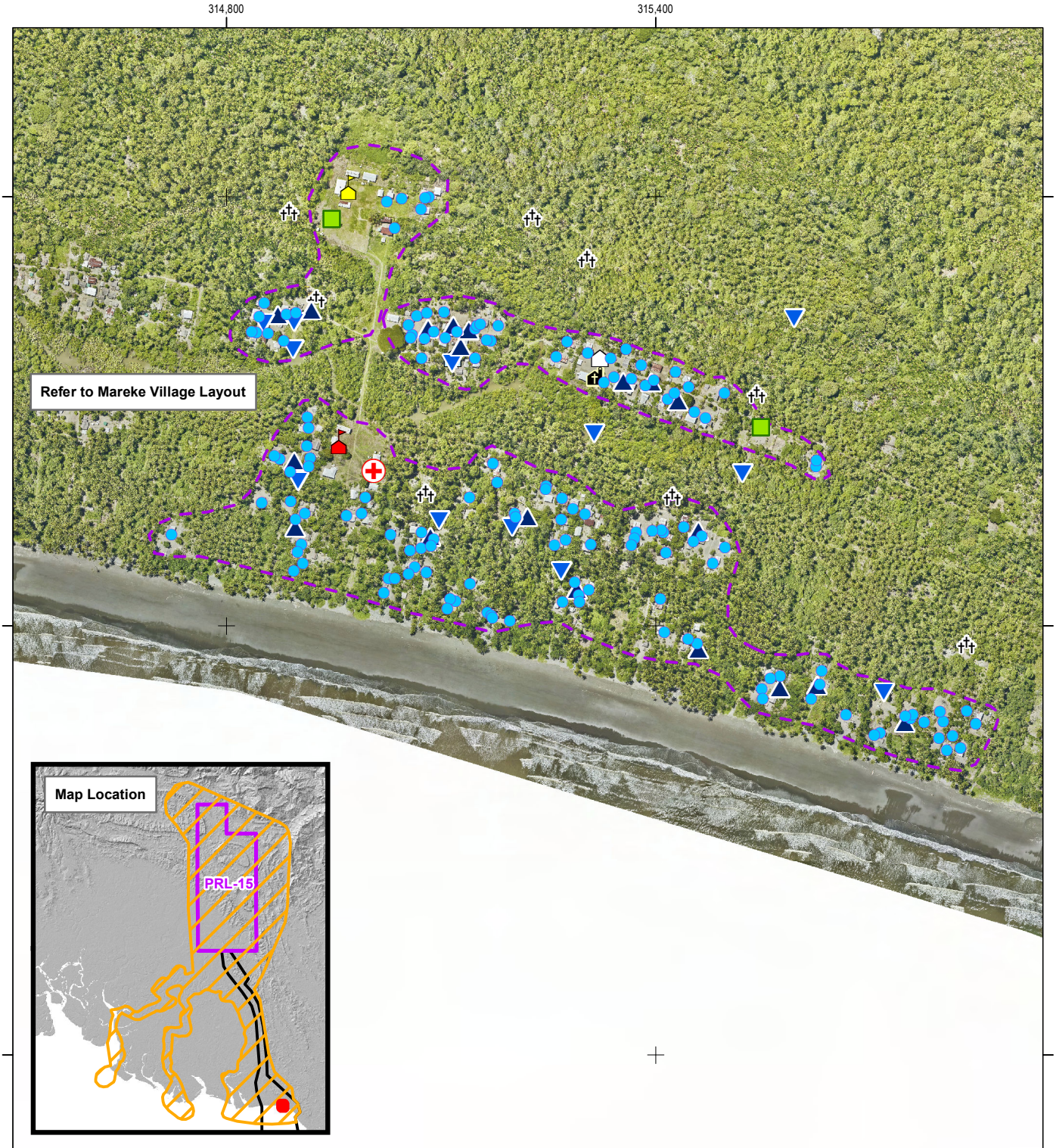
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Community members cited inter-marriage outside Orokolo communities and a decline in the use of Orokolo language by young people as negatively impacting community cultural heritage values. Regardless of outside influences, the Kavava community maintained intangible cultural heritage values that were important for their everyday lives.

During special occasions women and men performed a traditional song and dance called *poveapo*. The song and dance was performed on special occasions such as Independence Day and school cultural shows.

There were several special customary practices related to food or drinks that were also still observed. These included when a man is making a new garden he was not allowed to eat protein; when a man was gardening his wife was supposed to have her own fire and was not allowed to borrow fire from neighbours; women were not allowed to enter new gardens; and women were not allowed to sweep around the house prior to going fishing.

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SCALE: 1:8,000 @ A4

0 80 160 240 320 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Primary School
- Health Centre, Operating
- Burial sites/cemetery
- Church
- Community hall
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Kavava/Hururu/Mirimurua Village Layout

FIGURE: 3.21

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-78367 **REVISION:** E

DATE: 17/02/2017

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.21 – Kavava Gallery



Photo 1 – Elementary school classroom



Photo 2 – Inside the elementary school classroom



Photo 3 – Incomplete primary school teacher's house



Photo 4 – Orokolo Primary School



Photo 5 – School hall at Orokolo Primary School

3.22 Larihairu

3.22.1 Summary

Table 3.22 summarizes key social data for Larihairu.

Table 3.22 – Larihairu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Orokolo Popo coast, located approximately 55 km to the southeast of Herd Base	
	Coordinates	145° 17' 41.483" E	-7° 51' 6.224" S
	Physical setting	Located on Orokolo Bay amidst mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	3 (Kaivukavu)	
Population and demography	**Population**	450	
	Gender ratio (M:F)	112 (238:212)	
	Ethnic group	Orokolo	
	Affiliations	Coastal and inland of Orokolo Bay communities	
	Households	73	
	Household size	6.2	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Larihairu was the name of a male ancestor	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with coconuts, some garden food such as cooking banana, cassava, kaukau and taro. Occasional hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and monitor lizards and others. Extensive fishing also took plaice. Main species caught were catfish but also mullet, salmon, red emperor and barramundi and shark. Prawns, crabs and shellfish were also collected	
	Resources	Mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forest, rivers and the ocean	
Commercial activities	**Businesses**	3 x fuel retailers, 3 x commercial dinghy operators	

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Table 3.22 – Larihairu Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	62% traditional 30% semi-improved 7% modern 1% n/a
	Floor type	98% raised 1% dirt 1% n/a
	Housing materials	Split black palm and betel nut palm floors, hardwood posts (including coconut stems), sago leaf and nipa palm roof thatch, sago woven panel walls
	Cooking	Inside using firewood
	Lighting	Battery, kerosene, solar and generator
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located at Kavava approximately 3 km west
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15 to 20 years
Education	**Facilities**	None
	Attendance	N/a
	Nearest facilities used	Kaivukavu (1 x elementary school, 1 x primary school), less than 0.5 km to the west
Religion	**Churches**	United Church, PNG Revival Church
Water and sanitation	**Drinking Water**	Tanks, wells
	Toilet facilities	Long drop or bush
	Waste disposal	Tin cans/batteries were disposed by dumping in the sea or river. Paper/plastics were burnt or dumped in the sea or river and food scraps were fed to the animals
Law and order	**Prevalent issues**	Domestic violence, fighting, stealing, verbal abuse
	Resolution mechanisms	Mediation, village court. Domestic violence cases were often regarded as a family matter and resolved by immediate family
Cultural heritage	**Tangible cultural heritage sites**	Popo and Heve ancestral village sites. Maiaroa ancestral site which was located in the low hills north of Lairuhairu
	Intangible cultural heritage	Traditional song and dance were not performed regularly

3.22.2 Settlement History

The upper Purari was the original source of the first series of migrations by their ancestors. The reasons for moving were many and the direction was usually southward or downstream along the Purari River, settling in several locations, while others took the forest route. At some point in time, all those ancestors converged at Popo, which at that time was the coastline, and built a vibrant settlement. Over time, further migrations took place that saw people mostly moving to the coast to

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claim new land being formed due to sedimentation build-up. The Popo exodus was attributed to increasing population pressure which then caused intra-clan and family rivalry, not enough land for gardening and other valuable resources, and warfare.

3.22.3 Social Organization

Lairihairu was represented by a ward councillor and village court magistrate but did not have a land mediator in the village. Lairihairu did not have traditional chiefs, but they had elders who acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village.

3.22.4 Land Ownership

Lairihairu strictly observed the patrilineal system of land ownership. Power and control over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees.

3.22.5 Women

Similarly to the roles of other coastal Popo villages, the most important role a woman performed included making sago, fishing, carrying sand, making lime, collecting firewood, cleaning house, caring for children and family, fetching water, and cooking. Some women engaged in income earning opportunities and often sold betel nut, sago, fish, crabs, and other garden produce at Kaivukavu market on Mondays, Thursdays, and Saturdays. There were also informal market stalls in front of some households selling items such as betel nut and bananas.

Gardening practices were similar to other coastal Popo villages therefore women were limited to access land for gardening and sago making as it was the responsibility of men to make gardens and cut sago. There were however some women who had begun making gardens on their own without male assistance.

Women generally felt safe and secure despite being afraid of sorcery but this sense of security had decreased over the years.

Marrying age was between 15 and 20. The village had a traditional birth attendant and the majority of women walked to Orokolo Sub Health Centre to deliver their babies

3.22.6 Youths

Lairihairu village had a church youth group comprising more than 80 people between the ages of 15 to 40 years old. The main activities were sporting activities, and community work such as helping the old, widows, sick or single mothers. Fundraising activities were mainly done at a rate of K30-K40 for requested assistance with cutting sago, building house, and making canoes. The major roles for youth were caring for family members, making gardens, gardening, fishing, raising livestock, hunting, making sago, and collecting food, water and firewood. The youth also earned an income most days from selling betel nut, food crops, sago, fish and seafood products.

For recreation, youths mainly participated in sporting activities, relaxing, socialising and surfing the net.

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3.22.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted to the north of the village in low-lying swampy areas. Wild sago was also harvested from natural stands. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought. Extensive coconut plantations occurred throughout the area that was originally planted for copra production. Occasionally extensive flooding prevented access to harvest sago. Sago and garden crops were mostly not affected by drought, particularly across the alluvial plains.

Garden food was mostly grown in the nearby forest areas to the north of the village, within a few kilometres, but there were also beach side gardens towards the Alele Passage. A wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Fish and other crustaceans were also exchanged for garden food with other inland villages or purchased from the village market held on Mondays, Thursdays and Saturdays. Several food trees were grown including coconuts, guava, bread fruit (kapiak), and laulau. Additional food resources included nipa palm nuts and new shoots that were harvested from the extensive nipa palm swamps near the Alele Passage.

Occasional hunting in forests for most animal species included wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), monitor lizards and flying fox. There were few animal species that were not eaten apart from birds of paradise, goura pigeon, frogs and rats. Mushrooms that grew on the processed sago and on dead wood were also harvested. Insect larvae were also eaten including sago grubs (known locally as sago worms) and grubs.

Extensive fishing occurred along Mihamaa Creek, the Alele Passage and associated creeks. Catfish was the main species caught but also salmon, red emperor, barramundi, three species of black bass, mullet, sawfish, sailfish, shovel head and hammerhead sharks and mudfish and super tilapia in the freshwater areas. Other aquatic resources included prawns, mud crabs and ocean crabs, and three species of shellfish, one of which was collected from the beach sands in the intertidal zone. Two species of turtle were also caught for their meat. Crocodile and turtles were not normally hunted but caught accidentally by fishing line or nets. Crocodile eggs and turtle eggs were not normally collected. The community was also uncertain where the crocodiles laid their eggs.

In terms of fishing only men travelled further out to sea to fish, women only used traditional type nets to fish near the coast.

3.22.8 Land and Natural Resource Use

Land resources included mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forest. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Some of the forest resources were becoming harder to find because of population pressure, particularly house posts and the preferred canoe trees.

Sago and nipa palms were the main material used for house thatch but sago was woven to make house walls. Kwila was the most preferred tree species for house posts, which was mainly

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sourced from the Alele Passage, but rosewood and other species harvested from alluvial forest and hill forests were also used. Coconut posts were increasingly used due to the increasing distance the community had to travel to harvest kwila and other species. Occasionally posts were purchased from Apiope due to local shortages. Other hardwood species were also used for house bearers including mangrove cedar, but for rafters and joists avare (a swamp species) was used. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Pandanus leaves for weaving mats were collected from the banks of Mihamaa Creek. Mats were sold for between K20 – K30 per mat depending on the size.

The primary source of drinking water in the village was from rainwater tanks or wells at the rear of the village.

The village was connected to inland villages by walking track including Ere-Kilavi, Avavu, Arehava 2, Huruta and Paevera. The beach track connected with other coastal villages within Orokolo Bay and to Kerema, but the Vailala River had to be crossed by canoe. The primary river transport route was via canoe to the Alele Passage, Apiope, and villages along the Purari River. The main ocean transport route was via motorised dinghies that travelled to Ihu and Kerema for onward transport to Port Moresby.

3.22.9 Health

There were no health facilities in Larihairu and most people travelled to Orokolo Sub Health Center for treatment. Malaria and tuberculosis were thought to be the most common sicknesses in the community. Women believe that the main reason for poor health was their workload and climatic factors, and they believed that the reason for poor health among children was poor hygiene.

Women were aware STDs and they blamed sorcery. Most women understood how they were transmitted and treated. Most women were aware of family planning methods yet only some used contraceptives and some resorted to using traditional family planning methods. Some women made the decision to use birth control on their own and for some it was a shared decision. Sometimes women deciding alone resulted in domestic violence.

3.22.10 Education

Children in Lairihairu village went to elementary and primary school at Kaivukavu.

3.22.11 Law and Order

A range of law and order problems were reported including domestic violence, stealing and verbal abuse/obscene language. These issues were dealt with through mediation, or if unsuccessful, through the village court system. Some boys and girls smoked marijuana (and while common, it was not done in public) and occasionally consumed home brew (generally on special occasions). Gambling was said to have been prohibited and paying for sex strictly taboo (although the women reported that some people engaged in prostitution in secrecy). Domestic violence cases were often regarded as a family matter and often resolved by immediate family. Some sexual assault cases occurred from other village members especially young men under the influence of marijuana. The women also believed the fear of sorcery had increased over time.

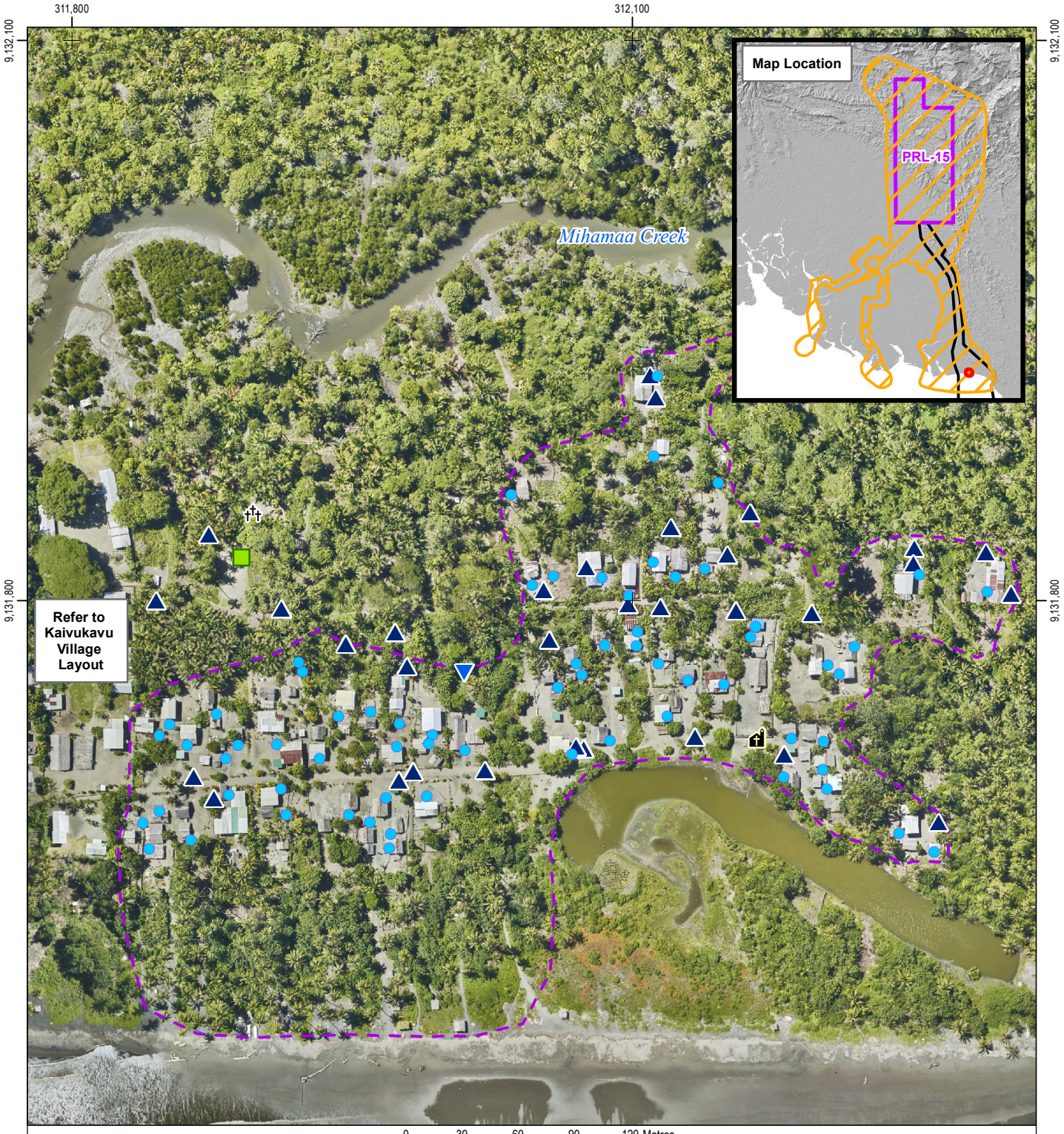
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3.22.12 Cultural Heritage

Lairuhairu clans traced their ancestral heritage to the Eastern Highlands and from there to the south through the upper Purari. With the exception of Popo and Heve, important ancestral village sites were all now at distant inland locations. There was however, some concern amongst elders about damage to the Maiaroa ancestral site which was located in the low hills north of Lairuhairu. Based on discussions, Maiaroa appeared to be close to the Ihu tower. The regional theme of following the prograding coastline southward again provided a key thread for oral traditions. After people left Popo because of the changing coastal environment they moved from place to place never staying anywhere for long until they finally settled at Lairuhairu. Over the past century Christian themes had been incorporated in many oral traditions and although the names of characters in stories had changed overarching themes explaining clan histories and advocating behaviors to maintain good social order had remained unchanged.

People regularly found pottery sherds when gardening and considered such finds to be important as the pottery was left there by their ancestors. Elders pointed out that pottery sherds were found ‘everywhere’ in gardens commencing north of Lairuhairu and continued inland to the base of the hills. Intangible cultural heritage values relating to ceremonial and spiritual activities had almost all been forgotten. During special occasions women and men sang and danced to traditional songs called *iko* and *melare*. However those songs and dances were not performed regularly.

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SCALE: 1:3,000 @ A4

0 30 60 90 120 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Larihairu Village Layout

FIGURE: 3.22

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77448 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.22 – Larihairu Gallery



Photo 1 – Disused aid post



Photo 2 – One of several water wells located at the rear of the village



Photo 3 – Burial ground located at the rear of the village



Photo 4 – Shower facility



Photo 5 – Catch of ocean fish ready for sale



Photo 6 – Price list from informal 'black market'

3.23 Maipenairu

3.23.1 Summary

Table 3.23 summarizes key social data for Maipenairu.

Table 3.23 – Maipenairu Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on a tributary of the Panaroa River near it's mouth, approximately 53 km southwest from Herd Base	
	Coordinates	145.0766296	-7.8018241
	Physical setting	Located on a low-lying area with vast areas of mangrove and nipa swamp	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	16 (Maipenairu)	
Population and demography	**Population**	339	
	Gender ratio (M:F)	90 (161:178)	
	Ethnic group	Iare	
	Affiliations	Old Iare, Mapaio, Aumu, Aivai, Kapai 2 and Kaevaria.	
	Households	60	
	Household size	5.7	
	Language	Iare	
	Other languages	Motu, Tok Pisin, English and some Orokolo	
Settlement	**Year established**	1947	
	Name meaning	Maipe meant "no father" and Nairu meant "clan", so Maipenairu meant "fatherless clan". Interpreted as welcome for people without leaders, to come and settle	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, taro, kaukau, pitpit and cassava. Extensive hunting for wild pigs, monitor lizard, bandicoots, megapodes, cuscus and more, and extensive fishing (main species catfish)	
	Resources	Extensive sago swamps including mixed nipa and mangrove swamp areas	
Commercial activities	**Businesses**	2 x trade stores, 1 x contracting services business called Baimuru Builders	

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Table 3.23 – Maipenairu Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	73% traditional 18% semi-improved 9% modern
	Floor type	100% raised
	Housing materials	Split black palm floor, hardwood posts, rough sawn frame, woven sago leaf stem panels for the walls, some split timber walls, sago roof
	Cooking	Both inside and outside using firewood
	Lighting	Battery, kerosene, solar and generator
Health	**Facilities**	Maipenairu Aid Post
	Nearest facilities used	Kapuna Health Centre, located approximately 28 km to the northwest
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	14 to 20
Education	**Facilities**	1 x elementary school, 1 x primary school
	Attendance	62 students attended elementary school, 108 students attended primary school
	Nearest facilities used	Kikori Secondary School, approximately 100 km to the northwest
Religion	**Churches**	United Church, Seventh Day Adventist, Christian Life Center
Water and sanitation	**Drinking Water**	Tanks adequate year-round
	Toilet facilities	Private pits, the bush, and the river
	Waste disposal	Tin cans, batteries, paper, and plastics into the bush. Food scraps are fed to the animals
Law and order	**Prevalent issues**	Stealing, disputes (relatively minor)
	Resolution mechanisms	Village leaders
Cultural heritage	**Tangible cultural heritage sites**	2 x ancestral village sites and 1 x archaeological site
	Intangible cultural heritage	Active intangible cultural heritage values were all indicated as being passed between generations and were considered very important

3.23.2 Settlement History

The Iare indicated that they originated from further up the Purari River and settled in several places, including Kaumeia (near Purari airstrip), Kairi Pairi Vaivere (near Evara) and then Old Iare. Much tangible cultural heritage was destroyed in the Tom Kabu Movement. However, Kabu also encouraged education, and possibly influenced the establishment of Maipenairu. Several residents of Old Iare established Maipenairu in 1947 to be near the London Missionary Society (LMS) mission, which had a boarding school, health centre, coconut plantation and cattle farm.

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3.23.3 Social Organization

Maipenairu had four main clans and 15 to 20 sub-clans. Many of these clans included people from other Iare villages. Possibly due to the influence of the London Missionary Society, the church was strong, education levels were relatively high, and the community as a whole was well organized, having a village recorder and a ward development committee.

3.23.4 Land Ownership

Each family within each clan was allocated land for their exclusive use for gardening and making sago, while anyone from the Iare tribe was allowed to fish in the rivers and hunt in areas that were not populated. Men made decisions regarding land use and maintain ownership. Women used their husband's land. Few land disputes were reported to occur within the village or with other villages.

3.23.5 Women

Caring for children and ensuring children attended school were seen as important roles for women. Most women engaged in marketing activities in various locations including Purari logging camp, Ihu, Baimuru station, Kikori and Kapuna. They often sold sago, fish, and traditional crafts such as mats and baskets and often earned around K100.

Women generally felt safe and secure. Marrying age was between 14 – 20 years of age, and approximately half of babies were delivered in the village. The others were delivered at Kapuna Health Centre.

3.23.6 Youths

There was a youth group at Maipenairu called Nairu Club with an appointed leader and more than 100 members between the age of 10 and 40 years. Sports activities were the main form of recreation for youths. The group also participated in regular community work such as building and cutting posts for houses, maintaining houses and cutting grass. Youths also participated in church activities. For recreation, most youths spent time with friends, played sport and smoked and chewed betel nut.

3.23.7 Subsistence

The main staple food was sago and garden food crops grown in the nipa areas include cooking banana, taro, kaukau, pitpit and cassava. A wide range of greens were grown included aibika, tulip and kalava. A wide range of fruit trees were grown included coconut, okari nut trees, mango, laulau, kapiak (breadfruit), guava, star fruit, and custard apple.

Extensive hunting was done in the sago swamp forest and forests upstream for wild pigs, monitor lizard, bandicoots, megapodes, cuscus, bush rats, Victoria crown pigeon and flying fox. Various insect larvae including larvae from dead trees and sago grubs were also harvested.

Extensive fishing activities occurred mainly along the Panaroa River and associated creeks including the ocean for catfish, mudfish, barramundi, Black bass, salmon, mullet, shark and jaw fish. Other aquatic resources harvested included prawns, shell fish and mud crabs. Freshwater and marine turtles were harvested. Saltwater and freshwater crocodiles were hunted for meat and skin for sale however not many people were interested in this trade.

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3.23.8 Land and Natural Resource Use

Land resources included extensive sago swamps including mixed nipa and mangrove swamp areas. These provided an array of essential timber and non-timber forest products including medicinal plants. Forest products were mainly harvested from along the banks of the Panaroa River and associated creeks, sago swamp, nipa and mangrove areas.

Kwila was the preferred house post. Sago was the main material used for house wall and nipa for thatched roof. Other building materials used for bearer, floor joist, studs and rafter were mainly sourced from the mangrove forest and mixed hardwood timber species bought from Baimuru sawmill. Black palms were split for flooring. Main species used for canoe making included erema, rosewood and red cedar.

Drinking water was mostly sourced from the household water tanks however in the event that the water was depleted during the dry season, water was sourced from Panaroa River.

The Panaroa River, which joined the Purari River, was the primary river transport route to visit riverside gardens, harvest sago and for fishing. It was also used for accessing basics government services like health and education, and for marketing of sago, garden produce and other seafood products at Kapuna, Baimuru, Kikori and Evara logging camp.

3.23.9 Health

An aid post was functioning at Maipenairu. The main health problem was identified to be malaria. Villages felt they had a relatively good knowledge of the causes of HIV/AIDS and other sexually transmitted diseases, how they were transmitted and how they were treated.

Women reported that most women use some kind of family planning and make a shared decision with men about what sort of contraceptive method to use.

3.23.10 Education

An elementary and primary school was located at Urika Mission, adjacent Maipenairu. Both were open all year in 2015. However, the elementary school had volunteer teachers that received no payment. Teachers at both schools confirmed high attendance. Various needs were identified by the teachers, including improvements to water supply, toilets and teacher's housing, more equipment such as computers and printers, a library and better communications

3.23.11 Law and Order

Men identified the main law and order problems as stealing and disputes, although both were regarded as relatively minor issues, and could be easily dealt with by the village leaders. Village court officials had been identified but apparently had not yet received salaries. Some young men consumed alcohol and smoked marijuana, but this was not seen as a major problem as it did not adversely affect other people. It was generally safe for women and children to wander through the village and to fish and attend their gardens on their own.

3.23.12 Cultural Heritage

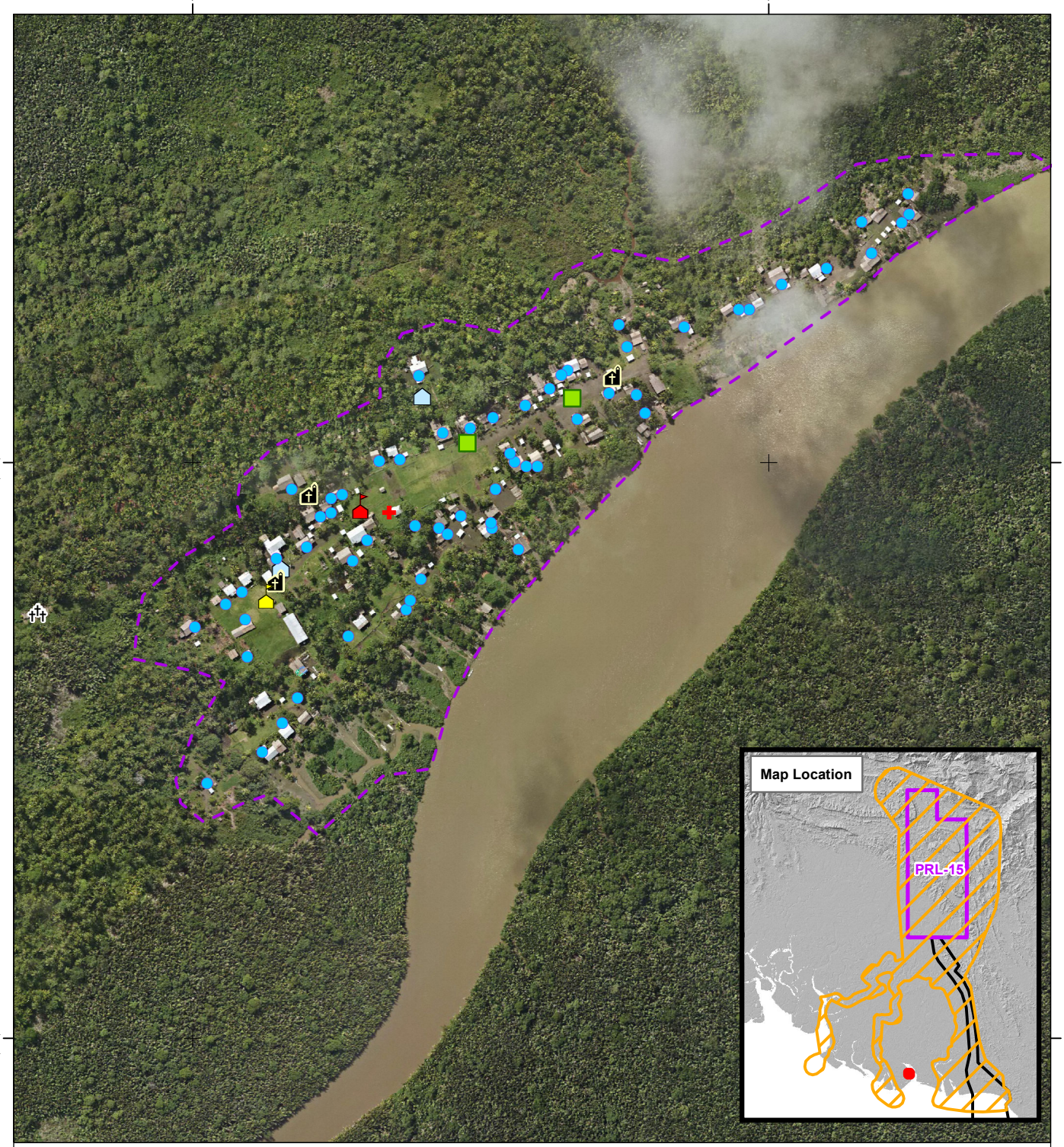
The migration story of the Maipenairu people was the same as the Mapaio migration story as both villages shared a common ancestor. The largest village complex for the Maipenairu was called Old Iare. Old Iare contained all material culture, and tangible cultural heritage sites. Tom Kabu

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arrived back from Australia where he had been educated and influenced by the lifestyle and beliefs of Christianity, and encouraged the Maipenairu people to settle in a new location and to learn the Word of God, and discouraged the use of their cultural heritage values. The new place was called Maipenairu. The gradual land formation along the coast from sedimentation from the river further encouraged the migration of people towards the riverbanks. This migration saw the establishment of present-day Maipenairu.

Active intangible cultural heritage values were all indicated as being passed between generations and were considered very important. Most of the associated beliefs and rituals for sago processing, fishing and hunting were very much active and these intangible cultural heritage values were being transmitted from parents to children. Women performed a traditional song and dance called *apa apa* when there were special guests visiting. Women still practiced customs relating to food after giving birth and during menstruation. Other customs specific to women applied to sago making practices, land and resource distribution.

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SCALE: 1:5,000 @ A4

0 50 100 150 200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Primary School
- Aid Post, Operating
- Burial sites/cemetery
- Church
- Operating trade store
- Sporting field
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Maipenairu Village Layout

FIGURE: 3.23

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77449 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.23 – Maipenairu Gallery



Photo 1 – Solar panels used to power lighting



Photo 2 – Functioning aid post (front) with disused aid post building in rear



Photo 3 – Inside the aid post with community health worker and dispensary shown on right



Photo 4 – Basketball court



Photo 5 – Elementary school



Photo 6 – Urika Primary School at Maipenairu

3.24 Mapaio Fish Camp

3.24.1 Summary

Table 3.24 summarizes key social data for Mapaio Fish Camp. Mapaio Fish Camp is a settlement of six families of people originally from elsewhere (Mapaio). As a small settlement (as opposed to a community), a community level survey was not conducted as it would not have been appropriate to conduct focus groups with just one or two people present on some topics (i.e., youth with no youth present). Being Iare people from Mapaio, much of the findings from the Mapaio surveys can be considered relevant to the people from Mapaio Fish Camp. However, given the settlement's proximity to the Project site, some fundamental information about the settlement and the origins of its people was collected in an abbreviated community level survey.

Table 3.24 – Mapaio Fish Camp Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Purari River at the mouth of Nea Creek, approximately 12 km downstream of Herd Base	
	Coordinates	145.1158447	-7.3660088
	Physical setting	Set on the mouth of Nea Creek amidst lowland forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	N/a	
Population and demography	**Population**	32	
	Gender ratio (M:F)	88 (15:17)	
	Ethnic group	Iare	
	Affiliations	Poroi 1, settlers from Vai'l Nairu clan of Maipenairu	
	Households	5	
	Household size	6.4	
	Language	Iare	
	Other languages	Tok Pisin, some English	
Settlement	**Year established**	1990s	
Commercial activities	**Businesses**	None	
Housing	**Housing style**	100% traditional	
	Floor type	100% raised	
	Housing materials	Bush materials	
Health	**Facilities**	None	
	Nearest facilities used	Kapuna Health Centre conducted outreach to village	
	Community Health Worker	0	
	Trained birth attendant	0	

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Table 3.24 – Mapaio Fish Camp Summary (cont'd)

Thematic Area	Indicator	Description
Education	**Facilities**	None
	Attendance	None
	Nearest facilities used	Poroi 2 (1 x primary and 1 x elementary school) approx. 9 km east-southeast or Mapaio (1 x primary and 2 x elementary schools) approx. 32 km south-southwest
Religion	**Churches**	N/a
Water and sanitation	**Toilet facilities**	Pit
	Waste disposal	N/a
Law and order	**Prevalent issues**	Arguments / land disputes

3.24.2 Settlement History

Residents relocated here from Mapaio and had lived in this current location for approximately 20 years (prior to any activity on PRL-15). Location was thought to be an ancestral village, situated where there was once a beach. Ancestors lived at Iare village, which was originally located near Subu. Ancestors moved to Nea Creek as the land began forming, as it was a place of abundant fish resources.

3.24.3 Social Organization

The community at Mapaio Fish Camp comprised five households of the same family.

3.24.4 Health

Residents used to visit Herd Base for health services but now they waited for Kapuna Health Centre to conduct outreach.

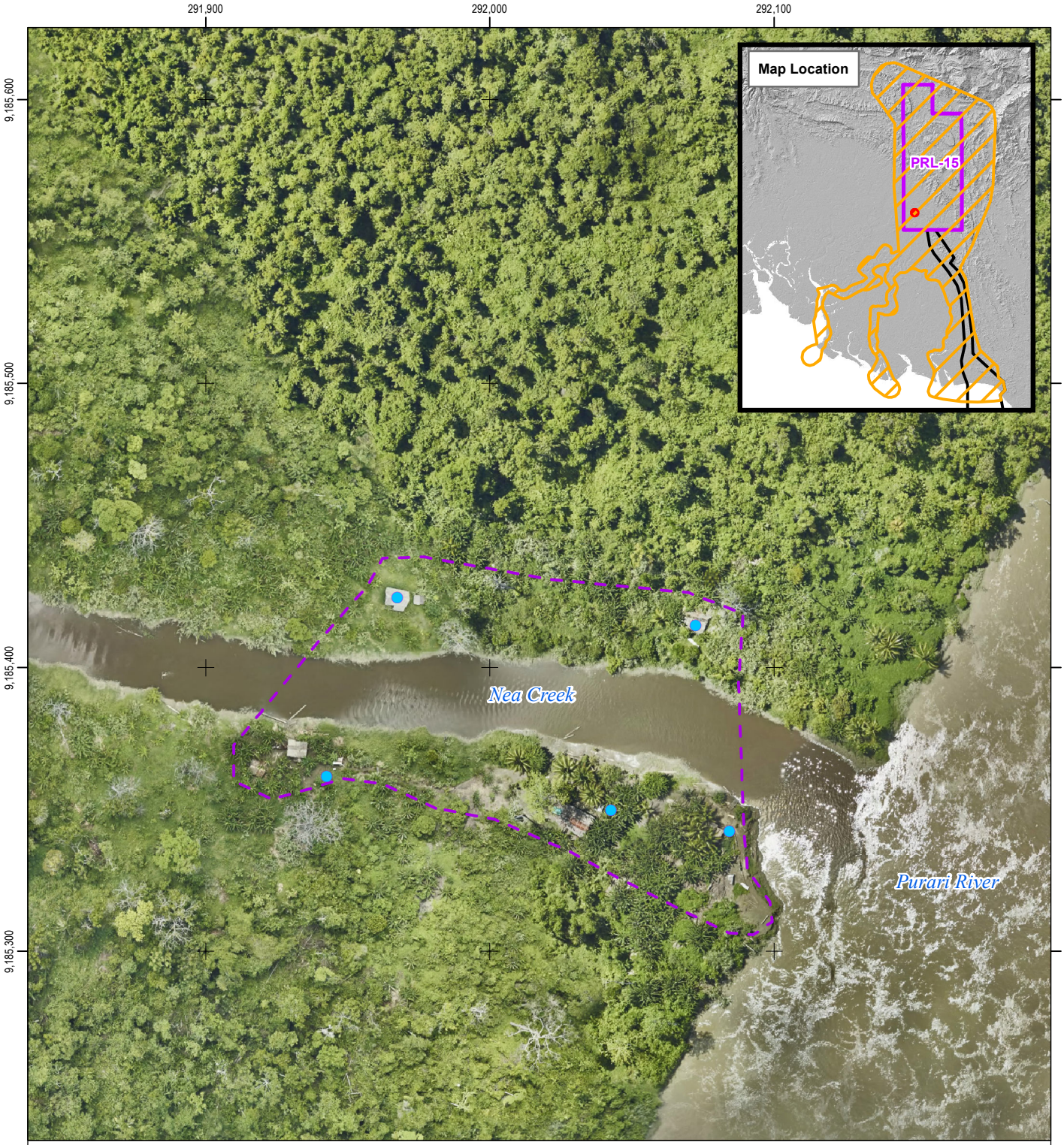
3.24.5 Education

Children did not attend school. It was reported that it was too expensive to send children to school. The nearest schools were located at Poroi 2 or Mapaio.

3.24.6 Law and Order

Arguments / land disputes were reportedly to occur with Pawaians over land. Two recent deaths were attributed to sorcery (in the form of crocodile attacks).

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SCALE: 1:2,000 @ A4

0 20 40 60 80 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Mapaio Fish Camp Village Layout

FIGURE: 3.24

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77450 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.24 – Mapaio Fish Camp Gallery



Photo 1 – Housing style at Mapaio Fish Camp



Photo 2 – Basketball court



Photo 3 – Houses belonging to Mapaio Fish Camp occur on both sides of Ne'ea Creek

3.25 Mapaio

3.25.1 Summary

Table 3.25 summarizes key social data for Mapaio.

Table 3.25 – Mapaio Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Ivo River (middle tributary of the Purari River), in the Purari River delta, approximately 37 km southwest of Herd Base	
	Coordinates	145° 2' 32.82" E	-7° 39' 0.411" S
	Physical setting	Located on the banks of the Purari River. Surrounded by lowland swamp forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	14 (Mapaio)	
Population and demography	**Population**	859	
	Gender ratio (M:F)	108 (446:412)	
	Ethnic group	Iare	
	Affiliations	Kaevaria, Maipenairu, Aumu and Aivei	
	Households	152	
	Household size	5.7	
	Language	Iare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1946	
	Name meaning	Come stop over	
	Land ownership	Patrilineal; ownership generally passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with some garden food such as cooking banana, kaukau, taro and cassava. Extensive hunting for wild pigs, cassowary, bandicoots, monitor lizards, megapodes and flying fox, and extensive fishing (main species catfish)	
	Resources	Extensive sago woodlands (swamps) that varied from almost pure sago to sago with an overstorey of large trees	
Commercial activities	**Businesses**	5 x trade stores, several fuel sellers, several table markets	
Housing	**Housing style**	89% traditional 11% semi-improved	
	Floor type	100% raised	
	Housing materials	Split black palm or split timber floor, woven sago panels on the walls and sago leaf roof and kwila posts	
	Cooking	Inside using firewood	
	Lighting	Some solar, battery and a few generators	

Table 3.25 – Mapaio Summary (cont'd)

Thematic Area	Indicator	Description

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Health	**Facilities**	No Aid Post however CHW operates from her house
	Nearest facilities used	Kapuna Health Centre, approximately 12 km to the northwest (however >50km via Purari River)
	Community Health Worker	1
	Trained birth attendant	Yes
	Marrying age (women)	20 – 40 years
Education	**Facilities**	2 x elementary schools, 1 x primary school
	Attendance	124 students attending elementary schools; 118 students attending primary school
	Nearest facilities used	Kikori Secondary School, approximately 92 km west-northwest
Religion	**Churches**	Seventh Day Adventist, Christian Revival Church, United Church
Water and sanitation	**Drinking Water**	River
	Toilet facilities	Shared pit toilet
	Waste disposal	Tin cans/batteries, paper/plastics and food scraps were disposed in river (some paper/plastics were buried)
Law and order	**Prevalent issues**	Sorcery, domestic violence, stealing and alcohol abuse
	Resolution mechanisms	Village peace officer, village court
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Women's songs and dances and women's knowledge about making traditional tools used for processing sago

3.25.2 Settlement History

Mapaio was established in 1946 after people left Old Iare. The present Mapaio was the eighth generation of the tribe. Their reasons for resettlement included lack of health and other basic services and no sustainable food supply in Old Iare.

3.25.3 Social Organization

Two clan chiefs and two village chiefs, four church leaders, ward councillor, village court magistrate contributed to social organization.

3.25.4 Land Ownership

The Iare people were generally patrilineal. Only the father or clan leader allocated land to the children. In cases where a father died, the mother could take on that duty. This could be applicable to in-laws and friends. Male clan members had much say over land ownership. In the event where there was no male heir, ownership could be placed in the custodianship of a female clan member.

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3.25.5 Women

Women's main role was to make sago, care for children, tend gardens, fish and collect water and firewood.

They reported generally feeling safe and secure (and that this feeling had remained the same over time), and that they were only afraid of sorcery.

Marrying age was generally between 20 and 40 years.

Approximately 33% (five of 15) babies were born in the village, assisted by a trained village birth attendant in the past 12 months. Others travelled to Kapuna Health Centre (four hours by paddle canoe) to give birth.

3.25.6 Youths

Eight youth groups each group containing about 100 members were present. All youth groups were involved in similar activities such as sports and providing community service with or without payment (e.g. sago making, building of classrooms, church and family homes and cutting grass). For recreation, youths played sport, spent time with friends, swam in the river and made crafts such as baskets (females) and bows and arrows (males).

3.25.7 Subsistence

The primary staple food was sago, which was harvested from extensive sago woodland (swamps). Some sago was planted particularly along riverbanks. The seedlings planted were selected from specific varieties that produced the best quality sago. Sago was supplemented by garden crops, primarily cooking banana, kaukau, taro kang kong and cassava. A range of 'greens' (e.g. aibika, tulip, aupa), other crops (e.g. pumpkin, sweet corn, pitpit, sugar cane and peanuts) and fruits (e.g papaya, and pineapples) were also grown. Coconuts, guava and Okari nut trees were extensively planted.

Extensive hunting in forests was reported for wild pigs, cassowary, monitor lizards, bandicoots, megapodes and flying fox.

Extensive fishing was reported along the Purari River down to the coast where a fishing camp was reportedly based. Aquatic resources included a range of fish (including tilapia), eels, crabs, shellfish (from the sago swamps and near the ocean), freshwater turtles, saltwater turtles that migrate from the ocean to lay eggs along the banks of the Purari River, and crocodiles.

3.25.8 Land and Natural Resource Use

Customary land accessed for resources was characterized by extensive sago woodlands (swamps) that varied from almost pure sago to sago with an overstorey of large trees. Further towards the coast extensive stands of nipa palms occurred along the waterways.

Sago was the main material used for house walls. Nipa palm was used for roofing thatch, which was collected downstream. Kwila was harvested from the swamps for house posts. Swamps and forests were used to harvest a range of timber and non-timber products including medicinal plants.

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Approximately half the settlement had been supplied with water tanks and used these as their primary source of drinking water. The remainder sourced drinking water from the Purari River. During the dry season, tank water supply was generally depleted and drinking water was sourced universally from the Purari River by all residents.

All transport routes to Mapaio were along the waterways, which were used to access the health centre at Kapuna, and government services and markets at Baimuru and Kikori.

The Purari River was also the primary transport route to visit riverside gardens, harvest sago, source a range of forest products and harvest canoe trees (erema).

3.25.9 Health

Mapaio village had a community health worker who had access to medications and administered treatment. The health worker operated from his house because the health centre was only partially constructed in 2011 and unused because payments had not been made to landowners and suppliers of building materials to complete the building. Serious health cases were referred to Kapuna Health Centre. Malaria and tuberculosis were noted as the main issues affecting health. Malaria patrols by Kapuna Health Centre were occurring at the time of the SBS surveys (May 2016).

Women reported the main reason for poor health was their workload and for children it was poor hygiene and too much washing in the river.

Only a few women were aware of STD, and how they were contracted and treated. Most women knew about, had access to and used contraceptives – a shared decision made between husband and wife.

3.25.10 Education

Two elementary schools operated in the village: (i) Mapaio Aikavalavi Elementary School and (ii) Mapaio Elementary School. There was also one primary school; Mapaio Primary School. Secondary school was located at Kikori, one days' travel by dinghy.

Mapaio Aikavalavi Elementary School had 48 students (19 males and 19 females) in Grade 2. It had one teacher and two vacant teaching positions. Parents paid K25 in project fees in 2016 for a sanitation project to build new toilets.

Mapaio Elementary School had a total of 76 students: 44 students (24 males and 20 females) in Prep, and 32 students (15 males and 17 females) in Grade 1. It had one teacher and one vacant teaching position. Parents paid K25 (at both elementary schools) for project fees (if required) for school maintenance.

Mapaio Primary School had grades 3-8 with a total of 118 students (46 males and 72 females). It had three teachers and one vacant teaching position. At the time of SBS surveying, the primary school had been closed for two weeks because the student toilet and teachers kitchens were in disrepair. It was noted that the school would reopen when the community constructed a new toilet/teachers kitchen. A project fee of K25 was paid annually by the parents for each student to contribute to small projects and maintenance.

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3.25.11 Law and Order

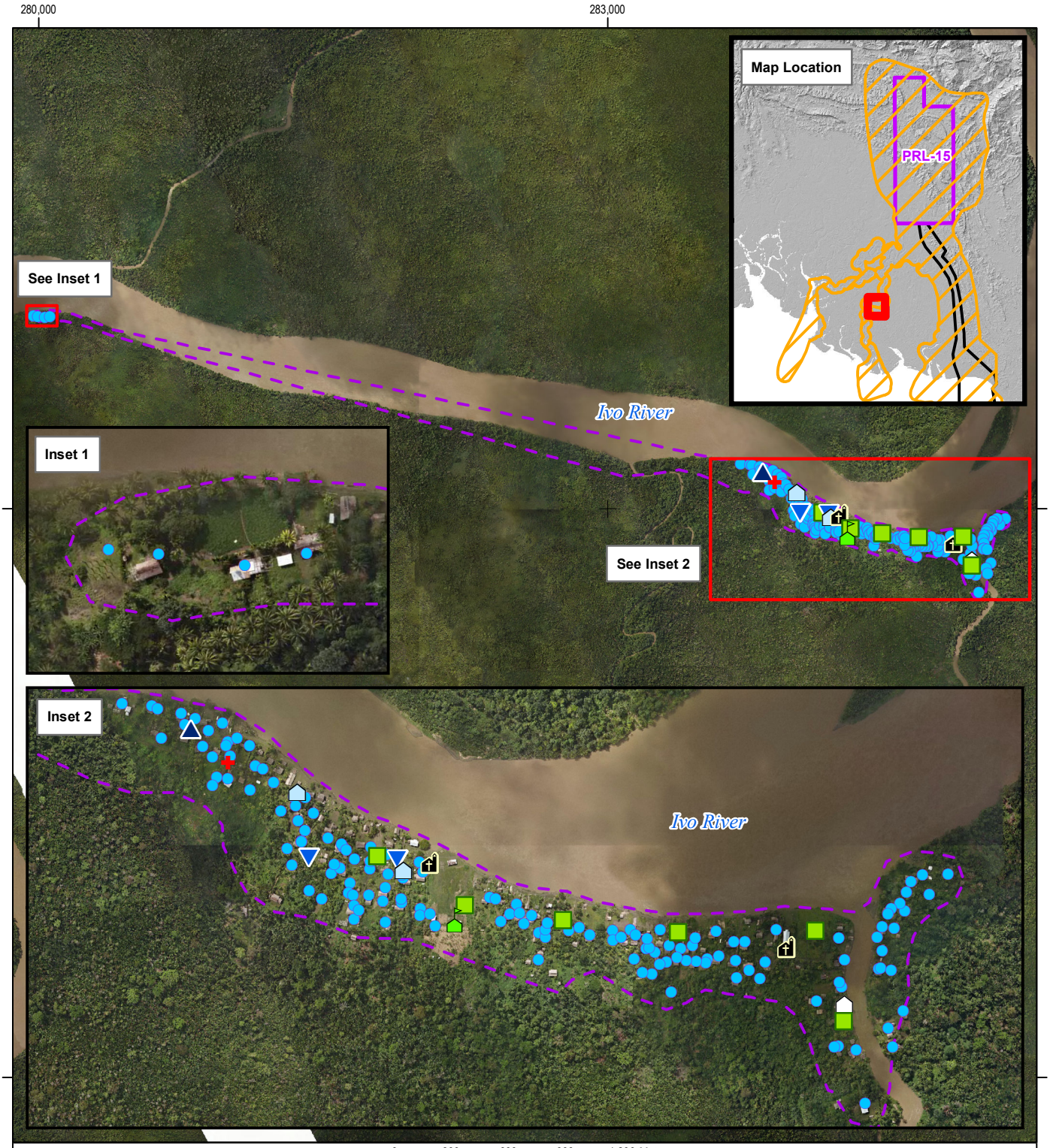
Sorcery was reported by the men as the main law and order issue. Cases of alleged sorcery were addressed with the intervention of the village peace officer who mediated between the parties. Domestic violence was cited as the second most prevalent issue. Women noted only theft as the main law and order issue. Most women did not talk openly about domestic violence and sexual assault cases within the community. Most law and order issues were referred to the village magistrate and/or court or resolution.

3.25.12 Cultural Heritage

Mapaio was the home village of Tom Kabu who in the 1940s advocated the destruction of tangible cultural heritage values. No tangible cultural heritage sites were recorded at Mapaio. According to key informants, tangible cultural heritage sites were found only at distant ancestral village sites. Intangible cultural heritage was present in the form of women's songs and dances, which remain practiced and used to teach young women about their role in Mapaio society. Intangible cultural heritage values were also maintained in the form of women's knowledge about making traditional tools used for processing sago. The community highly valued women's tool-making knowledge because the tools were considered essential to their subsistence security. Elders had names for the past eight generations and each generation was described with a brief anecdote. The present generation of youths was called Lipi Ope; the 'hard to hear' generation. Elders feared that outside influences would result in the Lipi Ope generation not learning about their cultural heritage, which would in turn have negative impacts for maintaining Mapaio cultural identity.

Women still practiced a special dance (called *apa apa*) which was performed only when there were special occasions in the village. They continued to make traditional items such as spoons, mats, baskets, and, fishing nets. Only special customs relating to food and drinks applied to pregnant women in the community.

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SCALE: 1:30,000 @ A4

0 300 600 900 1,200 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary and Primary School
- Aid Post, Operating
- Church
- Community hall
- Operating trade store
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Upstream project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Mapaio Village Layout

FIGURE: 3.25

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-79714 **REVISION:** F

DATE: 18/04/2017

DATA SOURCES:
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Plates 3.25 – Mapaio Gallery



Photo 1 – Man demonstrates basket weaving



Photo 2 – Mapaio Primary School



Photo 3 – Community meeting place



Photo 4 – Small informal 'black market'



Photo 5 – Small aibika market



Photo 6 – Ladies traditional dance

3.26 Marea

3.26.1 Summary

Table 3.26 summarizes key social data for Marea.

Table 3.26 – Marea Summary

Thematic Area	Indicator	Description	
Location	**Description**	Popo coast, Orokolo Bay, located approximately 55 km southeast of Herd Base	
	Coordinates	145° 17' 19.383" E	-7° 51' 8.614" S
	Physical setting	Set in the centre of Orokolo Bay, amidst mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	2 (Harevavo)	
Population and demography	**Population**	435	
	Gender ratio (M:F)	108 (226:209)	
	Ethnic group	Orokolo	
	Affiliations	Coastal and inland of Orokolo Bay communities	
	Households	79	
	Household size	5.5	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	Marea was the shorter name of one of their male ancestors: *Maiu Mavareakore*	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with coconuts, some garden food such as cooking banana, cassava, kaukau and taro. Occasional hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and others. Fishing in rivers for species such as barramundi, catfish, red emperor and in the ocean for sharks, barramundi, mullet and kingfish.	
	Resources	Mangrove forest, nipa palm swamps, beach vegetation, alluvial forest, hill forest, river and marine resources.	
Commercial activities	**Businesses**	2 x fuel sellers, 4 x commercial dinghy operators	

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Table 3.26 – Marea Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	77% traditional 22% semi-improved 1% modern
	Floor type	100% raised
	Housing materials	Split black palm and betel nut palm floors, hardwood posts (including coconut stems), sago leaf and nipa palm roof thatch, sago woven panel walls
	Cooking	Inside using firewood
	Lighting	Generator, solar and battery torch
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located in Kavava approximately 4 km to the east
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	15 – 20 years
Education	**Facilities**	None. Children attended elementary and primary schools at Kaivukavu
	Attendance	N/a
	Nearest facilities used	Kaivukavu (1 x elementary school, 1 x primary school) less than 0.5 km to the east, Ihu High School approximately 13.5 km to the southeast
Religion	**Churches**	Seventh Day Adventist
Water and sanitation	**Drinking Water**	Water tanks (two per clan), supplemented by wells at the rear of the village
	Toilet facilities	Bush, sea/river
	Waste disposal	Tin cans/batteries and paper/plastics were disposed by burying and food scraps were fed to animals
Law and order	**Prevalent issues**	Marijuana use, fighting, swearing, domestic violence
	Resolution mechanisms	Village court, village magistrates, peace officers and other village leaders
Cultural heritage	**Tangible cultural heritage sites**	Heve and Popo ancestral villages, also a village called *Irapuipiarumirie* which was the first place that their ancestors moved to after Popo
	Intangible cultural heritage	Embraced and practiced a vibrant oral tradition of secret magic chants and invocations to hunt, catch fish, do gardening and create social relationships

3.26.2 Settlement History

The upper Purari was the original source of the first series of migrations by their ancestors. The reasons for moving were many and the direction usually southward or downstream along the Purari river, settling in several locations. At some point in time, all those ancestors converged at Popo, which at that time was at the coastline and they built a vibrant settlement. Over time,

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further migrations took place that saw people mostly moving to the coast to claim new land being formed due to sedimentation build-up. The Popo exodus was attributed to intra-clan and family rivalry, inadequate land for gardening and other valuable resources, and warfare.

3.26.3 Social Organization

Marea was represented by a ward councillor, village court magistrate and land mediator. Marea had no traditional chiefs, but the elders acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village.

3.26.4 Land Ownership

Marea people strictly observed the patrilineal system of land ownership and control over it. Power and control over land was passed from father to son, generation to generation. Women and in-laws were given only user rights; they could not plant permanent fruit or food trees.

3.26.5 Women

Similar to other coastal Popo villages, women often carried sand from the beach to spread in yards and make lime from kina shells, in addition to performing the usual roles of sago making, fishing, and carrying out daily household chores.

Most women engaged in income earning opportunities and often sold fish, bananas, sago, and other garden produce at Kaivukavu market on Mondays, Thursdays, and Saturdays. There were also informal market stalls (table markets) in front of households selling items such as betel nut and bananas.

Women generally felt safe and secure despite being afraid of sorcery especially at night and this sense of security had remained stable over the years.

Marrying age was between 15 and 20. The village had a trained birth attendant and also a traditional birth attendant and approximately half the babies born were in the village. The remainder were born in the Orokolo Sub Health Centre, which was about one or two hours' walk away.

3.26.6 Youths

Marea village had a Seventh Day Adventist (SDA) and sports youth group. The total population of the youth members was more than 200 and the age group range was from 16 to 30 years old. Their main activities were sporting activities and community work such as helping the old, widows, sick or single mothers. Fundraising activities were performed at a rate of K25-K50 (for low workloads) and K100 (for heavy workloads) by the church. Main jobs included cutting sago, building houses, and making canoes upon request. Outside of the youth group, youths main activities were caring for family, making gardens, tending gardens, fishing, and collecting water and firewood.

For recreation, youths mainly participated in sporting activities, relaxing, socialising, and craft work such as making bilums, mats and mending fishing nets.

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3.26.7 Subsistence

The main staple food was sago which was harvested from sago palms that had mostly been planted to the north of the village in low-lying swampy areas. Coconuts were also an important staple particularly when garden foods had failed because of flooding or drought. Extensive coconut plantations occurred throughout the area that was originally planted for copra production. Occasionally extensive flooding prevented access to harvest sago. Sago and garden crops were generally not affected by drought, particularly across the alluvial plains.

Garden food was mostly grown in the nearby forest areas to the north of the village, within a few kilometres. A wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main staples. Aibika, kalava and tulip were the main greens grown in gardens and around houses. Fish and other crustaceans were also exchanged for garden food with other inland villages or purchased from the village market held on Mondays, Thursdays and Saturdays. Several food trees were grown including coconuts, guava, bread fruit (kapiak), and laulau. Additional food resources included the nipa palm nuts and new shoots that were harvested from the extensive nipa palm swamps near the Alele Passage.

Occasional hunting was reported to occur in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), monitor lizards and flying fox. There were few animal species that were not eaten apart from birds of paradise, goura pigeon, frogs and rats. Mushrooms were also harvested that grew on the processed sago and on dead wood. Insect larvae were eaten including sago grubs (known locally as sago worms) and grubs.

Extensive fishing was reported to occur along Mihamaa Creek, the Alele Passage and associated creeks. Catfish was the main species caught but also salmon, red emperor, barramundi, three species of black bass, mullet, sawfish, sailfish, shovel head and hammerhead sharks, and mudfish and super tilapia in the freshwater areas. Other aquatic resources included prawns, mud crabs and ocean crabs, and three species of shellfish, one of which was collected from the beach sands in the intertidal zone. Crocodile and turtles (two species) were not normally hunted but caught accidentally by fishing line or nets (thus their meat eaten). Crocodile eggs and turtle eggs were not normally collected. The community was uncertain where the crocodiles laid their eggs.

Gardening practices were similar to other coastal Popo villages wherein women gathered seeds, suckers, and stems for planting then handed them over to men to plant in a new garden. Only men were allowed to plant a new garden and tend it until after the first harvest when women were allowed into the garden. Men cut sago trees and scraped the sago for the women to beat and carry home.

3.26.8 Land and Natural Resource Use

Land resources included mangrove forest, nipa palm swamps, beach vegetation, alluvial forest and hill forest. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. Some of the forest resources were reportedly becoming harder to find because of population pressure, particularly house posts and the preferred canoe trees.

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Sago and nipa palms were the main material used for house thatch but sago was woven to make house walls. Kwila was the most preferred tree species for house posts which was mainly sourced from the Alele Passage, but rosewood and other species harvested from alluvial forest and hill forest were also used. Coconut posts were increasingly used due to the increasing distance the community had to travel to harvest kwila and other species. Occasionally posts were purchased from Apiope due to local shortages. Other hardwood species were used for house bearers including mangrove cedar, but for rafters and joists avare (a swamp species) was used. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Pandanus leaves for weaving mats were collected from the banks of Mihamaa Creek. Mats were sold for between K20 – K30 per mat depending on the size.

The primary source of drinking water was from rainwater tanks.

The village was connected to inland villages by walking track including Ere-Kilavi, Avavu, Arehava 2 and Paevera. The beach track connected with other coastal villages within Orokolo Bay and to Kerema, but the Vailala River had to be crossed by canoe. The primary river transport route was via canoe to the Aievi Passage, Apiope, and villages along the Purari River. The main ocean transport route was via motorised dinghies that travelled to Ihu and Kerema for onward transport to Port Moresby.

3.26.9 Health

There were no health facilities in Marea, but there was a traditional healer. The closest health centre was at Orokolo Sub Health Centre at Kavava.

The women perceived that most health issues faced by them were caused by their workload, and health issues for children were caused from lack of food. Men identified the main health problems as malaria and asthma. The main health concerns reported by the youths revolved around water related diseases especially during dry and rainy seasons when the water wells were thought to be at their poorest quality.

No one in the village knew about the prevalence of STDs and only a few had an understanding of how they were transmitted or treated, however they believed there were no STD cases within the village. Most of the women had an understanding of contraceptives and how to access them yet only a few used contraceptives. Most women resorted to using traditional family planning methods. For those few who used either type of birth control some made the decision on their own and for some it was a shared decision.

3.26.10 Education

There were no schools in Marea. Children attended elementary and primary school at Kaivukavu. It was reported that most children attended the school although numbers were unknown.

3.26.11 Law and Order

Leaders regarded the use of marijuana and women regarded fighting and swearing as the most prevalent law and order issues within the village. The women reported that most men used marijuana and some consumed alcohol (home brew) as well as gambled.

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Domestic violence cases were often regarded as family matters and generally resolved by immediate family. Within the past year one out of the three deaths in the village was reportedly the result of domestic violence. Fighting and swearing were often referred to the village court. The fear of sorcery was quite common especially at night.

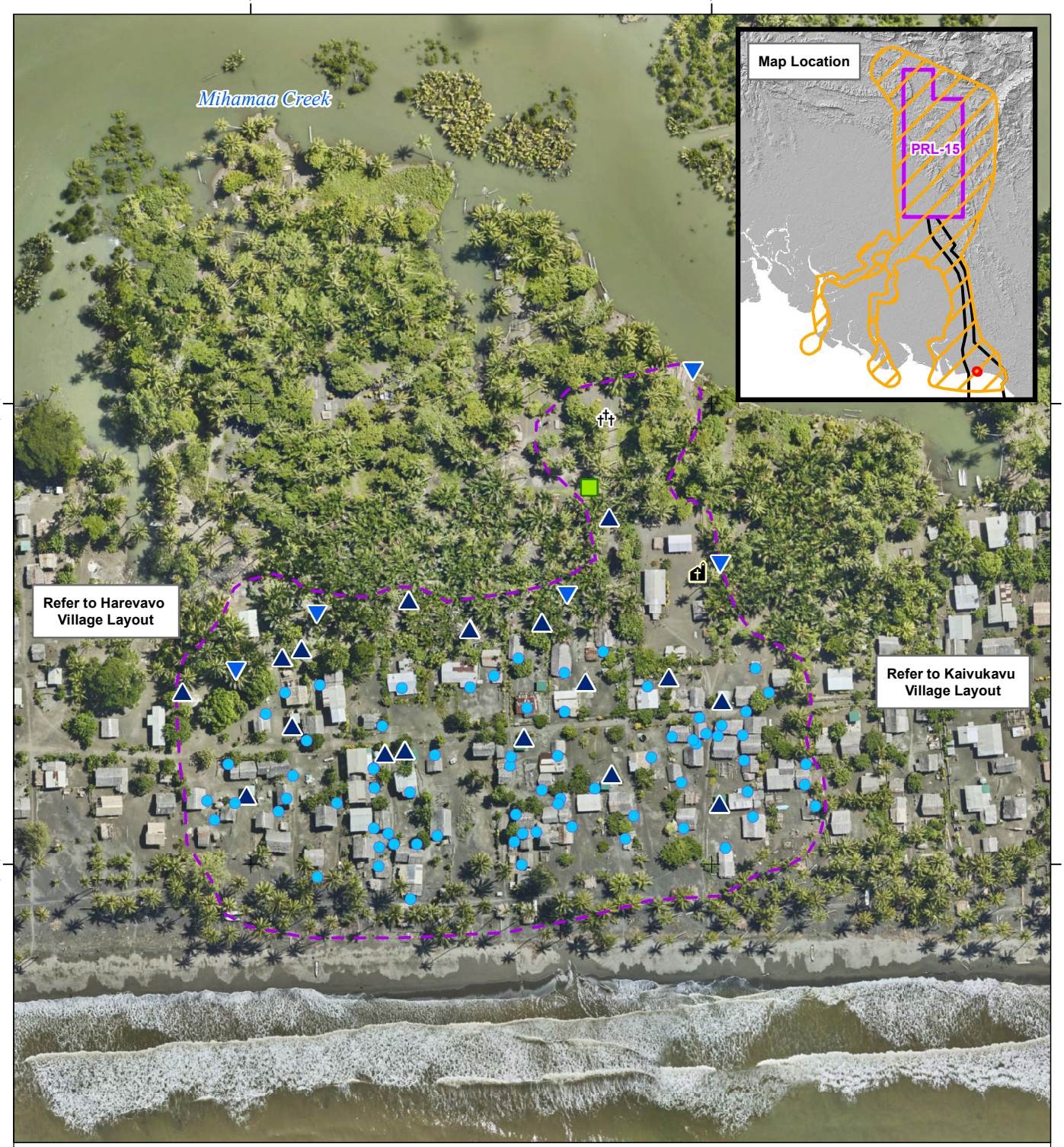
The village magistrates, peace officers and other village leaders generally tried to resolve issues by mediation, or if necessary, by referral to the village court. The main safety concerns included crocodiles and sorcery (often related to crocodiles).

3.26.12 Cultural Heritage

Consistent with regional migration themes, people moved as the land extended, often several times, until settling in their current location. For Marea elders, Heve and Popo were the two most important ancestral village locations in their cultural history. Their oral traditions recalled times when Heve Hill and later Popo were beach-fronting locations. In addition to these key locations, they also mentioned a village called *Irapuipiarumirie* which was the first place that their ancestors moved to after Popo. *Irapuipiarumirie* remained a highly significant ancestral location and was described as being located about one kilometre west of Popo, although such guidance could only be considered a general indication of the site's location. With the exception of *Irapuipiarumirie*, elders had reported no sites to the north or west.

Although much of their material culture was wiped out at the beginning of the last century, Marea still embraced and practiced a vibrant oral tradition of secret magic chants and invocations to hunt, catch fish, do gardening and create social relationships.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Marea Village Layout

FIGURE: 3.26

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77452 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.26 – Marea Gallery



Photo 1 – One of the Marea youth groups



Photo 2 – Disused aid post (located between Marea and Larihairu)



Photo 3 – Water well at rear of village



Photo 4 – Fishing catch ready for sale



Photo 5 – Water well constructed by the government several decades earlier



Photo 6 – River at the rear of Marea and Larihairu villages

3.27 Mareke

3.27.1 Summary

Table 3.28 summarizes key social data for Mareke.

Table 3.27 – Mareke Summary

Thematic Area	Indicator	Description	
Location	**Description**	Orokolo Bay, located approximately 55 km to the southeast of Herd Base	
	Coordinates	145° 18' 56.627" E	-7° 51' 6.303" S
	Physical setting	Located on Orokolo Bay set amidst mangroves, beach vegetation, alluvial and hill forests	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	6 (Harilarewa)	
Population and demography	**Population**	808	
	Gender ratio (M:F)	106 (416:392)	
	Ethnic group	Orokolo	
	Affiliations	Orokolo Popo inland and coastal communities	
	Households	145	
	Household size	5.6	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1913	
	Name meaning	Referred to islands or islets surrounded by water, in reference to land formation on the coast which was observed when the ancestors first populated the coast	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food, along with coconuts and some garden food such as cooking bananas, taro, cassava and kaukau. Occasional hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots and more, and extensive fishing (for fish and prawns)	
	Resources	Mangroves, beach vegetation, alluvial forest and hill forests	
Commercial activities	**Businesses**	1 x trade store, 3 x fuel retailers and 3 x commercial dinghy operators	
Housing	**Housing style**	88% traditional 11% semi-improved 1% modern	
	Floor type	100% raised	
	Housing materials	Split black palm floor, hardwood posts, sago and nipa for house walls and for roof thatch	
	Cooking	Both inside and outside using firewood	
	Lighting	Battery, solar, generator (petrol) and kerosene lamp	

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Table 3.27 – Mareke Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located in Kavava approximately 1 km to the southeast
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15 – 20 years
Education	**Facilities**	1 x elementary school. Primary aged students attended Orokolo Primary School at Kavava
	Attendance	63 students attended elementary school
	Nearest facilities used	Kavava (primary school) approximately 1 km to the east-southeast
Religion	**Churches**	United Church, Seventh Day Adventist, Catholic, Pentecostal
Water and sanitation	**Drinking Water**	Water tanks and wells
	Toilet facilities	Private pit toilet, bush, sea/river
	Waste disposal	Tin cans and batteries were disposed of in the bush, paper and plastics were burnt, and food scraps were fed to animals
Law and order	**Prevalent issues**	Murder, rape, break and entry, sorcery, land disputes and stealing, alcohol abuse, marijuana consumption and gambling
	Resolution mechanisms	Village court
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Song and dance only on special occasions

3.27.2 Settlement History

Mareke was established in 1913. The upper Purari was the original source of the first series of migrations by their ancestors. The reasons for moving were many and the direction usually southward or downstream along the Purari River, settling in several locations, while others took the forest route. At some point in time, all those ancestors converged at Popo, which at that time was the coastline, and built a vibrant settlement. Over time, further migrations took place that saw people mostly moving to the coast to claim new land being formed due to sedimentation build-up. The Popo exodus was attributed to increasing population pressure, which then caused intra-clan and family rivalry, not enough land for gardening and other valuable resources, and warfare.

3.27.3 Social Organization

Mareke was represented by a ward councillor and village court magistrate but did not have a land mediator in the village. Mareke did not have traditional chiefs, but did have elders who acted as custodians of traditional knowledge and history of the village. The elders worked closely with village court officials and other village leaders to maintain law and order in the village.

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3.27.4 Land Ownership

Mareke strictly observed the patrilineal system of land-ownership and control. Power and control over land was passed from father to son, generation to generation. Women and in-laws were only given user rights; they could not plant permanent fruit and food trees.

3.27.5 Women

Daily activities included caring for children, cleaning the house, fetching water and collecting firewood. Women sometimes participated in tending gardens and collecting edible plants. Only some women engaged in marketing to earn some income at Kavava or Kaivukavu markets on Mondays, Thursdays, and, Saturdays. Fish and sago were the main food sold by Mareke women.

Women reported feeling safe and secure (despite reports of rape)[15], that has feeling has stayed the same over time.

Marrying age was reported to be between 15 and 20.

The village did not have a trained village birth attendant, only a traditional village birth attendant. Only a quarter of babies were reportedly born in the village, the rest were delivered at Orokolo Sub Health Centre (approximately a 30 minute walk away).

3.27.6 Youths

There was one youth group (United Church youth group) with more than 100 members. Youth participated in community activities such as cutting grass and sago, making canoes and building houses. They also worked upon request for payment and helped the sick, elderly, widows and single mothers with work in the village.

For recreation, youths reported that they mostly relaxed, played sport, spent time with friends, surfed the net, repaired nets and mats and gambled.

3.27.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted in swampy sites close to the village. Coconuts were also an important staple particularly when garden foods were affected by flood. Frequent flooding was often experienced and was blamed on logging disturbance.

Garden food was mostly grown across the alluvial plains near the village and further north of the village. Small areas of gardens had also been established in the old dunes along the beach front. A wide range of garden foods were grown but cooking bananas, taro, cassava and kaukau were the main staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Additional food was bought from local markets. Several food trees were grown including coconuts, guava, bread fruit (kapiak), mango, and laulau.

Occasional hunting (with dogs and spears) occurred in the forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, wildfowl (eggs also collected), monitor lizards and birds. Since most animals had moved further inland because of forest degradation considered to be caused by logging, it took about two hour walking to reach the

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hunting area. Forest clearance from gardens was also reported to likely have impacted wildlife habitat. Sago grubs and grubs that lived in dead trees, including dead mangrove trees, were eaten. Mushrooms were also harvested that grow on the processed sago and on dead wood.

Extensive fishing occurred in sago swamps, in the mangroves east of Mareke known as Pakovovu-Auma, and the sea. The main catch included fish, prawns and turtle. Three types of catfish were commonly caught, but also salmon, red emperor, barramundi, mullet, sharks and stingrays, as well as other aquatic resources such as shellfish and occasionally turtles.

3.27.8 Land and Natural Resource Use

Land resources included mangroves, beach vegetation, alluvial forest, and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. A particularly important medicinal plant was kalava which was grown in the village. Leaves of the plant were mixed with lemon grass and boiled. The mixture was drunk by women after giving birth to restore their strength. This was a particularly important plant throughout the lowlands of the gulf.

Sago and nipa were the main material used for house walls and for roof thatch. Kwila was the most preferred tree species for house posts however it was difficult to find within close proximity of the village. Instead rosewood, coconut, maea (local name) and okari were some of the commonly used species for house posts. A species of black palm known as haeo was split for flooring. Pandanus leaves for weaving mats were collected from the banks of Herekere Creek and from the sago swamps. Mats were sold for between K20 – K30 per mat depending on the size.

Drinking water was mostly sourced from wells, although some houses had water tanks.

The village was connected to several other inland villages by walking tracks including Paevera, Arehava 2, Huruta, Muro Station, Avavu and Ere-Kilavi. Beach tracks connected other coastal villages within Orokolo Bay including Iuku, Harevavo, Kaivukavu and Kavava. There was no primary river transport. The main ocean transport route was via motorised dinghies to travel to Ihu and Kerema for onward journey to Port Moresby by road and Purari and Baimuru to the west. Dinghies were also used to visit logging camps at Kikoro, Kamusi and Evara to sell betel nut.

3.27.9 Health

There were no health facilities located at Mareke and the nearest facility was Orokolo Sub Health Centre located at Kavava. The main health problems were reported to be tuberculosis, malaria, leprosy, dental problems, back/joint aches, eye/hearing problems and headaches.

Only a few women were aware of how STDs were transmitted and treated. Most people were aware of family planning and most women used contraceptives. However some women resorted to traditional contraceptive methods.

3.27.10 Education

There was one elementary school with two teachers and two classes (Prep and Grade 2). There were 27 students in Prep and 36 students in Grade 2. The teacher reported that all children

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eligible for school attended classes and there was no reason for poor attendance. Primary aged students travelled to Kavava to attend school.

3.27.11 Law and Order

Law and order problems included murder, rape, break and entry, sorcery, land disputes and stealing. A murder/suicide (man and wife) occurred in February 2016. Two alleged rape cases had had no police response to date. Land disputes and stealing were addressed by the village courts and land mediators.

Women indicated that stealing, alcohol abuse, marijuana consumption and gambling were common activities within the village. Often serious cases were referred to the village court and solved. Although domestic violence was prevalent it was often regarded as a family problem and was therefore solved within families.

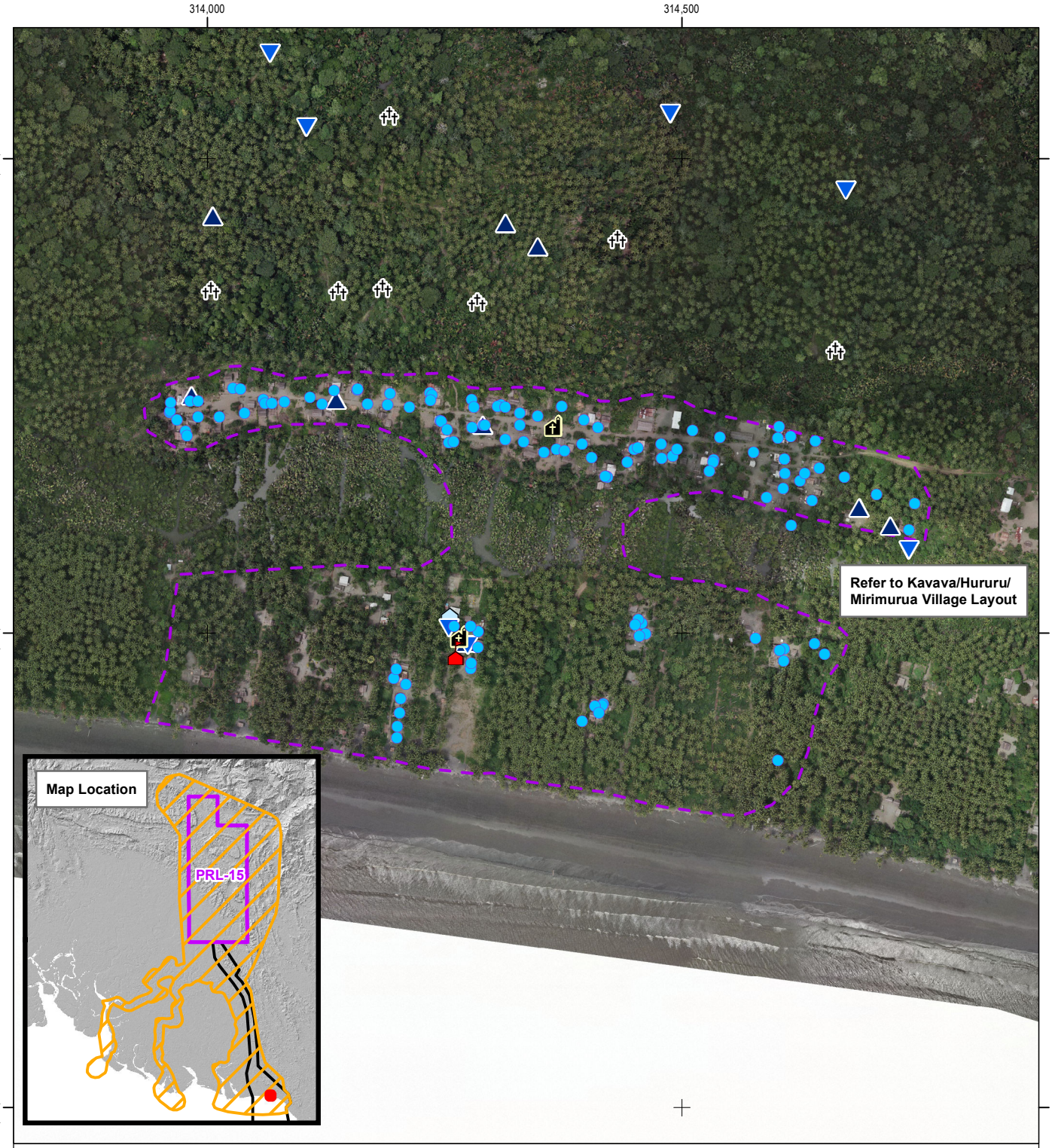
3.27.12 Cultural Heritage

The ancestral story for Mareke was very similar to that of other Orokolo-speaking villages. Their ancestral journey commenced in the highlands, traversed the Purari headwaters and tracked the prograding coastline through Heve, Popo and after a number of intermediate settlements to present-day Mareke. Ancestral stories were not a general part of community discourse and detailed ancestral oral traditions were known only to men. They had no traditional spiritual sites and elders made the point that traditional beliefs that were not consistent with Christianity had been largely discarded.

Villagers regularly uncovered pottery sherds and stone tools in their gardens but attached little importance to the finds. They no longer made traditional hunting tools and concentrated instead on fishing. Today they use nylon nets but considered that incantations passed down from ancestral times were important for maintaining their catch.

During special occasions women and men performed traditional songs called *mairi, doviri*, and *karelavu*. There were several customary practices related to food or drinks that were still observed in the village. These included when a woman was menstruating, pregnant, or has recently given birth, she was not allowed to go fishing; it was forbidden to engage in sexual activities prior to fishing; and after childbirth a woman was not allowed to eat protein until after the baby's umbilical cord had fallen off.

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SCALE: 1:6,000 @ A4

0 60 120 180 240 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Operating trade store
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Mareke Village Layout

FIGURE: 3.27

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77453 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.27 – Mareke Gallery



Photo 1 – Mareke elders



Photo 2 – Mareke youth group members

3.28 Mariki

3.28.1 Summary

Table 3.28 summarizes key social data for Mariki.

Table 3.28 – Mariki Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Papua coast between the mouth of the Varoi River to the east and the Pie River to the west, 60 km southwest of Herd Base	
	Coordinates	144.8829803	-7.7772498
	Physical setting	Low elevation with a receding coastline. Set amongst extensive sago swamp including mixed nipa and mangrove areas	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural LLG	
	Ward	5 (Mariki)	
Population and demography	**Population**	222	
	Gender ratio (M:F)	93 (107:115)	
	Ethnic group	Kaimare	
	Affiliations	Upaia, Aiere, Varia and Bekoro	
	Households	41	
	Household size	5.4	
	Language	Kaimare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	1947	
	Name meaning	Mariki meant “rich area”, referring to abundant natural resources. The full village name was Evara Miri Mariki Nu Mere which included references to the ancestral leader (Evara) and sand (miri)	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, taro, kaukau and cassava. Extensive fishing (main species catfish) and a wide variety of others	
	Resources	Extensive sago swamp including mixed nipa and mangrove areas	
Commercial activities	**Businesses**	5 x trade stores, including 3 x fuel sellers	
Housing	**Housing style**	100% traditional	
	Floor type	100% raised	
	Housing materials	Split black palm floor, hardwood posts, rough sawn frame, woven sago leaf stem panels for the walls, some split timber walls, sago roof	
	Cooking	Both inside and outside using firewood	
	Lighting	Battery, kerosene, solar and generator (petrol)	

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Table 3.28 – Mariki Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	Mariki Aid Post
	Nearest facilities used	Kapuna Health Centre, located 24 km to the northeast
	Community Health Worker	1
	Trained birth attendant	0
	Marrying age (women)	17 to 25 years
Education	**Facilities**	None
	Attendance	N/a
	Nearest facilities used	Varia (primary school) approximately 8 km east, Kikori Secondary School approximately 82 km to the northwest
Religion	**Churches**	United Church, Church of Christ
Water and sanitation	**Drinking Water**	Water tanks supplemented by river water (salty)
	Toilet facilities	Long drop
	Waste disposal	Tin cans/batteries, paper/plastics disposed in bush and sea/river. Food scraps were thrown into river or fed to animals
Law and order	**Prevalent issues**	Rape, attempted murder, stealing, property destruction
	Resolution mechanisms	Village leaders, village court
Cultural heritage	**Tangible cultural heritage sites**	3 x ancestral villages and 1 x spirit site
	Intangible cultural heritage	Language considered the most important intangible cultural heritage

3.28.2 Settlement History

The people of Mariki originated upstream from a place near Bekoro. They moved downstream and eventually settled at Mariki in 1947.

3.28.3 Social Organization

Two village leaders kept the peace and guided behavior. They received support from church leaders, the village magistrates and others. Mariki contained 13 clans, each with a leader that made decisions pertaining to land use. Mariki was well organized, having a village recorder and two members of the ward development committee (that covered three villages), although there had been no response to their funding submissions.

3.28.4 Land Ownership

Each family within each clan was allocated land for their exclusive use. Men made decisions regarding land use and maintained ownership. Women used their husband's land. Clan boundaries and internal clan boundaries changed as population changed. A clan could have several land parcels. Outsiders marrying into the village may be assigned land if they married locally and chose to reside in the village on a permanent basis. This land would be provided by the father of his wife, or their clan leader.

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Few land disputes were reported to occur within the village or with other villages, attributed to possibly be as a result of the low population density and the distance between villages.

3.28.5 Women

Women often traded fish and crabs with inland villages of Ara'ava, Kairimai, Akoma, Ikinu, Mirimailau and Kinipo for garden produce due to the lack of arable land available where the village was located. Most women sold fish and crab at Kapuna and Baimuru station and used the income to purchase garden food. There was hardly any gardening activity at Mariki.

Both men and women travelled upstream closer to Kapuna to cut sago palms and float them downstream to the village to process. Floods created by high tides were frequent all year round. During dry season when there were shortages of fresh water the villagers paddled upstream especially where sago was sourced to fetch fresh water. Sometimes fresh water was substituted with coconut milk (*kulau*). Men and women smoked fish and stored surplus sago to survive on during flooding period; if there were food shortages in a household other households assisted by sharing food.

Women generally felt safe and secure in the village and this sense of security had remained the same for some time. Marrying age was between 17 to 25 years of age. About 50% of babies were delivered in the village and the rest were delivered at Kapuna Health Centre. Women still practiced customs relating to food after giving birth. Women also practiced traditional family planning methods – eating a tree bark called *kauri* – to prevent pregnancies.

3.28.6 Youths

A combined denomination youth group consisted of about 30 members. There was an appointed leader and regular meetings as well as gatherings every Friday night where youth members would perform songs and dances and have bible quizzes. For recreation youth members participated in sporting activities (volleyball, basketball, soccer and touch football) and helped family members with daily household chores.

3.28.7 Subsistence

The main staple food was sago, which was harvested from an area known as *okono varoi sago swamp* further upstream of Kaimare River. This resource was also accessed by people from Upaia and Aiere. Due to unsuitable land for gardening, most garden food crops (cooking banana, taro, kaukau and cassava) were traded for fish and other seafood products with neighbouring inland villages such as Ara'ava, Kairimai, Bekoro and Karurua. Small quantities of kalava and a limited number of fruit trees (including coconut and kapiak) were grown in the village.

Hunting was not common as most villagers depended on fish and other crustaceans. Some people raised pigs and chickens as a supplementary protein source. Sago grubs were also harvested.

Extensive fishing activities occurred mainly along the Kaimare River and associated creeks including the ocean for catfish, mudfish, barramundi, maihara (local name), salmon, black bass, mullet, stingray and shark. Other aquatic resources harvested included prawns, shellfish and mud crabs. Marine turtles were only harvested from the beach. Freshwater crocodiles were hunted for meat and skin for sale.

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3.28.8 Land and Natural Resource Use

Land resources included extensive sago swamp including mixed nipa and mangrove areas. These provided an array of essential timber and non-timber forest products including medicinal plants. Forest products were mainly harvested from along the Kaimare River banks and associated creeks, sago swamp, nipa and mangrove areas.

Mangrove cedar was the preferred material for house posts. Sago was the main material used for house walls and nipa palm for thatched roof. Other building materials used for bearers, floor joist, studs and rafters were mainly sourced from the mangrove forest. Black palms were split for flooring and nails were commonly used to hold the building structures together. Erema was the main species for canoe making which was often traded with inland villagers for fish or cash.

Drinking water was mostly sourced from the Kaimare River although there were three community tanks, which became depleted in the dry season.

The Kaimare River was the primary river transport route for harvesting of sago and fishing. It was also used for accessing basic government services like health, education and marketing of sago, fish and other seafood products at Kapuna, Baimuru, Kikori and Evara logging camp.

3.28.9 Health

There was an aid post in the village but it had not operated for some time. Women reported that the main reason for poor health of children in the village was poor diet and for themselves poor diet and their workload.

Men indicated that knowledge of HIV/AIDS and other sexually transmitted diseases was very low. Women felt that most had an understanding of how they were transmitted and treated.

Most women had an understanding of contraceptive methods and where to access them. Most used modern family planning methods and they reported that this was a shared decision with their husbands.

3.28.10 Education

In 2015, the elementary school, located in the village, was open most of the year, however, it had not been open in 2016. In 2008, flooding destroyed the primary school. The nearest primary school was at Varia, a one to two hours' walk or paddle.

3.28.11 Law and Order

Men identified the main law and order problems in Mariki as rape, attempted murder, stealing and property damage. Two cases of rape occurred in the village in 2015. The offenders were taken to the police station at Baimuru by peace officers and they each spent a year in jail.

Some young men smoked marijuana, but alcohol consumption and gambling had ceased since the appointment of village court officials.

Village leaders attempted to resolve law and order problems through mediation. This involved traditional leaders, church leaders and village court representatives. If this failed then the case could be referred to the village court and fines and/or compensation imposed.

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3.28.12 Cultural Heritage

There were four tangible cultural heritage values recorded at Mariki. Three were ancestral villages and a spirit site of high importance to the people of Mariki. The ancestral migration story of the Mariki began in the ancestral village of Kaimare Daua located on the upper Purari River. From Kaimare Daua after continuous tribal fighting they migrated to their second ancestral village of Kairi Purari situated on the banks of the Pie River (away from the Iare and Koriki Tribes whom were strategically positioned along the main Purari River). Continuous tribal fighting between enemy tribes for dominion over land influenced the movement of the Mariki from Kairi Purari to Mairau Pairi at which time also saw the beginning of WWII in 1942. Also during this time at Mairu Pairi the struggle for control of much smaller factions eventuated and gave rise to the formation of sub-clans. In 1943, Seventh Day Adventist Missionaries arrived in the area and encouraged the locals to discard all their cultural beliefs. This was further aided by the Tom Kabu movement, which saw the complete destruction of all material culture and associated rituals and beliefs in the area.

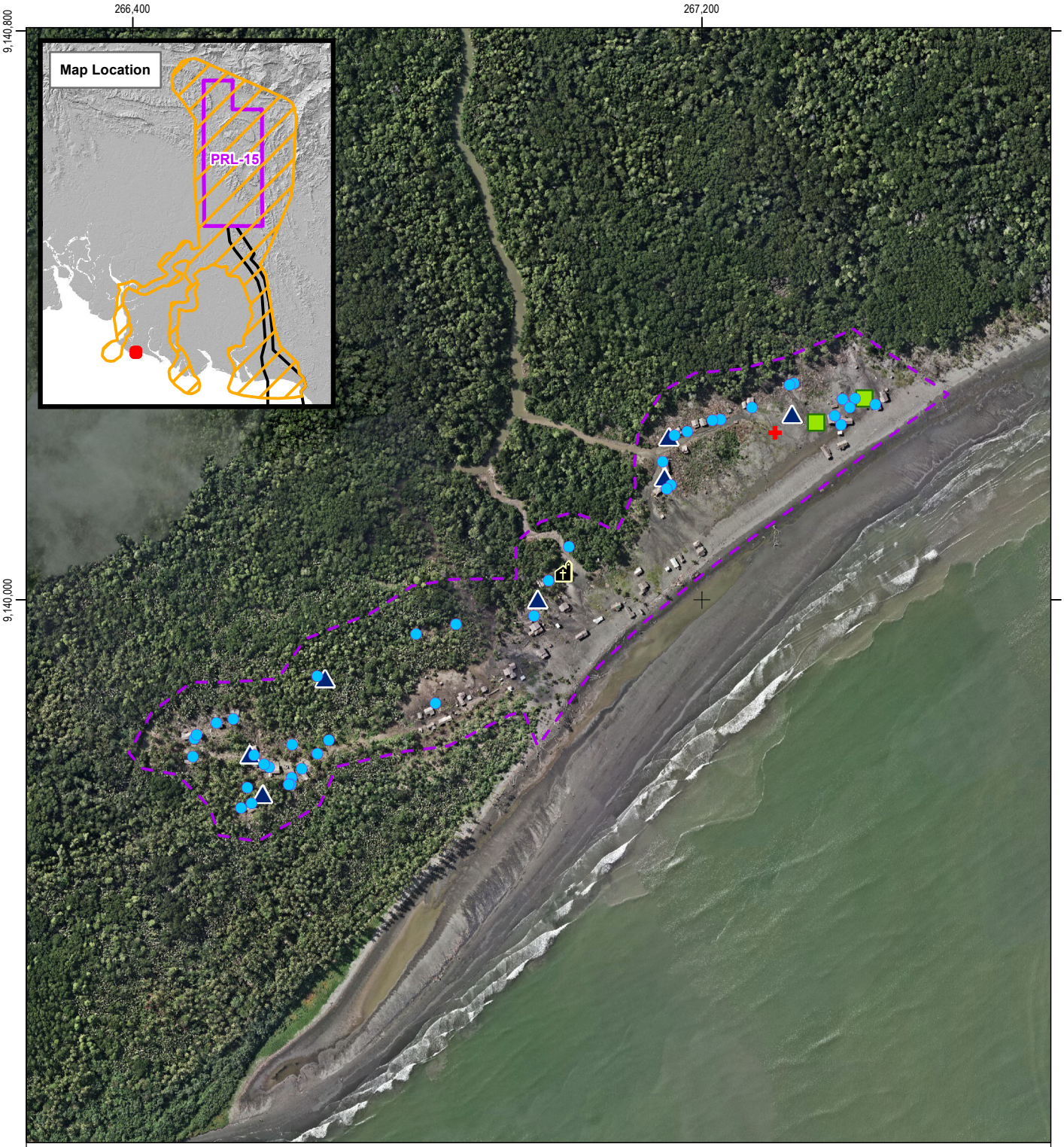
An agreement was struck between the colonial district government and the paramount chief of Mariki to resettle in the current day Mariki village.

The existing spirit/sacred site indicated but not recorded was also from the ancestral village of Mairau Pairi. The sacred site is called *Are'akere* where a sacred tree called *kara* was located and where the first fire was brought down from heaven to Mariki to use for cooking. This area was restricted from all sort of activity.

All active intangible cultural heritage values were passed between generations and were considered to be moderately important. Language use was a very significant tool for the dissemination of all intangible cultural heritage values.

Women performed a traditional song and dance called *bokire* to welcome special guests.

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SCALE: 1:8,000 @ A4

0 80 160 240 320 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Aid Post, Operating
- Church
- Sporting field
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Mariki Village Layout

FIGURE: 3.28

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77454 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.28 – Mariki Gallery



Photo 1 – Mariki aid post and community health workers



Photo 2 – Beachfront at Mariki



Photo 3 – One of three water tanks



Photo 4 – A community meeting house (haus win)



Photo 5 – Price list of an informal 'black market'



Photo 6 – Closed elementary school

3.29 Paevera

3.29.1 Summary

Table 3.29 summarizes key social data for Paevera.

Table 3.29 – Paevera Summary

Thematic Area	Indicator	Description	
Location	**Description**	Inland of Orokolo Bay, approximately 5 km north of Orokolo Bay and 53 km southeast of Herd Base	
	Coordinates	145.3185425	-7.8283629
	Physical setting	Set amidst sago swamps, alluvial forest and hill forest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Ihu Rural	
	Ward	4 (Arehava)	
Population and demography	**Population**	294	
	Gender ratio (M:F)	121 (161:133)	
	Ethnic group	Orokolo	
	Affiliations	Inland and coastal Orokolo Popo communities	
	Households	47	
	Household size	6.3	
	Language	Orokolo	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Unknown	
	Name meaning	“Bad / not good”. Refers to its people/tribes being war-like and sorcerers	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with coconuts and some garden food such as cooking bananas, cassava, kaukau and taro. Extensive hunting for wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, and wildfowl and occasional fishing (main species catfish)	
	Resources	Sago swamps, alluvial forest and hill forest	
Commercial activities	**Businesses**	None	
Housing	**Housing style**	90% traditional 10% semi-improved	
	Floor type	100% raised	
	Housing materials	Split black palm flooring, kwila and rosewood house posts, sago walls and roofs	
	Cooking	Inside using firewood	
	Lighting	Battery, kerosene, solar and generator (petrol)	

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Table 3.29 – Paevera Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Orokolo Sub Health Centre, located in Kavava approximately 3 km to the south-southeast
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	15 to 20
Education	**Facilities**	1 x elementary school
	Attendance	62 attending elementary school
	Nearest facilities used	Oru Primary School approximately 5 km southeast, Ihu High School approximately 13 km southeast
Religion	**Churches**	Catholic, United Church, Christian Revival Crusade
Water and sanitation	**Drinking Water**	Wells and river/creek
	Toilet facilities	Private pit
	Waste disposal	Tin cans/batteries and paper/plastics were disposed in bush and food scraps were fed to animals
Law and order	**Prevalent issues**	Stealing, rape, murder, fighting, domestic violence, verbal assault and land disputes
	Resolution mechanisms	Village court, police and district court in Kerema
Cultural heritage	**Tangible cultural heritage sites**	A spirit site in the form of a swamp known as Kaevaharu
	Intangible cultural heritage	Ceremonial songs and spells

3.29.2 Settlement History

Paevera people traced their origins back to a series of migration that started from Uri in the north of inland Vailala. Their ancestors led a nomadic life and established several settlements in the north of present day Paevera. From Uri, people began to migrate southward primarily due to tribal warfare relating to land and other important resources. Permanent settlement emerged as people started to cultivate the land and grow food crops.

3.29.3 Social Organization

Paevera had a ward councillor, village court magistrate, auxiliary police and a ward development committee. There were five clans each represented by a clan leader and three church denominations led by pastors.

3.29.4 Land Ownership

Land ownership was strictly patrilineal and was transferred from father to son from generation to generation. Women may be given user rights to farm the land but not the power to have permanent ownership. Under the Orokolo system of land ownership, women who married outside of the clan and tribe were expected to reproduce children who would inherit their father's land.

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Thus children could not go back to their mother's land to claim ownership although they could be given user rights to cultivate garden crops. They were not allowed to plant permanent fruit bearing trees such as coconuts, breadfruit or sago. In extreme cases where a man was not able to have sons of his own, he may be compelled to adopt a male member of his clan or tribe as his own son in order to continue his power of land ownership.

3.29.5 Women

There were many important roles that women performed on a daily basis including making sago, caring for children, tending gardens, raising livestock, cleaning and collecting firewood and water. A reasonably long distance was travelled in order to go fishing, collect shells and catch prawns and crabs to supplement their usual diet of sago, coconuts and garden produce. Most women engaged in income earning opportunities and often sold a variety of garden produce at Kavava village along the Orokolo coast on Mondays, Thursdays and Saturdays. If all their produce was not sold they resorted to exchanging food with the coastal Orokolo villages between Harevavo and Kavava.

Women generally did not feel safe and secure and often travelled in pairs because of the fear of sorcery and this had remained the same over the years.

Marrying age was between 15 and 20. The village had a traditional birth attendant and the majority of women delivered their babies in the village, the remainder walked to Orokolo Sub Health Centre to deliver their babies.

3.29.6 Youths

The youths of Paevera had a group consisting of more than 30 members ranging from age 15 to 30 years old. The group's major role was to perform (unpaid) community work around the village. Outside of the group, youths' most important roles were caring for family members, attending school, making and tending gardens, collecting seafood, water and firewood, raising livestock, hunting and fishing.

For recreation, youths mainly participated in sporting activities every Thursday and Friday, as well as relaxing, socialising and undertaking craft.

3.29.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had mostly been planted in small wetlands within close proximity to the village. Coconuts were also an important staple food, particularly when garden foods had failed because of flooding or drought.

Garden food was grown in the foothills north of the village and in clearings adjacent to the old logging tracks. Small areas of garden food were also grown within the village. A wide range of garden foods were grown but cooking bananas, cassava, kaukau and taro were the main garden staples. Aibika, kalava and tulip were the main greens grown in gardens and around the house. Several food trees were grown including coconuts, guava, bread fruit (kapiak), laulau and okari nut.

Extensive hunting occurred in forests for most animal species including wallaby, wild pigs, cassowary, cuscus, bandicoots, bush rats, wildfowl (eggs also collected), bandicoots, python,

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monitor lizards and flying fox. Insect larvae were also eaten including sago grubs and grubs that lived in dead trees. There were few animal species that were not eaten apart from birds of paradise and goura pigeon. Mushrooms were also harvested that grew on sago logs that had been processed and on dead wood.

There was occasional fishing in the upper reaches of the Kilavi (Muro) River which was approximately two to three hours' walk to the north of the village. Several Catfish species were the main species caught but also caught were mudfish, eels and prawns. There was no ocean fishing or fishing in estuarine habitats, as fishing rights were part of the customary land for the coastal villages only. However, villagers from the coast walked inland to exchange fish and crustaceans (e.g., mud crabs, shellfish) for garden food crops. Two species of turtle were also caught for their meat but eggs were not collected, as there were no nests in the area. Crocodiles were rarely hunted for meat or skins, unless they were accidentally caught in fishing nets.

3.29.8 Land and Natural Resource Use

Land resources included, sago swamps, alluvial forest and hill forests. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants. The hill forest was logged in 2003.

Sago was the main material used for house walls and for roof thatch. Kwila and rosewood were the preferred tree species for house posts. Kwila was sourced from swamps and riverbanks, mostly upstream of Kilavi River but rosewood and other species were sourced from alluvial forest and hill forest. Other hardwood species such as kavea and okari nut timber were used for house bearers, and avare (a swamp species) hapuru, pairi and porotoi (river side species) were used for rafters and joists. A species of black palm known as haeo and occasionally betel nut palms were split for flooring. Some haeo palms were grown in the village but most occurred in the forest. Strips of bark from a moroko tree were widely used for tying thatch and a range of cane ropes were used instead of nails. Pandanus leaves were used for weaving floor mats, which was only collected from a swamp known as Koaepea, which was about three hours', walk and was an old village site.

The forests also contain eaglewood, which was harvested for its high value dark aromatic resin. This had been sold to traders in Port Moresby but the trees were reportedly becoming hard to find in the forest.

The primary source of drinking water was from wells and the secondary source was the river/creek, which was about one hour walk away.

The village was connected to several other villages by walking tracks including Ere-Kilavi, Avavu, Muro Station, Huruta, Arehava 2, Paevera and Mareke on the coast. Betel nut and mustard, which were important cash crops and the main source of income, were mainly sold at Kerema or Port Moresby. Motorised dinghies were used to travel to Ihu and Kerema for onward transport to Port Moresby.

3.29.9 Health

There were no health facilities in Paevera, but there was a traditional healer. The closest health centre was Orokolo Sub Health Centre at Kavava.

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Males identified that the main health problems were malaria, tuberculosis and respiratory problems. Women indicated that common illnesses in the village included diarrhoea, fever, cough, and tuberculosis and the main reason for women's poor health was their workload. The youth reported that water born malaria from the water wells was the main reason for poor health.

People travelled to Orokolo Sub Health Centre for treatment or resorted to traditional methods of healing. Some women had an understanding about STDs, how they were treated and transmitted, but were not sure about the prevalence of STDs in the village. Most women were familiar with contraceptives and the use of family planning methods. It was often a shared decision between a woman and her husband to use family planning methods.

3.29.10 Education

There was one elementary school in Paevera village. A primary school and high school were located in Oru and Ihu respectively. The elementary school was attended by 62 students (37 males and 25 females), and taught by two teachers. According to the teachers, there was a lack of parent motivation to encourage schooling and also a lack of teaching resources and facilities including books, water supply and toilets/sanitation.

3.29.11 Law and Order

Stealing (e.g. betel nut, garden food), rape, murder, fighting, domestic violence, verbal assault and land disputes were all reported to occur in the village. A village court team resolved minor disputes through mediation. If mediation failed, the village court would preside over the matter, imposing fines up to K100. Serious crimes were referred to the police and district court in Kerema. Major land disputes would be resolved by calling village magistrate officials from different areas together to hold court and resolve.

According to both men and women, most men consumed alcohol and some smoked marijuana but no women did.

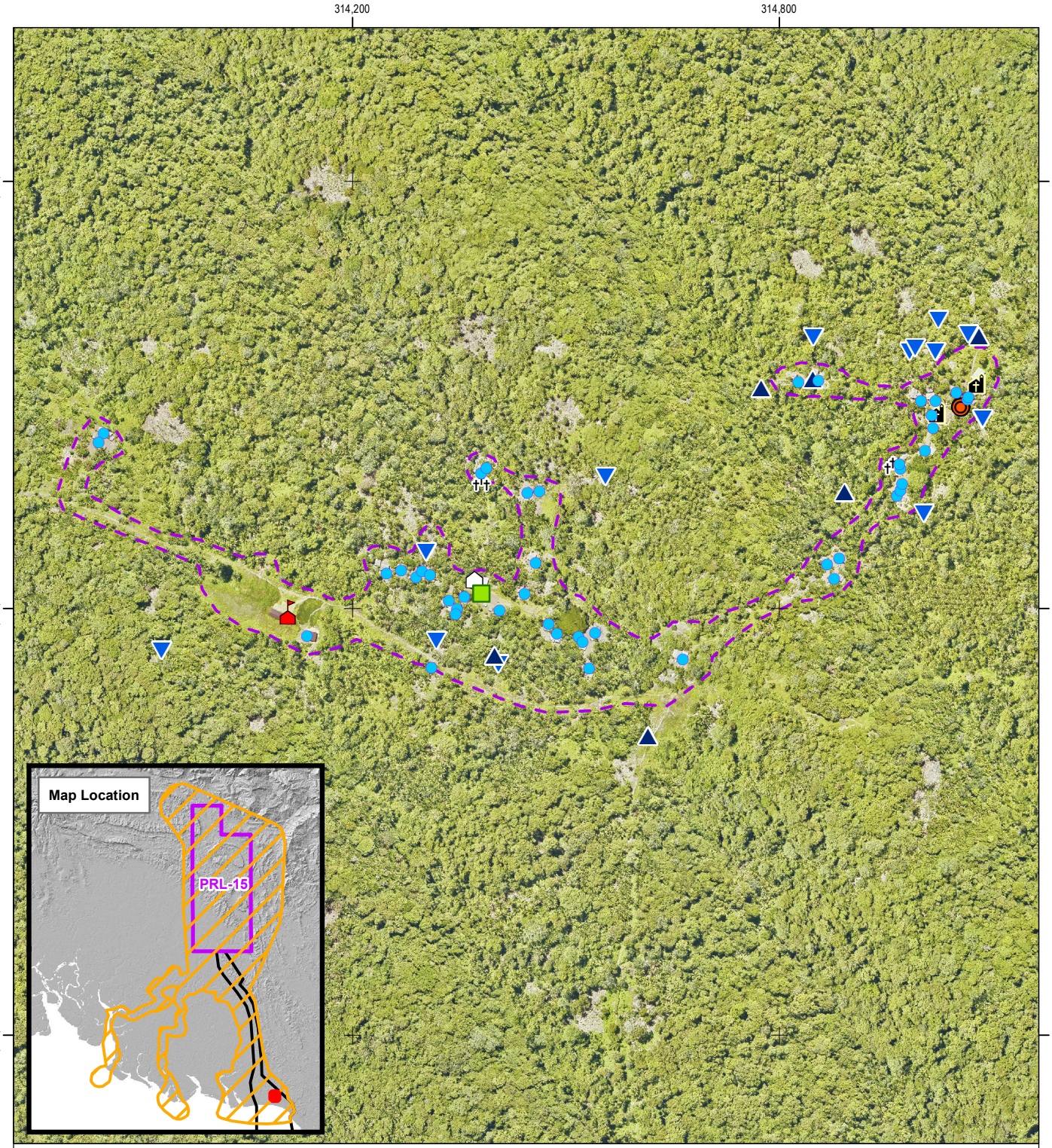
3.29.12 Cultural Heritage

Elders expressed disappointment that they had seen their intangible cultural heritage values fading from use during their lifetimes. They also considered all tangible values, ancestral sites, spirit sites ancestral heirlooms and pottery found in their gardens to be important cultural property. A swamp known as *Kaevaharu* with an island in the middle was a forbidden area to go to. It was believed that if a person in the village died his/her spirit could be seen around the swamp.

During bride price ceremonies, older women sang and danced traditional songs. The most common songs performed were called *ia'e* and *harai*. Traditional dances and songs were also incorporated into church activities.

It was common practice for both men and women to cast spells on other people's gardens to bring a poor harvest. It was taboo to eat kina shells, crabs, and sago grubs when planting a new garden. Men and women were forbidden to sleep with their spouses before going to the garden. After childbirth, a woman was only allowed to eat sago and avoided all processed food. It was also forbidden to make garden or plant food when menstruating.

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SCALE: 1:8,000 @ A4

0 80 160 240 320 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Community hall
- Saw mill
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Paevera Village Layout

FIGURE: 3.29

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77455 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.29 – Paevera Gallery



Photo 1 – Paevera church in the background



Photo 2 – Elders recount their cultural heritage

3.30 Poroi 1, 2 and 3

3.30.1 Summary

Table 3.30 summarizes key social data for Poroi 1, 2 and 3.

Table 3.30 – Poroi 1, 2 and 3 Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the banks of the Purari River approximately 15 km upstream from Herd Base	
	Coordinates		
	Poroi 1	145.1921	-7.39271
	Poroi 2	145.3121	-7.335093
	Poroi 3	145.3051	-7.304371
	Physical setting	Surrounded by undulating, lowland rainforest. The main village is Poroi 2. Poroi 1 and Poroi 3 (Suarido) are hamlets of Poroi 2.	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	20 (Poroi)	
Population and demography	**Population**	380; (Poroi 2 - 301; Poroi 1 - 34 and Poroi 3 (Suarido) -45)	
	Gender ratio (M:F)	All: 118 (206:175), Poroi 2: 110 (158:143), Poroi 1: 150 (21:14); Poroi 3: 150 (27:18)	
	Ethnic group	Pawaian	
	Affiliations	Wabo, Ura, Subu and several villages to the north in Karimui District of Simbu Province	
	Households	62; (Poroi 2: 44; Poroi 1: 10 and Poroi 3: 8)	
	Household size	6.1; (Poroi 2 6.8; Poroi 1 3.4; Poroi 3 5.6)	
	Language	Pawaia	
	Other languages	Motu, Tok Pisin	
Settlement	**Year established**	1970s	
	Name meaning	Unknown. Formerly called “Soutou” after a nearby river. Colonial government workers imposed the name Poroi after a nearby village and that name has remained. “Suarido” (Poroi 3) meant ‘sand’ and was the name belonging to the area	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, kaukau, taro, kang kong and cassava. Extensive hunting for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, rats, cuscus and flying fox and extensive fishing	
	Resources	Hill forest and some alluvial forest	
Commercial activities	**Businesses**	1 x trade store	

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Table 3.30 – Poroi 1, 2 and 3 Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	54% traditional 46% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm or split timber floor, hardwood posts, woven sago panel walls and sago leaf roofs
	Cooking	Inside using firewood
	Lighting	Battery or generator
Health	**Facilities**	None
	Nearest facilities used	Herd Base and Rimbunan Hijau (RH) Logging Camp located approximately 5 km to the northeast of Poroi 1, or Kapuna Health Centre located 32 km to the southwest of Poroi 1
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	14 to 18
Education	**Facilities**	1 x elementary school and 1 x primary school
	Attendance	Attendance at elementary school was unknown (teacher absent at time of SBS survey in May 2016) 60 students attended primary school
	Nearest facilities used	Ihu High School, located approximately 62 km from Poroi 1 to the southeast
Religion	**Churches**	Lutheran, New Tribes Mission
Water and sanitation	**Drinking Water**	Community water tanks, piped water and creeks at back of village
	Toilet facilities	Shared pit, bush, sea/river
	Waste disposal	Tin cans/batteries, paper/plastics and food scraps disposed in river
Law and order	**Prevalent issues**	Sexual assault, domestic violence, fighting, sorcery, consumption of alcohol and marijuana and stealing
	Resolution mechanisms	None
Cultural heritage	**Tangible cultural heritage sites**	None recorded
	Intangible cultural heritage	Traditional hunting and fishing techniques, tool making and related rituals as well as traditional sing sing

3.30.2 Settlement History

The current location of Poroi 2 was established in the 1970s. People came from Poroi 1 due to problems with mosquitoes/disease. People were nomadic prior to the 1960s and established villages along the Purari in the 1970s when the Purari hydro dam was proposed. Suarido (Poroi 3) was settled by its residents after the floods of 2014 when their homes and land at Poroi were flooded. Suarido was a previous village, abandoned and then re-settled.

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3.30.3 Social Organization

Ten clans were represented in Poroi, each with its own leader. There were two chiefs, and two church leaders (from the Lutheran Church and New Tribes Mission).

3.30.4 Land Ownership

Each clan owned its own land and distributed it according to individual and family needs. The clan leader was male and ownership was from father to son. Female members of the clan who married outside of the clan may be given user rights to land out of “sorrow” as she was leaving the clan to go and live with her husband. The chief system was very much integral to Pawaian society, and was hereditary and assumed by male descendants when a chief died. The chief played an important role in presiding over land disputes between clans and other social problems that required his knowledge and experience.

3.30.5 Women

Two women’s groups existed within Poroi village; (i) the Lutheran Women’s Group which focused on church activities; and, (ii) the Poroi Community Women’s Group which was established recently by InterOil and focused on agricultural projects.

The main role of women was to make sago, tend gardens, fish, care for children and undertake domestic duties.

Women reported that they did not feel safe, but that this had been their feeling for a long time and was due to the commonplace occurrence of physical and sexual assault.

Marrying age was generally between 14 and 18 years.

The majority of babies were born in the bush/village with the assistance of a trained and/or traditional birth attendant. A small proportion would travel to Kapuna Health Centre for delivery.

3.30.6 Youths

There was no youth group; however, the youths did participate as individual members of the community by doing community service such as building houses and classrooms, cutting grass or beating sago. Recreational activities included sport, relaxing, spending time with friends and hunting (males).

3.30.7 Subsistence

The primary staple food was sago, which was harvested from sago palms that had been planted along the banks of the Purari River and associated creeks. Sago was supplemented by a range of garden food, primarily cooking banana, kaukau, taro, kang kong and cassava. A range of ‘greens’ (e.g., aibika and aupa), other crops (e.g., pumpkin, sweet corn, pitpit, sugar cane and peanuts) and fruits (e.g., Papaya, and pineapples) were also grown. Coconuts, guava, okari nut, taun and to a lesser extent tulip were extensively planted.

Extensive hunting was reported to occur in forests for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, rats, cuscus and flying fox. Various insect larvae were also harvested including sago grubs.

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Extensive fishing was reported to occur along the Purari River and associated creeks. Other aquatic resources included prawns, two species of turtles and one species of tortoise. Turtles included a saltwater species that migrated to lay eggs in sand along the riverbanks. Crocodiles were also hunted.

3.30.8 Land and Natural Resource Use

Customary land was mostly located along the west bank of the Purari River, however permission had been granted from people at Poroi 3 (Suarido) to plant sago and establish gardens along the east bank.

Unlike villages in the Purari delta no natural sago swamps occurred within the customary land near the village. Land resources were primarily hill forest and some alluvial forest. Land resources extended to Nea Creek, which provided access to a large oxbow lake and associated herbaceous swamps. The oxbow lake was an important hunting and fishing site that was accessed mainly in the wet season when high water levels allowed access via the creek.

Sago was the main material used for house walls and roofs. A range of species was used for house posts, house bearers and studs. Black palms were split for flooring. A range of tree species was also used for making dugout canoes. Forests were used to harvest a wide range of timber and non-timber products including medicinal plants, most of which were considered essential for their livelihoods.

Drinking water was sourced from community water tanks, piped water and creeks at the rear of the village. In a severe dry season/drought drinking water was sourced from the Purari River.

The Purari River was also the primary transport route to visit riverside gardens and to harvest planted sago, and to travel downstream and occasionally upstream to access services at Wabo.

3.30.9 Health

There was a non-functioning aid post. Patients attended Herd Base and Rimbunan Hijau (RH) Logging Camp (by canoe, 10 minutes paddling) or Kapuna Health Centre for more serious cases. Tuberculosis was reported as the main illness affecting people's health and the lack of health workers was thought to contribute.

Women reported their heavy workload was the main reason for their poor health, and for children, they thought the main reason to be poor hygiene. Most women were not aware of STDs, how they were spread or treated. However most were familiar with family planning and contraceptive methods.

3.30.10 Education

One primary school of 60 students, (37 males and 23 females) and four teachers owned by the Lutheran Church Agency and managed by the Simbu Provincial Education Board functioned in Poroi 2. As a result, most of the teachers were from the highlands region. The school had benefited from several development initiatives since 2011, evident in its facilities such as classrooms and tanks. Most support had come from InterOil, National Government and the Simbu Provincial Government. An elementary school, called Sorita Elementary, had an unknown number of students (teacher absent at the time of SBS survey). It was small, run down and in need of

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desks, books, and other basic elementary school resources. The school had three teachers. No project fees were paid.

3.30.11 Law and Order

Men noted law and order issues relating to boy-girl relationships (that is, young men fighting over the affection of a girl and fighting with her and her family if the feelings were not reciprocated). They also felt sorcery was a notable law and order issue.

Sexual assault and domestic violence were rife within the village, associated with alcohol and marijuana consumption especially by the younger men, and in most cases nothing was done to deal with perpetrators. It was reported as the “norm” that women were assaulted. Serious law and order issues were thought to be associated with the nearby Rimbunan Hijau (RH) logging camps at which several police officers were stationed.

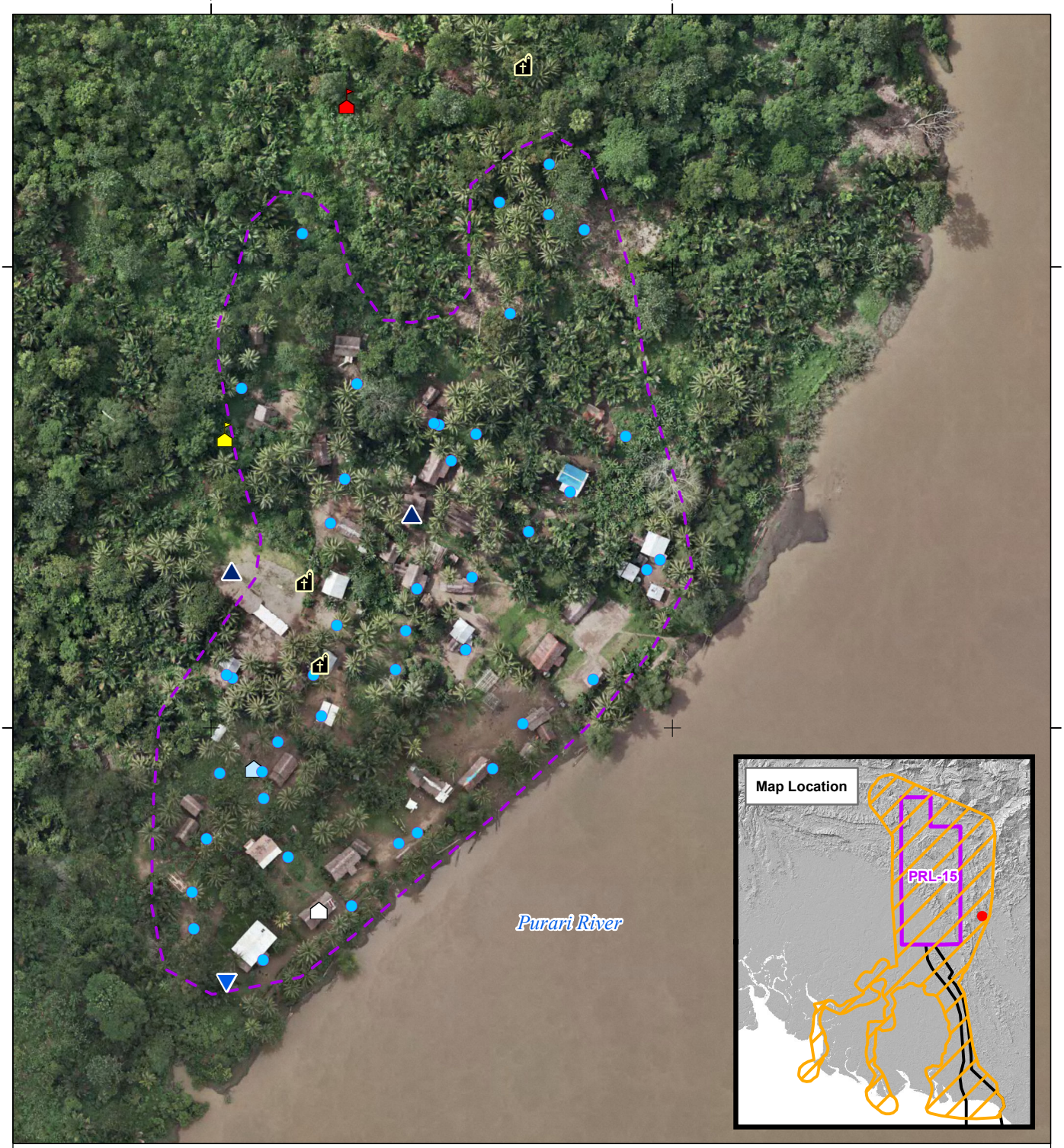
3.30.12 Cultural Heritage

Village elders had been previously visited by researchers collecting information about their cultural heritage values (e.g. InterOil and social mapping) and elders were not enthusiastic about being asked similar questions again. Elders also questioned how we thought that we could document the complexities of their cultural knowledge in one day particularly given that their cultural heritage sites are at some distance from the village. For these reasons, and after lengthy discussion amongst themselves, elders decided that they would provide only general comments about the community’s cultural heritage values.

Elders confirmed that they had detailed knowledge of their ancestral history and that their ancestral history was passed on to younger generations through oral traditions. Details of their ancestral history were confidential and were not recorded. Traditional knowledge about hunting and fishing techniques, tool making and related rituals were passed from father to son. Traditional sing sing was performed by the community on special occasions such as Independence Day and Christmas. Women taught their daughters how to make sago processing tools and rituals that promoted the growth of sago palms. Tom Kabu who advocated the destruction of ancestral material culture was influential at Poroi and no examples of ancestral heirlooms appeared to have survived. General aspects of cultural heritage values were taught in the Poroi schools, specific knowledge of cultural heritage values were taught at home or learned during community activities.

Women continued to practice a special dance, *Ta*, to welcome guests for special occasions. Daily interactions of women and men within Poroi were largely influenced by customary practices especially for women, the practice of not looking in the face of a man to whom they were not married when spoken to, and, not being allowed to talk openly to men. Women-headed households and single mothers were considered more vulnerable within the community as they did not receive much assistance from extended family unless they had older male kin who could assist them.

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SCALE: 1:2,500 @ A4

0 25 50 75 100 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Primary School
- Community hall
- Operating trade store
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Poroi 2 Village Layout

FIGURE: 3.30a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77478 **REVISION:** E

DATE: 20/12/2016

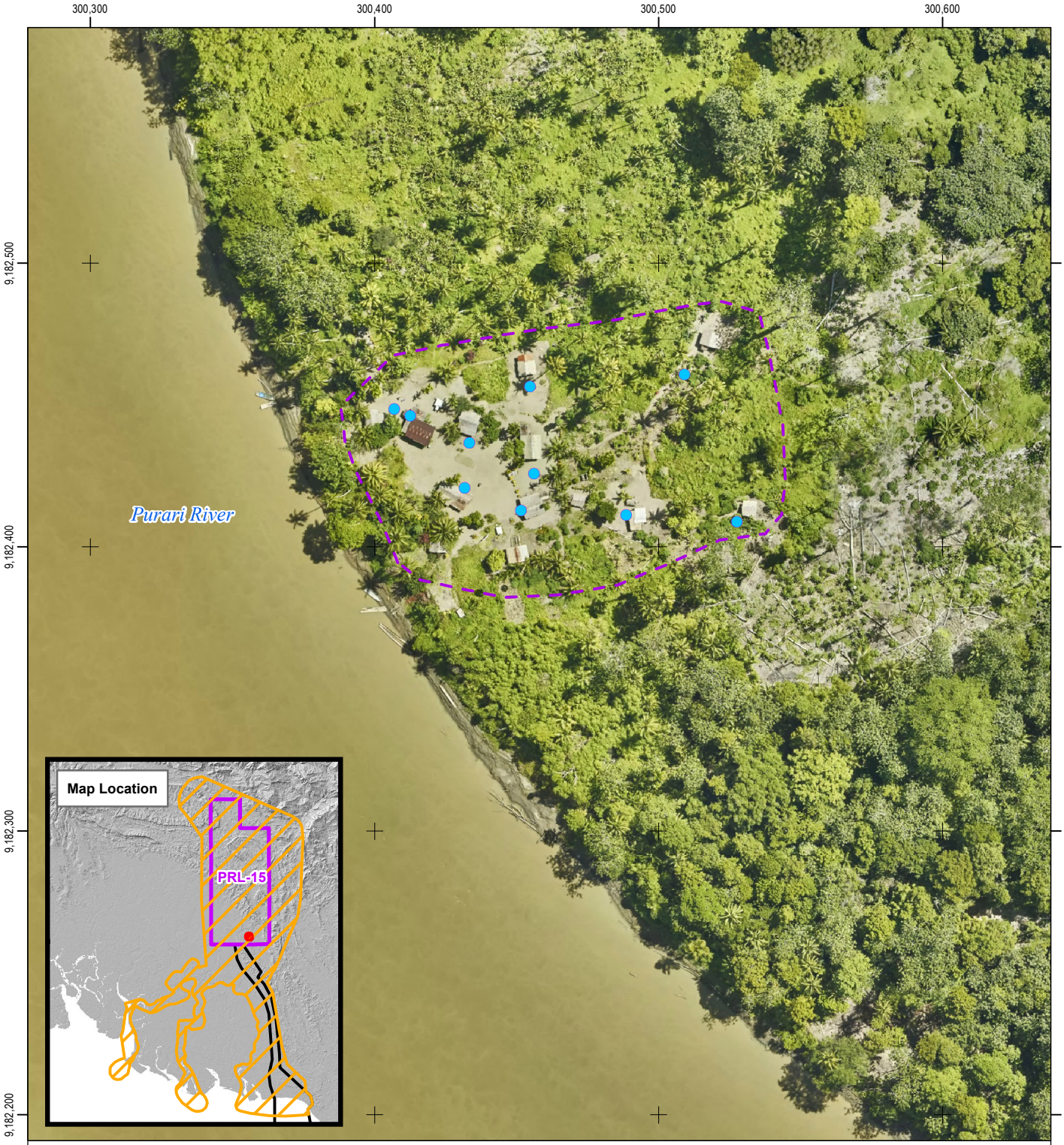
DATA SOURCES:
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SCALE: 1:2,000 @ A4

0 20 40 60 80 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Poroi 1 Village Layout

FIGURE: 3.30b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77471 **REVISION:** D

DATE: 20/12/2016

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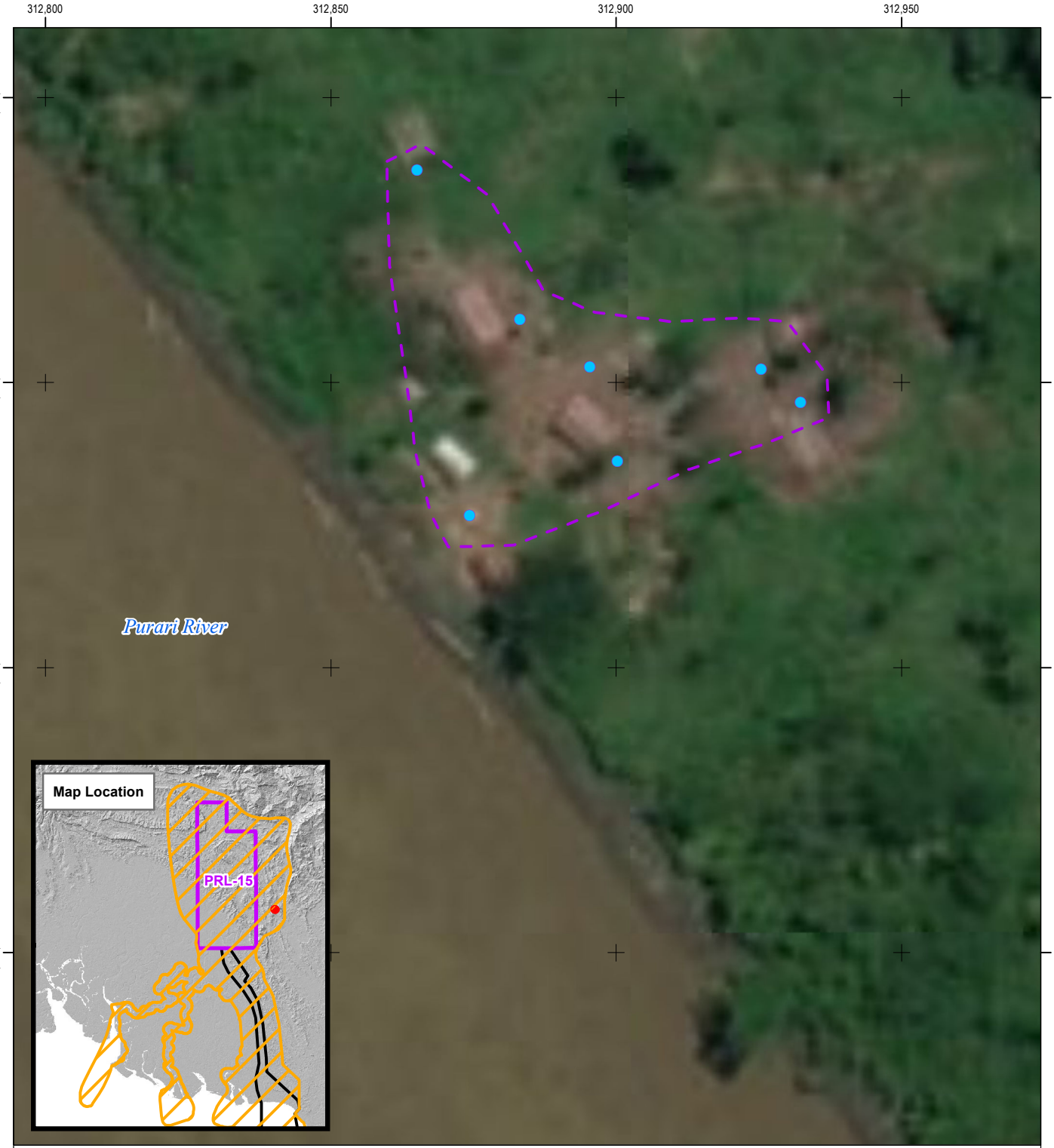
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SCALE: 1:1,000 @ A4

0 10 20 30 40 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Poroi 3 (Suarido) Village Layout

FIGURE: 3.30c

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-80112 **REVISION:** E

DATE: 15/05/2017

DATA SOURCES:
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Plates 3.30 – Poroi Gallery



Photo 1 – Elementary classroom



Photo 2 – School water tank



Photo 3 – Primary school classrooms



Photo 4 – Trade store



Photo 5 – Poroi woman displaying sago processing tools



Photo 6 – Canoes on the Purari River at Poroi

3.31 Subu and Subu 2

3.31.1 Summary

Table 3.31 summarizes key social data for Subu and Subu 2.

Table 3.31 – Subu and Subu 2 Summary

Thematic Area	Indicator	Description	
Location	**Description**	Purari River, located approximately 33 km upstream of Herd Base	
	Coordinates Subu	145.3174744	-7.073627
	Subu 2	145.2692413	-7.0608177
	Physical setting	Located on the banks of the Purari River, surrounded by undulating, lowland rainforest, Subu and Subu 2 are located within about one kilometre of each other. Subu is the original village and Subu 2 is more recently settled	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	20 (Poroi)	
Population and demography	**Population**	159; Subu 62, Subu 2 97	
	Gender ratio (M:F)	124; Subu 170 (39:23), Subu 2 102 (49:48)	
	Ethnic group	Pawaian	
	Affiliations	Wabo, Ura, Poroi and several villages to the north in Karimui District of Simbu Province	
	Households	24; Subu 11, Subu 2 13	
	Household size	6.6; Subu 5.6, Subu 2 7.5	
	Language	Pawaia	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	Subu unknown, Subu 2 2014	
	Name meaning	Subu meant to “lose something” as in slipping away from one’s grasp. It also referred to the name the Subu River (which joins the Purari adjacent to the village) and was the name of a lizard	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, kaukau, taro kong and cassava. Extensive hunting for wild pigs, cassowary, monitor lizards, bandicoots, megapodes and others, and extensive fishing (main species tilapia)	
	Resources	Primarily hill forest	
Commercial activities	**Businesses**	None	

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Table 3.31 – Subu and Subu 2 Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	100% traditional
	Floor type	Subu – 73% traditional; 27% semi-improved Subu 2 – 100% traditional
	Housing materials	Split black palm or split timber floor, woven sago panels on the walls and sago leaf roof, range of species used for house posts
	Cooking	Inside using firewood
	Lighting	Battery, solar
Health	**Facilities**	None
	Nearest facilities used	Wabo Health Centre, approximately 24 km from Subu 2 and 29 km from Subu to the northwest
	Community Health Worker	0
	Trained birth attendant	0
	Marrying age (women)	12 to 30
Education	**Facilities**	1 elementary school at Subu 2
	Attendance	52 students attended elementary school
	Nearest facilities used	Wabo Station (primary school) approximately 30 km northwest along the Purari River, Poroi 2 (1 x primary and 1 x elementary school) approximately 29 km to the south
Religion	**Churches**	Seventh Day Adventist
Water and sanitation	**Drinking Water**	Subu – small creeks and Purari River. Subu 2 – one community water tank, small creeks and Purari River
	Toilet facilities	Shared and private pit toilets and used the bush or river
	Waste disposal	Tin can/batteries and paper/plastics disposed in bush and food scraps were fed to animals or used as mulch
Law and order	**Prevalent issues**	Domestic violence, alcohol abuse, stealing, fighting, adultery and land disputes
	Resolution mechanisms	Resolved by family members or referred to police at Baimuru
Cultural heritage	**Tangible cultural heritage sites**	Spirit site in the forms of a large rock called *Laupara* and water spirit called *Subuia*
	Intangible cultural heritage	Making tools for processing sago, knowledge about hunting and fishing as well as knowledge about the medicinal properties of plants

3.31.2 Settlement History

At Subu, settlement history was not disclosed. Elders claimed it had always been located in this position. Subu 2 was established in 2014 after flood destroyed part of Subu and some residents agreed to relocate upstream. Subu 2 was on higher ground than Subu as a measure to avoid future possible flooding consequences.

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3.31.3 Social Organization

There was no real leadership evident at Subu or Subu 2. The councillor resided in Poroi and there was no knowledge as to the nearest village magistrate. A clan leader who resided at Subu 2 undertook some leadership responsibility.

3.31.4 Land Ownership

The Pawaian tribe was patrilineal. Only males assumed clan leadership. The clan leader determined allocation and user rights to clan land. All clans had clan leaders and clearly defined land boundaries. Allocation of land to female clan members for their exclusive use could be considered in the event of their husband's death and the number of children borne by the couple. A widow without children could be allocated clan land for her own use.

3.31.5 Women

Women's roles included child bearing, looking after their children and feeding the family. Women earned income mainly from the sale of food crops and sago. Some women contributed to decision-making about how money would be spent, most/all money was usually spent on family needs and not for their own personal use. Some women borrowed money from other relatives for basic needs such as clothes, salt and soap.

Women felt generally safe and secure at Subu 2, but they did not at Subu. At Subu they feared sorcery occurring in the bush, but accepted it as a part of life. Their feeling of security had not changed over time.

Marrying age was between 12 and 30 years.

The majority of women gave birth in the bush, assisted by a traditional birth attendant (there were no trained birth attendants). It was reported that women didn't go to Kapuna Health Centre because the Kapuna people argued that they should get help from the Project/Company since they were the ones that would benefit from it.

Custom required that women were not allowed to cook or give food or sleep with their husbands for a period of three weeks after the birth of their child for fear of making the husband ill. Women were not allowed to cook or give food to their husbands when they were menstruating.

3.31.6 Youths

The Seventh Day Adventist (SDA) church was active in Subu however there were no women's or youth groups.

3.31.7 Subsistence

The primary staple food was sago, which was harvested from sago palms that had been planted along the banks of the Purari River and associated creeks. Sago was supplemented by a range of garden food, primarily cooking banana, kaukau, taro, kang kong and cassava. A range of 'greens' (e.g., aibika and aupa), other crops (e.g., pumpkin, sweet corn, pitpit, eggplant, sugar cane, ginger, chillies, and peanuts) and fruits (e.g., papaya, and pineapples) were also grown. Coconuts, guava, okari nut trees, citrus, kumu mosong and to a lesser extent tulip were extensively planted.

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Extensive hunting was reported in forests using dogs, bows and arrows and spears for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, bush rats, cuscus, a range of birds (e.g. hornbills and goura pigeon) and flying fox. Various insect larvae were also harvested including sago grubs.

Extensive fishing was reported along the Purari River and associated creeks for tilapia, super tilapia, barramundi, mullet and black bass. Other aquatic resources included one species of shellfish that occurred in the small creeks, two species of prawn and two species of turtles. Both species laid eggs in sandy riverbanks that were harvested for food. Freshwater and saltwater crocodiles were also hunted.

3.31.8 Land and Natural Resource Use

Customary land was mostly located along the west bank of the Purari River, however sago could be planted along the east bank and gardens established with the permission of clans from Subu. The Subu 2 community had established clan boundaries to minimise land ownership conflict that may arise with the Project. Prior to the Project, members of the community were free to hunt and establish gardens anywhere but permission was now required from the relevant clan owner.

The pattern of land use had changed since the 2014 flood that swept away mature sago and riverside gardens causing food shortages. To avoid potential food shortages from future floods gardens were increasingly made on the hills, above potential flood levels.

Unlike villages further downstream in the Purari delta no natural sago swamps occurred within the customary land near the village. Land resources were primarily hill forest that provided a greater diversity of forest resources than sago swamps, including a choice of tree species for house construction.

Sago was the main material used for house walls and for house thatch. A range of species was used for house posts, house bearers and studs. Black palms were split for flooring. A range of tree species was also used for making dugout canoes.

The forests were used to harvest a wide range of timber and non-timber products including medicinal plants, most of which were considered essential for their livelihoods.

Drinking water was sourced from small creeks and, in severe dry seasons, from the Purari River. At Subu 2, drinking water was also obtained from one community water tank.

The Purari River was also the primary transport route to visit riverside gardens and to harvest planted sago. The river was also used to travel downstream and occasionally upstream to access services at Wabo.

3.31.9 Health

There were no health facilities at Subu or Subu 2. The nearest aid post was located at Wabo and the nearest health centre at Kapuna.

Main illnesses were reported to be malaria, skin sores, colds/coughs and head/body pains. Traditional medicine was predominantly used for treatment due to the excessive time required to reach the nearest health facility. Women reported their heavy workload was the main impact on their health, especially making sago. The main reason affecting the health of children was

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reported to be the workload of mothers and poor diet. Women did not know what STDs were, if they were prevalent, how they were contracted or treated. Likewise, not all women used family planning methods and the ones that did had to seek consent from their husband first. Most women used traditional contraceptive methods.

3.31.10 Education

There were no education facilities at Subu. Subu 2 had an elementary school with approximately 52 students in Prep, Grade 1 and Grade 2, one teacher and a volunteer teacher. Students wanting to attend Grades 3-7 had to travel to Wabo Station and Grades 8 and above to Kerema or Kikori.

3.31.11 Law and Order

Men reported boy-girl relationship issues as the only law and order dispute that only occurred once in a while.

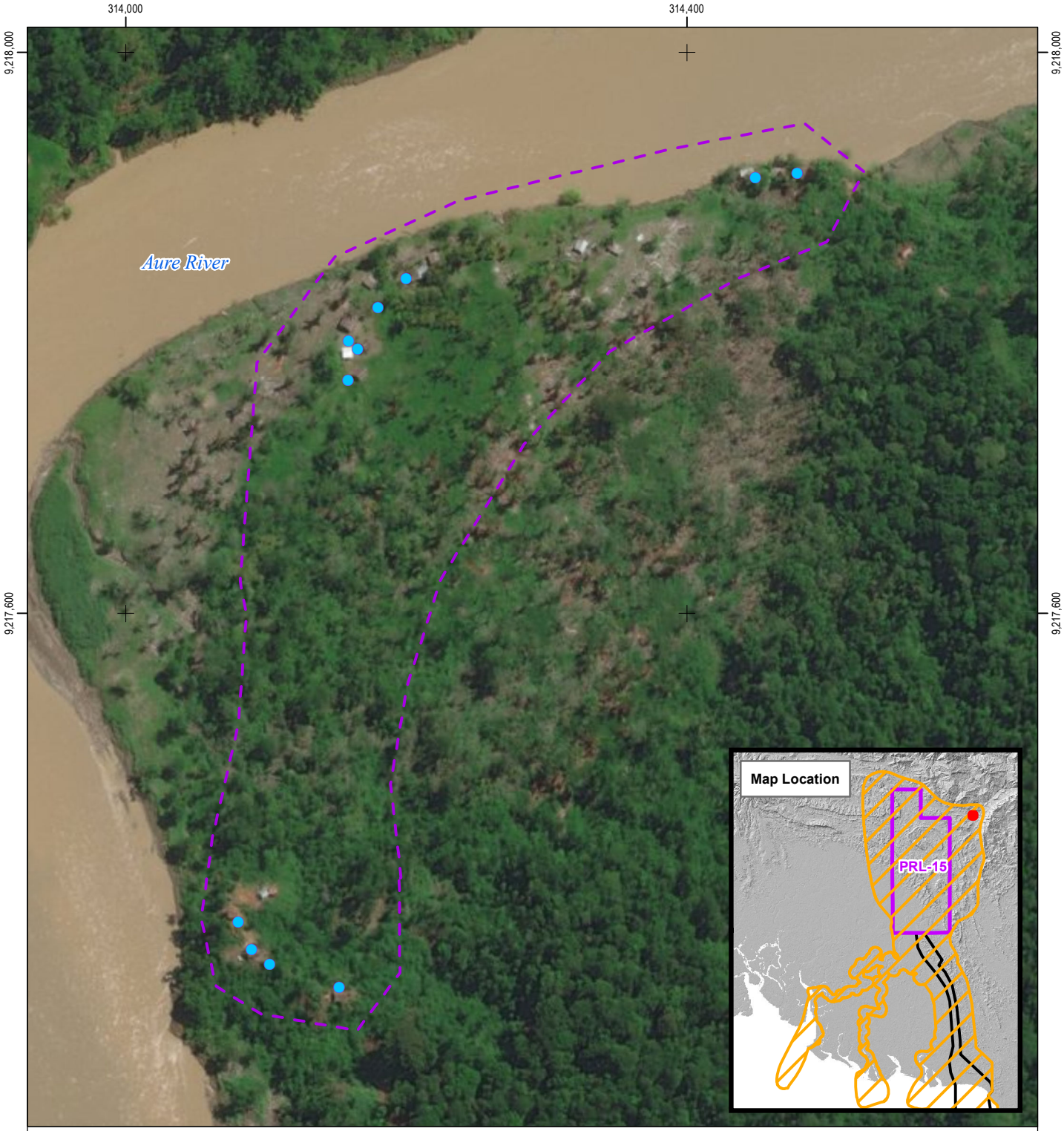
Women reported that incidences of adultery, domestic violence, alcohol abuse, stealing, fighting and land disputes were infrequent. Assault was generally perpetrated by other family members when a man was found to have been involved with a woman without her parent's permission. Issues with marijuana and other drugs were not reported, however women were unsure if prostitution was occurring. In cases of domestic violence often the immediate and extended relatives intervened.

3.31.12 Cultural Heritage

At Subu, traditional dances and songs were not commonly performed. Taboos relating to food and drinks applied to women who gave birth and women who experienced their menstrual period. Women were not allowed to talk openly to other men; disregard for this taboo often led to domestic violence.

When residents relocated to Subu 2, they brought their intangible cultural heritage values with them. At the time of the SBS survey, intangible cultural values passed on to younger generations included a detailed but confidential oral history. Intangible cultural heritage values present in the village included knowledge about making tools for processing sago, knowledge about hunting and fishing as well as knowledge about the medicinal properties of plants. Intangible cultural heritage values were very important to the community because cultural knowledge underpinned their subsistence strategies. One tangible site was recorded, a spirit site in the form of a large rock, a pig called *Laupara* that turned to stone when a woman named *Subuia* traveling down river from the mountains became too tired to take the pig any further. The site was called *Subuia*. It was an important site that was also recalled in oral traditions at Ura village.

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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

TITLE: Subu Village Layout

FIGURE: 3.31a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-80113 **REVISION:** E

DATE: 15/05/2017

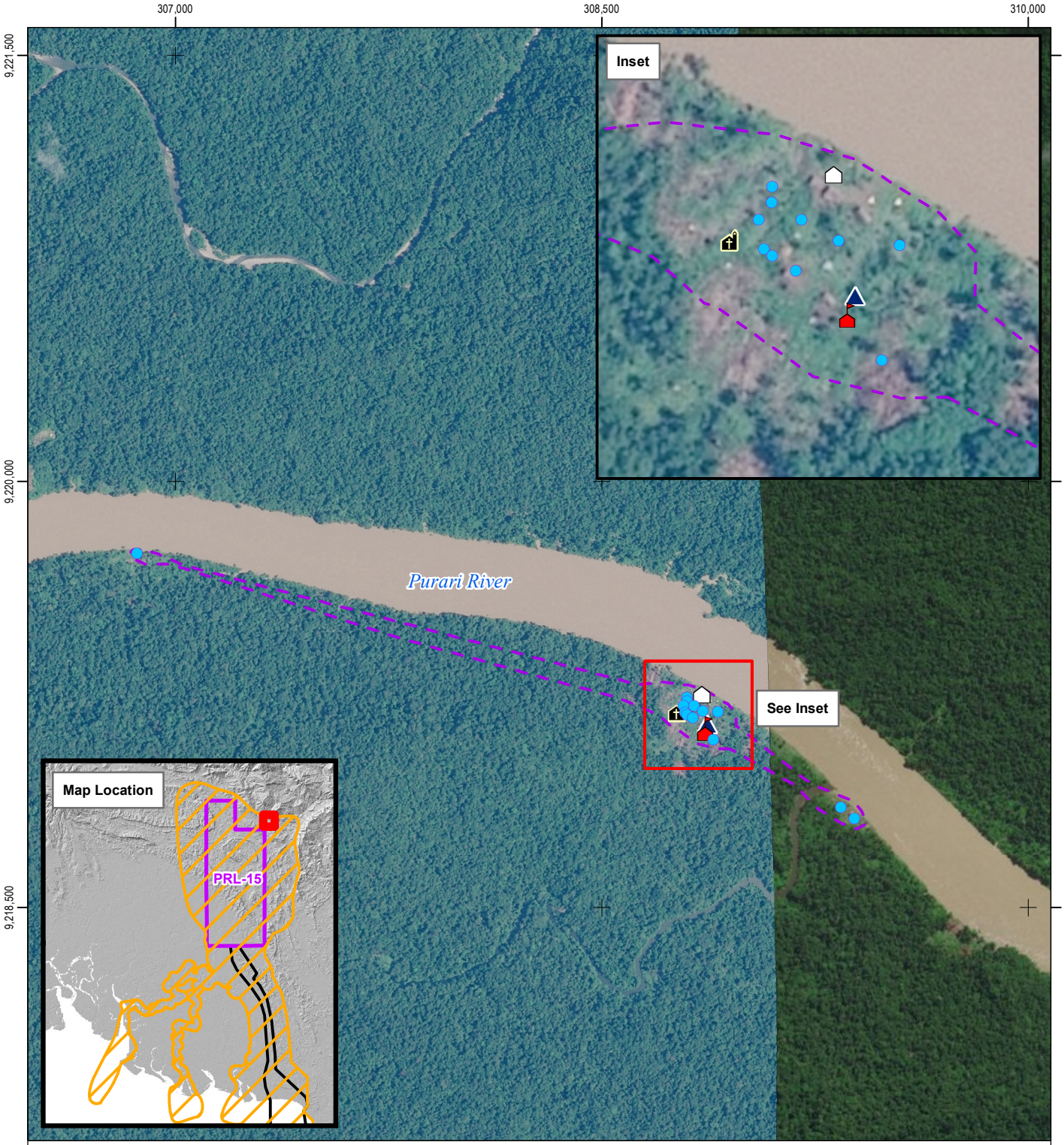
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SCALE: 1:20,000 @ A4

0 210 420 630 840 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Church
- Community hall
- Water source (drinking)
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

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TITLE: Subu 2 Village Layout

FIGURE: 3.31b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-80114 **REVISION:** E

DATE: 15/05/2017

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Plates 3.31 – Subu and Subu 2 Gallery



Photo 1 – View from Subu 2 towards the Purari River



Photo 2 – Communal water tank at Subu 2



Photo 3 – Elementary classroom at Subu 2



Photo 4 – Timber in the process of being hand-milled at Subu



Photo 5 – Rock spirit site, representing the pig *Laupara*



Photo 6 – Subu 2 woman demonstrates basket weaving

3.32 Upaia

3.32.1 Summary

Table 3.32 summarizes key social data for Upaia.

Table 3.32 – Upaia Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Papua coast in the Purari River delta, approximately 70-75 km to the south of the Pie River mouth on the Aria River, which flows into the Wame and Varoi rivers, the most western tributary of the Purari	
	Coordinates	144.8416138	-7.7435822
	Physical setting	Located on the western bank of the Aria River. Surrounded by beach dunes, mangroves, extensive tidal nipa palm swamps and small patches of forest within the nipa palm swamps	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	5 (Mariki)	
Population and demography	**Population**	277	
	Gender ratio (M:F)	94 (134:143)	
	Ethnic group	Kaimare	
	Affiliations	Mariki, Aiere and Bekoro	
	Households	41	
	Household size	6.8	
	Language	Kaimare	
	Other languages	Motu, Tok Pisin, English	
Settlement	**Year established**	2007	
	Name meaning	Referred to the name of a nearby river of the same name	
	Land ownership	Strictly patrilineal; ownership passed from father to son.	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cassava, kaukau, cooking bananas, and aibika. Limited hunting for wild pigs, cuscus, bandicoots wildfowl, large lizards and occasional flying foxes and extensive fishing (main species catfish)	
	Resources	Beach dunes, mangroves, and extensive tidal nipa palm swamps	
Commercial activities	**Businesses**	2 x trade stores and fuel sellers	
Housing	**Housing style**	100% traditional	
	Floor type	100% raised	
	Housing materials	Split black palm floors, hardwood posts, sago leaf or grass roof, split timber or woven panel walls	
	Cooking	Inside using firewood	
	Lighting	Kerosene, solar	

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Table 3.32 – Upaia Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	None
	Nearest facilities used	Kapuna Health Centre, located 23 km to the northeast
	Community Health Worker	0
	Trained birth attendant	Unknown
	Marrying age (women)	15 – 20
Education	**Facilities**	1 x elementary school
	Attendance	40 students attended elementary school
	Nearest facilities used	Varia (primary school) approximately 14 km southeast
Religion	**Churches**	Church of Christ
Water and sanitation	**Drinking Water**	Aria River
	Toilet facilities	Private, raised toilet
	Waste disposal	Tin cans/batteries and paper/plastics were disposed in the bush and food scraps were fed to animals
Law and order	**Prevalent issues**	Stealing, fighting, domestic violence
	Resolution mechanisms	Village court
Cultural heritage	**Tangible cultural heritage sites**	None
	Intangible cultural heritage	Maintained a range of intangible cultural heritage values that were important including taboos relating to food that applied to women

3.32.2 Settlement History

The Kaimare tribe originated from Pairi'umu (old village), which was their ancestral origin. Due to increases in family sizes and conflicts over resources, they moved to Mariki, but the same problems forced some of them to move downstream to settle in the present location. Upaia's location at the time of the SBS survey was a very recent settlement. In 2007 continuous high tide and flooding destroyed many of their houses and food crops, forcing them to resettle approximately one kilometre inland in the present location.

3.32.3 Social Organization

The village was represented by a ward councillor, village court magistrate and land mediator. Traditional leadership was strong in the form of chiefs. Each clan had a chief. Apart from their political role, Upaia chiefs were regarded as custodians of tribal history and knowledge.

3.32.4 Land Ownership

Land tenure was strictly patrilineal; ownership was passed from father to son. In the absence of a male heir, male family members of the clan could assume custodianship until a male heir from the blood line was reproduced to assume ownership. Female members of a clan were expected to marry outside of the tribe so that they would produce the male heirs of their husbands. Male

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members of the clan were expected to marry women outside of the tribe who would bear the next male heirs for the clan and the tribe. It was forbidden to marry within the clan or tribe as it was thought this would cause serious issues of ownership and inheritance.

3.32.5 Women

Making and collecting of sago and freshwater and salt water fish, crabs, prawns, and shells were the most important roles performed by women. Most women engaged in income earning activities and tended to spend most of their income for the household. They travelled to Baimuru station and Kapuna market to sell their produce, often crabs and coconuts. It took half a day to travel to Baimuru market and a full day to travel to Kapuna market via an outboard motor dinghy.

Women reported feeling safe and secure in Upaia and attributed their sense of security to the presence of the churches.

Marrying age was between 15 and 20 years.

Approximately one-third of babies born in the past 12 months were born in the village/bush, while the others were reportedly born at Kapuna Health Centre, a day's canoe paddle away.

3.32.6 Youths

Youths participated in both church and sporting activities. There were two youth groups with names Upaia Rainbow for spiritual activities (church related) and Okeakaemiri (OKM) for sporting activities. Membership fee was K5.

Youths provided community service every Thursday such as mending broken fences and posts, cleaning tanks, cutting grass and cleaning their village. For fundraising, youths assisted with building houses, weaving nipa leaves for roof tops, beating sago and making canoes. Youths reportedly spent their free time with their parents or elders learning how to sew fishing nets and weave baskets (for the young women) while the young men learned how to make canoes and paddles, and make spears and bow and arrows.

3.32.7 Subsistence

The main staple food was sago, which was harvested from sago palms that had been planted along the banks of the Purari River and associated creeks. Wild sago stands were present in the swamps but were distant from the village and mostly not used for food.

During the wet season when the river level was high, sago was cut by either men or women and floated down to the village where it was processed. When the river level dropped during the dry season it was difficult to float sago downstream hence families camped upstream for two to five days to process sago before returning home.

Garden food was mostly grown in beach side gardens. Smaller amounts of garden food were grown in the nipa palm swamps. The main garden food included cassava, kaukau, cooking bananas and aibika. In addition to the staple garden foods, other food crops were grown including sugar cane and occasionally peanuts. Extensive stands of coconuts occurred close to the beach; the remnants of a coconut plantation. Breadfruit trees were also planted in the sand dunes since they would not grow in the village due to the high water table and sallow tidal flooding. Edible nuts were also harvested from the wild nipa palm stands.

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There were fewer gardens than villages further upstream reflecting the limited suitable land available to grow crops due to frequent flooding and tidal inundation in the nipa palm swamps. Most gardens were made next to the beach due to limited arable land and therefore when garden land was left fallow a new garden was made within close vicinity of the previous garden. Pigs were fenced at the back of houses to prevent destruction of gardens. Food was often shared between households when scarce. Often during drought periods villagers exchanged food such as sago, fish, crabs, and, coconuts with other villages especially Akoma and Kairu'u.

Limited hunting reportedly occurred in forests and swamps for wild pigs, cuscus, bandicoots wildfowl (eggs also collected), large lizards and occasional flying fox.

Extensive fishing was reported to occur along the Aria River and associated creeks. Catfish was the main species caught but also salmon, barramundi, mullet and eels. Nets and fishing lines were used. Other aquatic resources included sharks, sawfish, stingrays, prawns, mud crabs and three species of shellfish, which included tiny *epaua* (tok ples name) collected from the beach. Two species of turtle were also caught for their meat and their eggs collected. These included a marine turtle that laid eggs from September to January and the freshwater turtles. Saltwater and freshwater crocodiles were also hunted. Fish and other aquatic resources were also traded for garden food with upstream villages such as Mapaio and Kaevaria.

3.32.8 Land and Natural Resource Use

Land resources included beach dunes, which were used for gardens, mangroves and extensive tidal nipa palm swamps. Small patches of forest were also present on raised sites within the nipa palm swamps which become more extensive upstream. These resources provided an array of essential timber and non-timber forest products including house construction materials, canoe trees and medicinal plants (some medicinal plants were also planted within the village).

Land resources, particularly the low-lying village areas, were frequently affected by flooding from high tides and heavy rain events resulting in extensive waterlogging and a high water table.

Sago was the main material used for house walls and nipa palm was used for house thatch. The preferred tree species for house posts included kaipu, kara, mangrove cedar (listed under the IUCN as Least Concern (LC)) and *na'o* and the black palm *karara* was split for flooring. A range of rattans were harvested to use as rope as a replacement for nails. Dugout canoes were made from erema and rosewood.

Drinking water was mostly sourced from the Aria River and was often collected upstream from the village where it was less salty.

There was no land based access to the village although a walking track connected the village to Mariki where there was an aid post. The Aria and Purari rivers were the primary transport routes to visit riverside gardens, the nipa palm swamps to harvest planted sago and to visit other villages. Medical facilities at Kapuna were also accessed via the river, which took approximately one day. Occasional trips were made by canoe to Baimuru, about six hours away (if paddling with the incoming tide).

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3.32.9 Health

There were no functioning health facilities at Upaia; the nearest facilities were located at Mariki. The most common health issues were perceived to be malaria, cough and joint pain (due to workload). The reason for poor health was described as workload, especially for women.

Women had an understanding of STDs and family planning. However in order to access contraceptives at Kapuna Health Centre, a woman must be accompanied by her husband or she would be turned away as the health centre emphasised that the decision to use contraceptives must be a shared decision of both husband and wife.

The majority of babies were born at Kapuna Health Centres; others were born in the village with the assistance of a traditional birth attendant.

3.32.10 Education

Upaia had an elementary school, but no primary school, with one local teacher, and 40 students (30 males and 10 females) across Grades 1 and 2. According to the teacher most students attended school all year round. Primary school students attended Mariki Primary School or Varia Primary School. The school had a water tank, however, toilets were in need of upgrade.

3.32.11 Law and Order

Women reported the main law and order problems as being stealing from gardens, fighting and domestic violence. Only some men consumed alcohol on special occasions such as bride price ceremonies, Christmas and Independence Day. When food was stolen from a garden, the owner removed the plant(s) from where the theft occurred then walked throughout the village displaying the plant, announcing the crime and asking the villagers to identify (“dob-in”) the offender. If the offender was identified or confessed the matter was referred to the village court. It was also strictly forbidden for individuals to swear at each other even when fighting.

3.32.12 Cultural Heritage

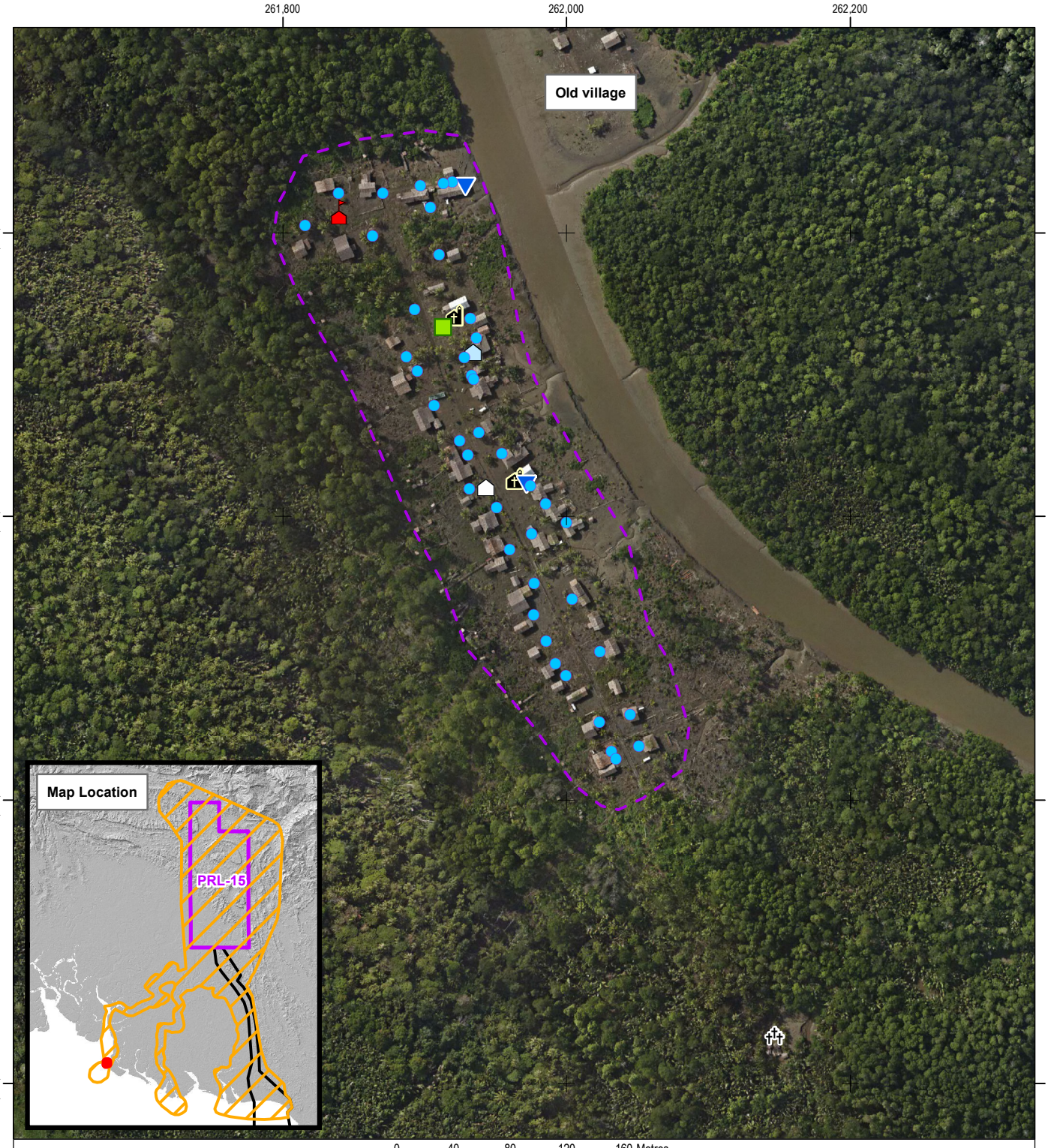
Upaia clans trace their ancestral history inland through five ancestral villages. There were no tangible cultural heritage sites at Upaia; there was an ancestral village east of Upaia Creek which, based on genealogical reckoning, was first occupied c. 110 years ago. The village was only completely abandoned after recent flooding. There was no knowledge of places where archaeological materials were visible on the ground surface, which was to be expected in a rapidly changing alluvial landscape. The community did have two heirloom Motu pots obtained through the hiri trade. There were no spirit sites in the village but there were sites in the general area. Knowledge about these sites had been eroded by Christianity and according to informants these sites were of diminished importance to the community. Upaia maintained a range of intangible cultural heritage values that were important to the community.

There were several taboos relating to food that still applied to women. Women who experienced their menstrual period were not allowed to cook for the family; a woman must always wash her hands in the morning after sleeping with her husband, before cooking a meal for her family to avoid causing illness; it was forbidden to see a pregnant woman before going fishing as this may bring bad luck; amongst others.

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Traditional dances and songs were performed on special occasions such as bride price payments within the village. Often the groom paid an amount of money ranging between K10,000 to K15,000 to the bride's kin and the bride's kin, in exchange, gave pigs, baskets, mats and other food to the groom's kin.

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SCALE: 1:4,000 @ A4

0 40 80 120 160 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary School
- Burial sites/cemetery
- Church
- Community hall
- Operating trade store
- Sporting field
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Upaia Village Layout

FIGURE: 3.32

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77459 **REVISION:** D

DATE: 20/12/2016

DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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Plates 3.32 – Upaia Gallery



Photo 1 – United Church



Photo 2 – European Union sponsored water tanks at Upaia



Photo 3 – Elementary school classroom



Photo 4 – Low tide at Upaia



Photo 5 – Upaia hospitality – sago and smoked fish



Photo 6 – Markham Valley pot displayed at Upaia

3.33 Ura and Wabo Station

3.33.1 Summary

Table 3.33 summarizes key social data for Ura, including Wabo Station.

Table 3.33 – Ura and Wabo Station Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Purari River, approximately 44 km northwest of Herd Base	
	Coordinates		
	Ura	145.0769	-6.988961
	Wabo Station	145.0712	-6.986851
	Physical setting	Located on the banks of the Purari River adjacent to Wabo village. Surrounded by undulating, lowland rainforest. Ura is an original village while Wabo Station has been more recently settled	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	21 (Wabo)	
Population and demography	**Population**	229; plus 108 at Wabo Station	
	Gender ratio (M:F)	127 (128 males: 101 females). For Wabo Station: 242 (80 males, 33 females)	
	Ethnic group	Pawaian	
	Affiliations	Wabo, Subu, Poroi and several villages to the north in Karimui District of Simbu Province	
	Households	42 plus Wabo Station 22	
	Household size	5.5 (Wabo Station 5.0)	
	Language	Pawaia	
	Other languages	Motu, Tok Pisin	
Settlement	**Year established**	1970s	
	Name meaning	Ura is the name of the river near which the village is situated	
	Land ownership	Strictly patrilineal; ownership passed from father to so	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, kaukau, two types of taro, cassava, breadfruit and sugarcane. Extensive hunting for wild pigs, cassowary, monitor lizards, bandicoots, megapodes and more, and extensive fishing (main species tilapia)	
	Resources	Primarily hill forest	
Commercial activities	**Businesses**	3 x trade stores	

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Table 3.33 – Ura and Wabo Station Summary (cont'd)

Thematic Area	Indicator	Description
Housing	**Housing style**	53% traditional, 47% semi-improved Wabo Station 86% traditional, 14% semi-improved
	Floor type	100% raised
	Housing materials	Split black palm floors, hardwood posts, sago leaf or grass roof, split timber or woven panel walls
	Cooking	Inside using firewood
	Lighting	Battery and solar
Health	**Facilities**	Wabo Health Centre
	Nearest facilities used	Kapuna Health Centre, located approximately 66 km to the south-southwest
	Community Health Worker	2
	Trained birth attendant	0
	Marrying age (women)	13 to 19
Education	**Facilities**	1 primary school (located at Wabo Station)
	Attendance	50 students attended the Wabo Primary School
	Nearest facilities used	Goroka (secondary school) approximately 106 km to the northeast
Religion	**Churches**	New Tribes Mission
Water and sanitation	**Drinking Water**	Community water tanks and creeks
	Toilet facilities	Private pits (gender specific)
	Waste disposal	Tin cans/batteries were buried, paper/plastics were burnt or disposed in the bush and food scraps were fed to animals
Law and order	**Prevalent issues**	Sorcery, fighting, stealing, domestic violence, consumption of alcohol and marijuana and prostitution
	Resolution mechanisms	Village leaders, police
Cultural heritage	**Tangible cultural heritage sites**	Spiritual sites *Peiweino*, a creek, *Mei*, waterfalls, *Twepei* and *Wepei*, a spirit meeting/dancing ground, *Joropeswanopon*, a pig that turned into stone, *Laupura*, a women's site, *Moiwailedsa,* a site close to the village, *Wabu Kai Seiro*
	Intangible cultural heritage	Tool-making, hunting techniques, ways of dress, songs and dance

3.33.2 Settlement History

The Jauho clan of the Pawaian tribe were the original landowners of present day Ura. In the 1970s the colonial government proposed a dam to be constructed upstream for a hydro power plant. Pawaians living in the proposed catchment area were relocated to present day Ura. It was also thought that the resettlement would allow Pawaians to be closer to government services and for administration purposes. Other Pawaian clans settled in Wabo.

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3.33.3 Social Organization

A ward councillor had not been elected since 2012 and there was no village magistrate. There were three clan leaders and a church pastor – from the New Tribes Mission church. There was rarely any community work undertaken.

3.33.4 Land Ownership

Pawaian social structure was patrilineal with the rules and expectations strictly adhered to. Land ownership passed from father to son. Clan members only used their own land for gardening and obtaining materials for other uses. Permission must be sought if a member of one clan wished to access another clan's lands. If a Pawaian woman married outside the tribe and was widowed and without children, her own clan may take her back so she could work on her own clan's land. However, if she had children, she would not be allowed to claim her clan's land for her own or her children's use, as her husband's clan was expected to take care of them. The village relied on Ura's traditional chiefs' knowledge and experience to settle land disputes and other social problems in the village.

3.33.5 Women

Sago making was regarded as the most important role performed by women as it was the staple food and in times of flooding and drought served to be the main food available. Income generating opportunities had reportedly decreased since InterOil ceased operating in 2015. Most often women gave money to husbands to spend as it was men who went to Wabo station, while women were expected to stay at home or go to the bush or other places to fulfil household responsibilities.

Women did not feel safe and secure in the community. They reported to be afraid of sorcery, practiced only by men and often in the bush, and as a result, they often travelled in pairs to the bush. Women's' feelings of safety and security had not changed over time.

Marrying age was reported to be between 13 and 19.

Women gave birth in the bush, even though the Wabo Health Centre operated until recently (it was not operating at the time of the SBS survey) because the health extension officer was male and custom forbade it.

3.33.6 Youths

One youth group in Ura, called the Pawaia Panthers, focussed mainly on sports but also participated in church and community activities such as cutting grass and cleaning. For recreation, youths played sport, relaxed and spent time with friends.

3.33.7 Subsistence

The primary staple food was sago, which was harvested from two types of sago palms (one with thorns and one without) that had been planted along the banks of the Purari River and associated creeks. Sago was supplemented by a range of garden food, primarily cooking banana, kaukau, two types of taro and cassava, breadfruit and sugarcane. A range of 'greens' (e.g. aibika), other crops (e.g. pumpkin, sweet corn, pitpit, eggplant, sugar cane, ginger, chillies, and peanuts) and

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fruits (e.g. papaya, and pineapples) were also grown. Coconuts, guava, okari nut, kumu mosong and to a lesser extent tulip were extensively planted.

Extensive hunting was reported to occur in forests using dogs, bows and arrows and spears for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, bush rats, cuscus, most bird species, flying fox and small bats. Various insect larvae were also harvested including sago grubs. Two species of spider that lived in burrows were also eaten.

Extensive fishing was reported to occur along the Purari River and associated creeks for tilapia, super tilapia, barramundi, catfish, mullet and black bass. A recently introduced fish was also eaten known as “besta”. This species was thought to have escaped from fish farms in the highlands, travelling downstream in the Purari River. Other aquatic resources included one species of shellfish that occurred in the small creeks, two species of prawn and two species of turtles. Both species laid eggs in sandy riverbanks that were harvested for food. Freshwater and saltwater crocodiles were also hunted and their eggs were collected for food

3.33.8 Land and Natural Resource Use

Customary land was mostly located along the west bank of the Purari River either upstream or downstream of Ura. Most of the land was hill forest that supported a diverse range of flora and fauna. The pattern of land use had changed since the 2014 flood that swept away mature sago and riverside gardens causing food shortages. To avoid potential famine from future floods gardens were increasingly made in the hills above potential river flood levels.

Unlike villages in the Purari delta no natural sago swamps occurred within the customary land near the village. Land resources were primarily hill forest that provided a greater diversity of forest resources than sago swamps, including a choice of tree species for house construction. Sago was the main material used for house walls and for house thatch. Long grasses were also used for thatching roofs. A range of species were used for house posts, house bearers and studs. Black palms were split for flooring. A range of tree species were also used for making dugout canoes. The forests were used to harvest a wide range of timber and non-timber products including medicinal plants, most of which were essential for their livelihoods. Despite abundant resources some resources were locally scarce because of overharvesting caused by population increase.

Drinking water was sourced from community water tanks and side creeks that were distant from the village. In a severe dry season/drought, drinking water was sourced from the Purari River.

The Purari River was also the primary transport route to visit riverside gardens and to harvest planted sago. Access to the Eastern Highlands and Simbu from the east bank via Wabo was also possible by walking tracks. It took approximately two weeks’ to walk to Goroka and Kundiawa, but increasingly travel was undertaken by plane from Wabo airstrip for those who were employed.

3.33.9 Health

A health centre existed at Wabo Station staffed by two community health workers (at the time of the SBS surveying, they had not been paid and were refusing to work). The nearest health centre was located at Kapuna.

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Men identified the main health problems as malaria, tuberculosis, maternal deaths (during child birth) and snake bites. Women attributed poor health to excessive workload causing stomach aches which they believed affected their reproductive systems. Injuries sustained from fighting and domestic violence cases were also common. Women thought poor health amongst children was mainly related to poor diet. In most cases people resorted to traditional healing methods or presented at Wabo Health Centre for treatment. Serious cases that required further assistance were referred to Kapuna.

Some women were aware of STDs but were not sure of prevalence, and only a few knew how STDs were transmitted or treated. Most women know about family planning but only some used contraceptives. Often it was a shared decision of both husband and wife to use contraceptives.

3.33.10 Education

Wabo Primary School is located at Wabo Sation (adjacent to Ura). It was Government run and was attended by a total of 50 students (40 males and 10 females). The school had two teachers.

The school's basic teaching materials were inadequate, and the classrooms dilapidated with broken desks. Digicel built Grade 5 and 6 classrooms in 2013. InterOil donated four water tanks in 2015. No project fees were reported to be paid by parents (and school fees were subsidised by the Government).

Wabo Primary School had not been operating consistently since InterOil assistance ceased in 2015. Many primary school-aged students went to school in Goroka, Simbu, Baimuru and Kerema.

3.33.11 Law and Order

Men reported the main law and order issue to be sorcery, followed by fighting over women, stealing and domestic violence. Outsiders were blamed for escalating law and order problems. Problems were usually resolved by village leaders, which included elders and church pastors. Previously, the police at Herd Base would help resolve some problems. At the time of SBS surveying, police assistance was sought from Baimuru.

Women reported the most prevalent law and order issue to be domestic violence, often caused by jealousy among couples and adultery. There was no village court and serious cases, especially when serious injuries were sustained, were referred to the police at Wabo Station. Alcohol and marijuana consumption were reportedly high among most men and often led to the destruction of property and violence. Promiscuous activities involving the exchange of money for sex occurred sometimes and were thought to involve unmarried women. Highlanders settling at Wabo Station were thought to gamble often but gambling had reportedly decreased after police intervention. In polygamous marriages, arguments and fights among the several wives were common. It was reported that sometimes wives would assault husbands.

3.33.12 Cultural Heritage

Jaoho clan were acknowledged as the founding clan of Ura village although other clans had recently established a presence in the village. The Jaoho clan referred to many cultural heritage sites at distant inland locations, these included: traditional hunting grounds (*Peiweino*), a creek occupied by a spirit in the form of a snake (*Mei*), waterfalls created by spirit brothers (*Twepei* and

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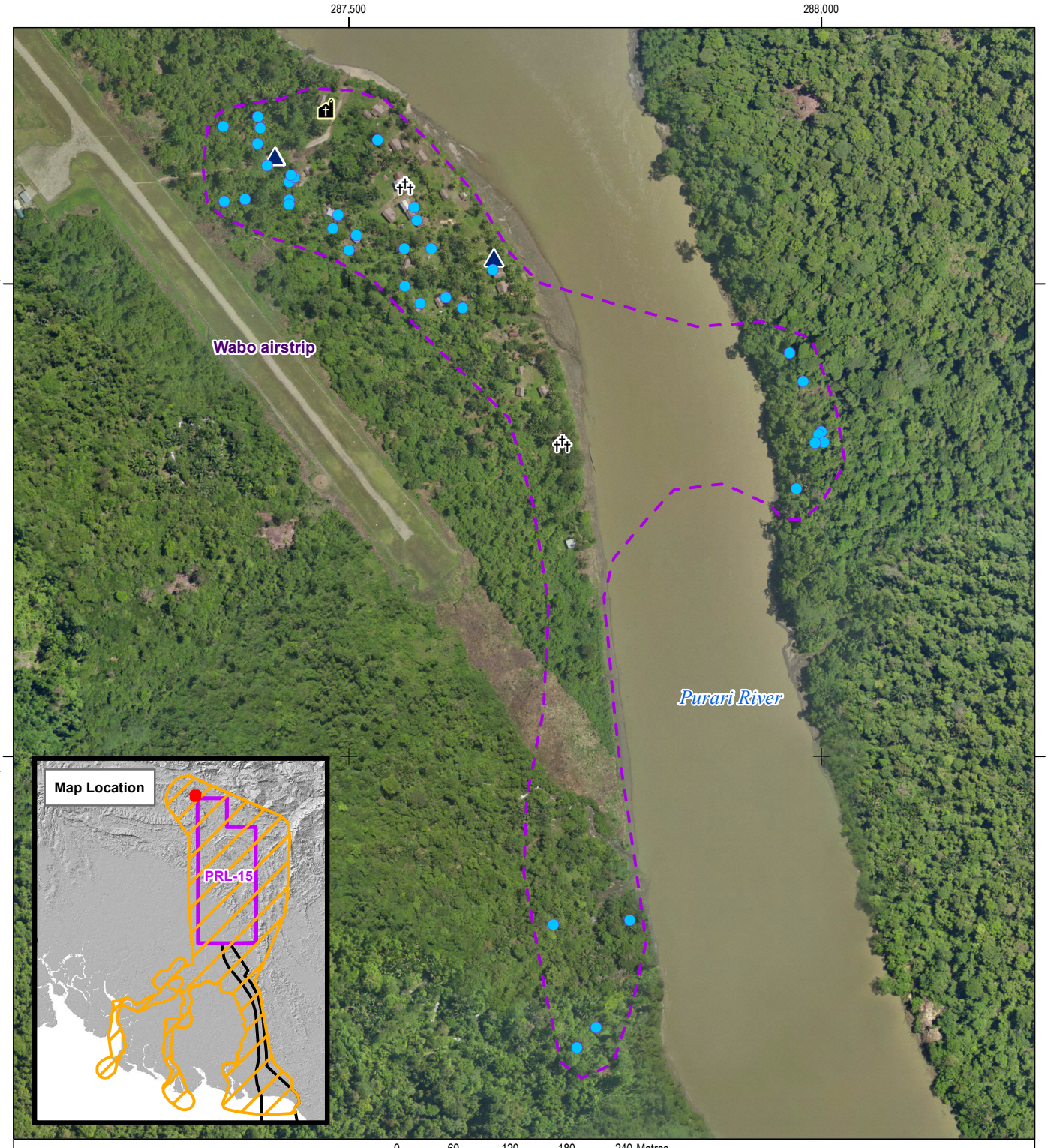
Wepei), a spirit meeting/dancing ground (*Joropeswanopon*) and a pig that turned into stone (*Laupura*).

There was also one women's site not far from the village where women went to give birth (*Moiwailedsa*). The birthing site was still used today and babies were only later taken to the medical centre. There was one tangible cultural heritage site close to the village. The site was in the form of a rock in the Purari River called *Wabu Kai Seiro*, the spirit that dwelled there sometimes caused canoes to capsize and women and children were forbidden from paddling in that part of the river.

Jaoho clan maintained a rich inventory of intangible cultural heritage values that continued to be passed from generation to generation. Intangible cultural heritage values included tool-making, hunting techniques, ways of dress, songs and dance.

Taboos relating to food and drinks applied to women who gave birth and women who experienced their menstrual period. Women who gave birth lived further away from the house for a time and were visited regularly by other females who bought her food. Women experiencing menstruation refrained from cooking during those periods.

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SCALE: 1:6,000 @ A4

0 60 120 180 240 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Water source (drinking)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Ura Village Layout

FIGURE: 3.33a

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77475 **REVISION:** E

DATE: 20/12/2016

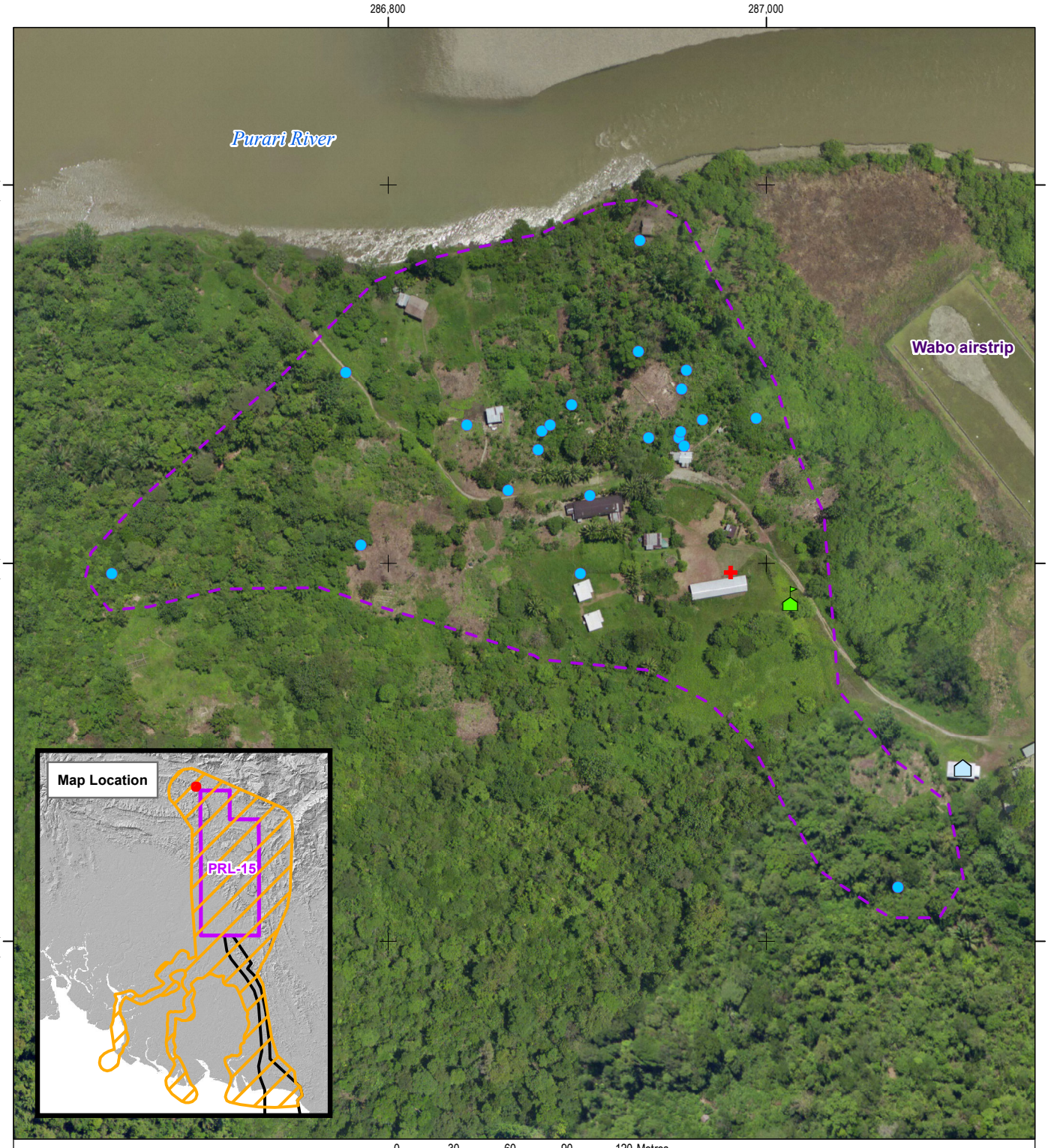
DATA SOURCES:
Households and Infrastructure points supplied by ERIAS Group (2016). Extent of dwellings manually digitised by Mipela GeoSolutions (2016). Imagery supplied by Total. Direct project area of influence supplied by ERIAS Group (2016). PRL-15 and Export pipeline corridor supplied by Total (2016).

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SCALE: 1:3,000 @ A4

0 30 60 90 120 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Elementary and Primary School
- Aid Post, Operating
- Operating trade store
- Extent of dwellings
- Project areas of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Wabo Station Village Layout

FIGURE: 3.33b

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-78372 **REVISION:** F

DATE: 17/02/2017

DATA SOURCES:
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Plates 3.33 – Ura and Wabo Station Gallery



Photo 1 – Inside the Grade 3 classroom



Photo 2 – Grade 3 classroom



Photo 3 – Trade store



Photo 4 – Bush tobacco and betelnut for sale



Photo 5 – Ura leaders with cultural heritage items



Photo 6 – Bow and arrows

3.34 Wabo

3.34.1 Summary

Table 3.34 summarizes key social data for Wabo.

Table 3.34 – Wabo Summary

Thematic Area	Indicator	Description	
Location	**Description**	Located on the Purari River, opposite Ura, approximately 45 km northwest of Herd Base	
	Coordinates	145.0684052	-6.9815397
	Physical setting	Located on the banks of the Purari River, surrounded by undulating, lowland rainforest	
Administrative structure	**Province**	Gulf	
	District	Kikori	
	LLG	Baimuru Rural	
	Ward	21 (Wabo)	
Population and demography	**Population**	542	
	Gender ratio (M:F)	108 (281:261)	
	Ethnic group	Pawaian	
	Affiliations	Ura, Simbu and Eastern Highlands provinces	
	Households	73	
	Household size	7.4	
	Language	Pawaia	
	Other languages	Motu and Tok Pisin	
Settlement	**Year established**	1970s	
	Name meaning	Wabo meant “true”. It also referred to a nearby river	
	Land ownership	Strictly patrilineal; ownership passed from father to son	
Subsistence and land use	**Subsistence base**	Sago was the main staple food along with some garden food such as cooking banana, cassava and kaukau. Limited hunting for wild pigs, cuscus, bandicoots and monitor lizards and extensive fishing (main species catfish)	
	Resources	Primarily hill forest	
Commercial activities	**Businesses**	2 x trade stores	
Housing	**Housing style**	80% traditional 20% semi-improved	
	Floor type	100% raised	
	Housing materials	Split black palm floor, hardwood posts, sago leaf or grass roof, split timber or woven panel walls	
	Cooking	Inside using firewood	
	Lighting	Torches made of fronds/other bush materials	

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Table 3.34 – Wabo Summary (cont'd)

Thematic Area	Indicator	Description
Health	**Facilities**	Wabo Health Centre
	Nearest facilities used	Kapuna Health Centre
	Community Health Worker	0
	Trained birth attendant	1
	Marrying age (women)	10 to 14
Education	**Facilities**	None
	Attendance	Students travelled across the river to Wabo Primary School
	Nearest facilities used	Ura (primary school) approximately 1 km southeast; Goroka (secondary school) approximately 106 km to the northeast; Kerema approximately 132 km to the southeast
Religion	**Churches**	N/a
Water and sanitation	**Drinking Water**	Community water tanks and small creeks/springs
	Toilet facilities	Private pit toilets
	Waste disposal	Most domestic waste was disposed in bush
Law and order	**Prevalent issues**	Domestic violence, adultery, consumption of alcohol and marijuana
	Resolution mechanisms	Serious cases were dealt by police
Cultural heritage	**Tangible cultural heritage sites**	*Sasmeia* (river site) occupied by a spirit called *Intou*
	Intangible cultural heritage	Knowledge about making tools for processing sago and hunting techniques had been essential to maintaining food security

3.34.2 Settlement History

Being Pawaians, the Wabo and Ura villages shared a common history of resettlement that started in the early 1970s with the proposed damming of upper Purari catchment areas for a hydro power plant. Pawaians living in the proposed catchment area were relocated to present day Wabo and Ura. It was also thought that the resettlement would allow Pawaians to be closer to government services and for administration purposes.

3.34.3 Social Organization

There was no ward councillor, village court magistrate or land mediator in the village. There were 23 clans represented at Wabo, and four chiefs. Church leaders also contributed to social organization.

3.34.4 Land Ownership

Wabo villagers, like other Pawaians, still practiced many of their traditional customs, beliefs, and daily ways of living and subsisting. Land ownership was strictly patrilineal, passed onto a son after the father died. In gardening, all members of the clan had equal rights to clan land. However, in hunting and fishing, certain areas of a clan's land and waters were restricted specifically for

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such purposes. If a man from outside married a Pawaian woman but died without children, the widow was permitted to access her own clan's land for her own use. If she remarried into another Pawaian clan she could be granted access to land use in that other clan if she had no children. If she had children, she was permitted to claim land for her own use on her own clan land.

3.34.5 Women

Sago making was regarded as the most important role performed by women as it was the staple food and in times of flooding and drought. Income generating opportunities had reportedly decreased since InterOil ceased operations in 2015. Some women in the village had no notion of the use of money hence often men tended to spend income the women made. Borrowing of money occurred only on a needs basis especially for medical evacuations as well as to purchase school materials for children.

It was the women's role to clear the bush to make garden; if her husband desired, he assisted her. Most decisions regarding gardening and sago making were primarily made by women. Only when a woman intended to plant sago, would she consult her husband and they would both decide on where to plant. When periods of flooding approached, women would make surplus sago to store at home.

Women did not feel safe and secure as they were afraid of their husbands. They were not allowed to walk around uncovered to avoid attracting attention (this related to prearranged marriages, thus to need to avoid drawing the attention of men other than the man to whom she was promised). Feelings of safety and security had increased over time, attributed to the influence of outsiders who had influenced less possessive behavior.

Marrying age was reported as being between 10 and 14 years. Divorce was unlikely as it was thought to result in retribution (murder) of one of the divorcee's immediate family. It was reported that in cases of a husband beating a woman, the woman should not retaliate to the extent that she would draw the blood of the husband because he would seek retribution (carried out by the husband's family) in the event of his eventual death resulting in her being killed. A woman was also not allowed to marry outside of her husband's clan if he died unless she had older children to help take care of her; this ensured she was supported by her husband's clan.

The majority of births occurred in the bush with the assistance of a trained and/or traditional birth attendant.

3.34.6 Youths

Wabo Youth Group was highly functional, led by an effective leader. The group was formed in 2015 to i) rehabilitate youths from marijuana consumption through sporting activities and other community service work and ii) to fundraise to support Wabo youths furthering their education in Goroka, Simbu, Hagen and Kerema.

Youths were vocal about the marijuana problem. They believed it was preventing them from securing jobs and contributing to many law and order issues.

Recreational activities included sport, relaxing, spending time with friends and craft activities (primarily making bilums).

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3.34.7 Subsistence

The primary staple food was sago, which was harvested from two types of sago palms (one with thorns and one without) that had been planted along the banks of the Purari River and associated creeks. Sago was supplemented by a range of garden food, primarily cooking banana, kaukau, two types of taro and cassava. A range of 'greens' (e.g. aibika and aupa), other crops (e.g. pumpkin, sweet corn, pitpit, eggplant, sugar cane, ginger, chillies, and peanuts) and fruits (e.g. papaya, and pineapples) were also grown. Coconuts, guava, okari nut, kumu mosong and to a lesser extent tulip were extensively planted. When food was in short supply due to flood or drought three types of wild yam were used as famine foods.

Extensive hunting was reported to occur in forests using dogs, bow and arrow and spears for wild pigs, cassowary, monitor lizards, bandicoots, megapodes, bush rats, cuscus, most bird species, flying fox and small bats. Various insect larvae were also harvested including sago grubs. Two species of spider that lived in burrows were also eaten.

Extensive fishing was reported to occur along the Purari River and associated creeks for tilapia, super tilapia, barramundi, catfish, mullet, black bass and microfish. A recently introduced fish was also eaten known as "*besta*". This species was thought to have escaped from fish farms in the highlands, travelling down the Purari River. Other aquatic resources included one species of shellfish that occurred in the small creeks, two species of prawn, two species of turtles, and one species of tortoise. Both turtle species laid eggs in sandy riverbanks that were harvested for food. Freshwater and saltwater crocodiles were also hunted and their eggs were collected for food.

3.34.8 Land and Natural Resource Use

Customary land was located along the east and west bank of the Purari River. Most of the land was hill forest that supported a diverse range of flora and fauna. The pattern of land use had changed since the 2014 flood that swept away mature sago and riverside gardens causing food shortages. To avoid potential famine from future floods gardens were increasingly made on the hills that were above potential river flood levels.

Unlike villages in the Purari delta no natural sago swamps occurred within the customary land near the village. Land resources were primarily hill forest that provided a greater diversity of forest resources than sago swamps, including a choice of tree species for house construction.

Sago was the main material used for house walls and for house thatch. A range of species were used for house posts, house bearers and studs. Black palms are split for flooring. Pitpit (a tall grass) was also used for fencing around residential areas, although not a common practice, it was brought in by outsiders especially from the highlands. A range of tree species were also used for making dugout canoes. Bamboo was also very important. At least two species were used as cooking pots. Food was placed inside the bamboo. A small diameter bamboo was used for cooking sago and a large diameter bamboo was used for cooking aibika, fish and meat.

The forests were used to harvest a wide range of timber and non-timber products including medicinal plants, most of which were essential for their livelihoods. The community had a particularly good knowledge of medicinal plants across all age groups. Despite abundant resources some were locally scarce because of overharvesting attributed to population increase.

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Drinking water was sourced from community water tanks and small creeks/springs when the tanks were dry. Bamboo was used to carry water from the springs but more recently discarded plastic bottles sourced from workers at Herd Base were used. In a severe dry season/drought drinking water was sourced from the Purari River and Wabo Creek.

The Purari River was also the primary transport route to visit riverside gardens and to harvest planted sago. Access to Wabo was also possible from the highlands by walking tacks from Goroka and other highland locations. It took approximately two weeks' to walk from Wabo to Goroka in Eastern Highlands and one week to Karamui in Simbu Province, but increasingly travel was undertaken by plane from Wabo Airstrip for those who were employed.

3.34.9 Health

A health centre was located across the river at Wabo Station but was not operating consistently at the time of SBS surveying. The nearest health centre was located at Kapuna.

Tuberculosis and malaria were believed to be the most common illnesses within the village. Injuries sustained from fighting and domestic violence cases were also common. It was reported that in most cases, people used traditional healing methods for illnesses or injuries or travelled to Wabo Health Centre for treatment (noting it was not operational at the time of the SBS survey). Serious cases that required further assistance were referred to Kapuna Health Centre.

Women attributed the main reason for their poor health to their workload especially making sago. They attributed poor health of children primarily to poor hygiene.

Only some women were aware of STDs and none were sure of the prevalence of STDs, transmission or treatment. Most women knew about family planning but only some used contraceptives.

3.34.10 Education

No education facilities existed at Wabo. Some students travelled daily to Ura Community School (across the Purari River) while others travelled to Goroka, Simbu, Hagen and Kerema.

3.34.11 Law and Order

The main law and order problem in the village was reported to be domestic violence, often caused by jealousy among couples, adultery and relationships between young couples. There was no village court therefore no action was taken for domestic violence cases. Serious cases were often solved by both fighting parties reaching a consensus; where serious injuries were sustained the matter was referred to the police at Wabo Station. Women feared reporting their husbands believing this could lead to retaliation by the husband and his relatives. Alcohol and marijuana consumption were reported to be high especially among young men and a few women. Some men who travel to Port Moresby and other main centres were believed to engage in promiscuous activities.

Women were often afraid of men as it was a customary practice for women to only stay at home if not out making gardens, or other chores that required her outdoors. A woman often required permission from her husband prior to leaving the house. Disregard for this was reported to lead to

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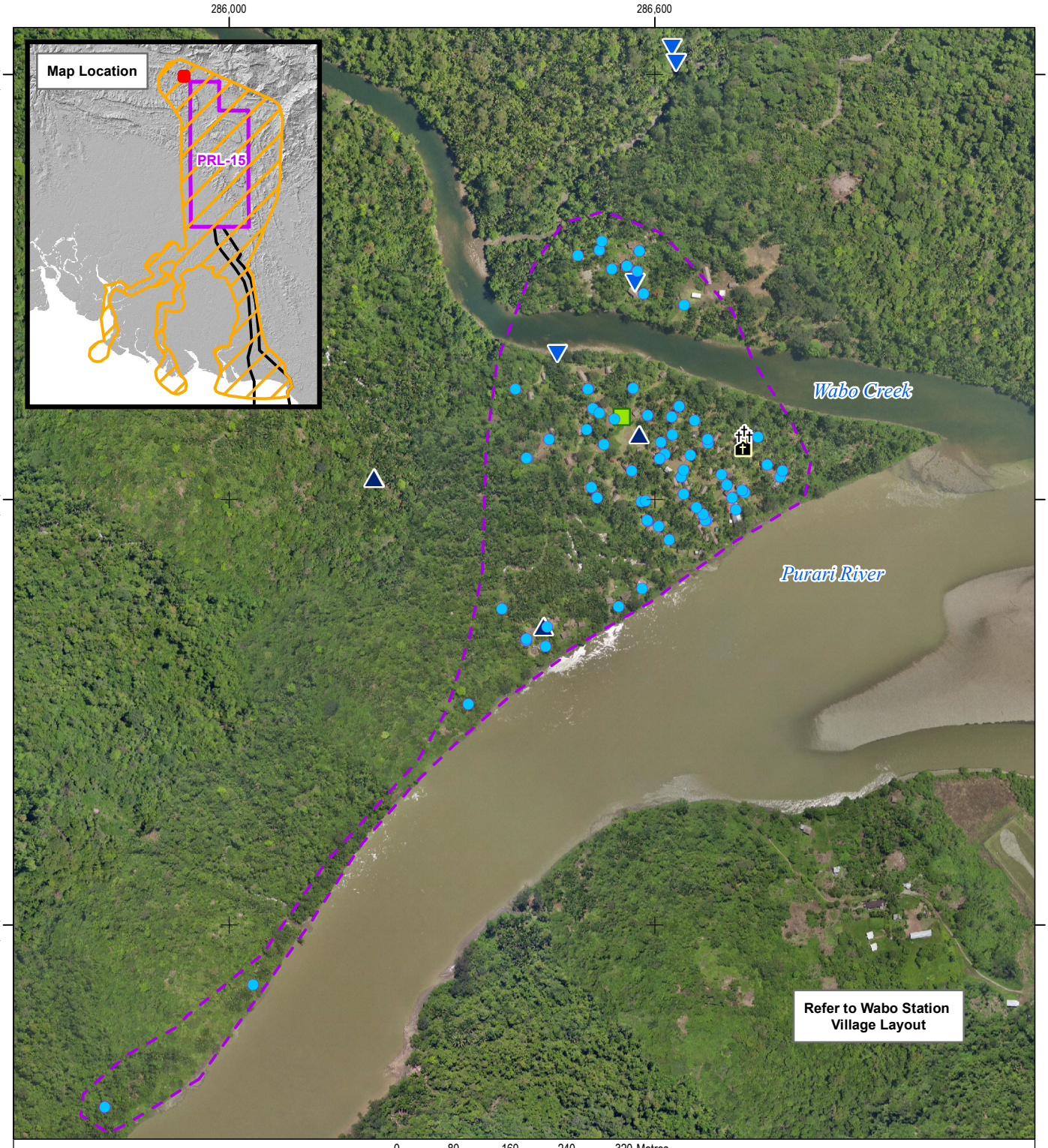
domestic violence. This practice was reported to have slightly decreased due to outside influences.

3.34.12 Cultural Heritage

Wabo clans had detailed knowledge of their ancestral past, however, these oral traditions were confidential and were not recorded. Oral traditions recalling ancestral migrations were passed from father to son and men also explained oral traditions to their wives so that they could educate their sons if their fathers died. One tangible cultural heritage site was recorded at Wabo. It was a spirit site in the form of a tunnel that ran for about 90 m along the bottom Eé Creek. The site was called *Sasmeia* and was occupied by a spirit called *Intou* who took the form of a man or a snake. It was reportedly dangerous for children or mothers with babies to paddle their canoes near *Sasmeia* and for those reason children only paddled their canoes near the banks of the creek and did not cross the creek in the area of *Sasmeia*. Wabo villagers maintained intangible cultural heritage values that were used in their day-to-day subsistence activities. Elders explained that there had been talk of development in the Wabo area for the past 40 years but nothing had happened. Throughout that time intangible cultural values such as knowledge about making tools for processing sago and knowledge about hunting techniques had been essential to maintaining food security.

Traditional dances and songs were not commonly performed anymore as older women had died without passing on such knowledge. Taboos relating to food and drinks applied to women who gave birth and women who experienced menstruation. Women who gave birth lived at ground level and were forbidden to cook for the family. Women who experience menstruation did not sleep downstairs but still refrained from cooking.

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SCALE: 1:8,000 @ A4

0 80 160 240 320 Metres

COORDINATE SYSTEM: PNG94 PNGMG94 Zone 55

- Households
- Burial sites/cemetery
- Church
- Sporting field
- Water source (drinking)
- Water source (washing)
- Extent of dwellings
- Direct project area of influence
- PRL-15
- Export pipeline corridor

N

Current household and infrastructure points may not align with the older imagery shown on this figure.

TITLE: Wabo Village Layout

FIGURE: 3.34

PROJECT: Papua LNG Project

DOCUMENT NUMBER: R_082-77476 **REVISION:** E

DATE: 20/12/2016

DATA SOURCES:
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Plates 3.34 – Wabo Gallery



Photo 1 – Young people on the bank of the Purari River at Wabo



Photo 2 – Wabo men carry a log from the river to the village



Photo 3 – Stone axe heads on display at Wabo



Photo 4 – Wabo elder demonstrating stone axe



Photo 5 – Wabo elder demonstrating traditional fire making



Photo 6 – *Sasmeia* river spirit site