

ORO BRIDGES RECONSTRUCTION PROJECT



EVALUATION STUDY

Institute of National Affairs

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ACRONYMS

ADB	Asian Development Bank
BSP	Bank South Pacific
CPO	Crude Palm Oil
DoW	Department of Works
FFB	Fresh Fruit Bunches
GoA	Government of Australia
GoPNG	Government of Papua New Guinea
HIES	Household Income and Expenditure Survey
INA	Institute of National Affairs
INGO	International Non-Government Organisation
KTA	Kokoda Track Authority
LLG	Local Level Government
MDG	Millennium Development Goal
MP	Member of Parliament
NARI	National Agricultural Research Institute
NASFUND	National Superannuation Fund Ltd
NSO	National Statistical Office
NGO	Non-Government Organisation
OBRP	Oro Bridges Reconstruction Project
PKO	Palm Kernel Oil
PNG	Papua New Guinea
PMSC	Project Management and Supervision Consultant
PMV	Public Motor Vehicles
REAM	Rapid Evaluation Appraisal Method
SMEC	Snowy Mountain Engineering Corporation
TSSP	Transport Sector Support Program

EXECUTIVE SUMMARY

Tropical Cyclone Guba struck Oro Province on 12–16 November 2007. The impact was devastating for the community. From that time on, communities struggled to survive. Government services and support systems were disrupted and fragmented.

The Oro Bridges Reconstruction Project replaced bridges at Eroro, Girua, Ambogo and Kumusi rivers, including approach roads which vary from 100m to 44m depending on the bridge site. The new bridges were designed to withstand floods of greater magnitude to the flooding which followed Guba. In addition, two smaller bridges were installed at the Martyrs Wet Crossing and the Auga Wet Crossing, located between Popondetta town and Kumusi Bridge. The total project cost was PGK 141.9 million inclusive of supervision costs. Construction started in December 2013 and all bridges were fully operational by November 2016.

Seventy-nine per cent (77,092 males and 70,574 females) of the total population of Oro live in the five Local Level Government (LLG) areas: Oro Bay LLG, Afore Rural, Popondetta Urban LLG, Higaturu Rural LLG, and Kokoda LLG directly affected by the reconstruction of the bridges

The four bridges, and connecting roads, link the provincial capital, Popondetta, to the key transport infrastructure services in the province: the main sea port at Oro Bay; the airport at Girua; and the airstrip at Kokoda station.

The road corridor also serves as the main artery for the transport of palm oil, which is the dominant agricultural product in the province.

The timing of the evaluation study was conducted relatively early in relation to the opening of the bridges: just one year after project completion.

The evaluation study seeks to assess the outcomes and impacts that have occurred from the project in transport, agriculture, tourism, local economy, government services, NGOs and communities. Fifteen focus groups involving 152 people, of which 42% were female, were conducted; key informant interviews held with the private, government and non-government sectors; and formal surveys conducted with citizen's income levels, Public Motor Vehicles (PMVs) operators, business and trade store owners, government and non-government organisations.

There are many factors affecting economic and social activity in Oro Province such as seasonal variations in agriculture; international commodity prices; landowner issues; and general social and economic conditions prevailing in the wider PNG economy at any time.

The study is conscious of this and careful not to claim direct attribution for improved social and economic conditions resulting from the reconstruction of the four bridges. The study has collected data which suggest that the reconstructed bridges have contributed to the recovery of the province including measures which have achieved or exceeded pre-Cyclone Guba levels such as:

- increased activity by transport service providers - the number of PMVs increased by 56% between 2008 and 2017;
- increased palm oil exports from the Oro Bay Port - palm oil exports almost doubled between 2005 and 2016 and represented 95.9% of total shipments from the Oro Bay Port in 2016;
- Crude palm oil and palm kernel oil increased by 21.4% from 2005 to 2016;
- stronger local economic activity - access to larger markets, and on a regular basis, enabled subsistence farmers to sell more produce and increase disposable income;
- the number of loans by the Bank of South Pacific to SMEs increased from 7 in 2016 to 161 in 2017;
- increased school enrolments at all levels of education;
- increased trekking numbers; and
- improved NGO and financial service sector access to remote villages.

Business activity has increased since the bridges were opened. Government and the private sector can meet easily and plan with confidence and deliver goods and services, including transportation of people safely, and on time. There have been increases in the use of financial services, and the volume of cargo being shipped into and out of the province. There has been an increase in informal business activities by farmers, roadside markets, selected small businesses, and diversification of income generation activities by palm oil small block holders.

Interviews with community focus groups, key informants, businesses and government representatives indicated positive emerging impacts for beneficiaries. These include improved transportation services such as more PMVs, shorter travel time between destinations, more frequent trips to markets and town, improved access to health facilities. Government operations in the sectors of law and justice, health, and transport services such as port and airport services, are combining to provide an enabling environment for further government outreach and for a conducive business environment in the province.

Villagers bring garden produce and cash crops into town markets (coffee and cocoa) and harvest their palm oil for pickup by the New Britain Palm Oil Limited-Higaturu (NBPOL), and in return are increasing income. Many services have returned to pre-cyclone times with reliable roads and bridges now fully operational.

Women are experiencing greater mobility, and able to access services better than when the bridges were down. Women, along with men, are diversifying their income generating activities to earn more income. Women are taking up jobs and roles that were traditionally male dominated occupations such as police officers and transport operators. Women in Oro Province are increasingly empowered.

Improved access to markets, to information, to financial services, and agricultural inputs, is leading to increased sales and income. A key indicator of poverty is access to health and education facilities. Average outpatient visits per person declined after the cyclone and improved as bridge construction commenced. Education statistics reveal significant increases of 60-70% for males and females in school enrolments at all levels of education from 2006 to 2016. Government policies have contributed mostly to the increases, while the bridges have contributed to safer travel for young children and greater confidence of parents to send children to school.

The study considered the global impact of the reconstruction on poverty in the province. Eleven poverty dimensions: employment, land, technology, information, credit, education, health services, water, energy, markets, and transport are key to achieving sustainable livelihoods. The majority of focus group respondents indicated that access to education, health and employment had improved as an outcome of the reconstructed bridges.

The sustainability of the investment is vital and there is political will at the provincial level to allocate funds to maintain the bridges. Issues to do with road safety, increased speed, and the role of the Police in awareness and enforcement are included in a number of lessons learned from this major development activity. There is a common understanding in the province that developmental gains would not have occurred as quickly or at such depth had it not been for the reconstruction of the bridges.

INTRODUCTION

The Australian aid program aims to promote Australia's national interests by contributing to sustainable economic growth and poverty reduction. Australian aid works to maximise impact by being innovative and leveraging knowledge and finance in private sector development, and human development. Infrastructure investment is 'a key plank of the Government's commitment to scale-up the aid for trade portfolio' (DFAT 2014).

The Transport Sector Support Program (TSSP) has focused on Government of PNG (GoPNG) agencies to deliver on commitments outlined in the Aid Partnership Arrangement between the two countries; the national priorities established in the GoPNG Medium Term Transport Plan 2014-2018 (MTTP); and the National Transport Strategy (NTS). TSSP is an Australian aid project funded by the Government of Australia (GoA), with the goal of 'A safer, more reliable transport network enabling economic and social development in Papua New Guinea'.

Tropical Cyclone Guba struck Papua New Guinea from 12-16 November 2007, bringing torrential rains and high tides which caused severe flooding in Oro and Milne Bay provinces in the east of the country. The flooding that occurred in the Oro Province caused widespread damage to many bridges and other facilities. Four key bridges were destroyed:

- Eroro River Bridge in Ijivitari District;
- Girua River Bridge in Ijivitari District;
- Ambogo River Bridge in Sohe District; and
- Kumusi River Bridge in Sohe District.

GoPNG reported that 145,000 people in Sohe and Ijivitari districts and Popondetta Town in Oro Province were directly affected by the Cyclone and the provincial Police reported 164 casualties and some 13,000 people were displaced.

The Government of Australia responded quickly with humanitarian and relief assistance as well as funding a temporary Bailey Bridge at the Kumusi River.

Several non-government organisations such as Oro PMV Association; the Oro Oil Palm Growers Association and other community leaders (Box 1) petitioned the authorities to build a stronger, permanent set of bridges. The Snowy Mountains Engineering Corporation (SMEC) was commissioned to carry out survey, investigation and design for the four bridges in 2010. In February 2012, it was

announced that AusAID would fund the Oro Bridges Reconstruction Project. GoPNG, through the Department of Works (DoW), was responsible for the implementation of the project with involvement by the Oro Provincial Government in dealing with landowner issues in the project impact areas.

The contract for the construction of Oro Bridges was awarded to Canstruct Construction Solutions Ltd by the PNG Department of Works in October 2013, and work commenced in December 2013. Cardno (PNG) Limited was awarded the Project Management and Supervision Consultancy (PMSC) which provided management and supervision services to assist DoW with supervision of the construction of the bridges.

The project replaced the four bridges, including approach roads which vary from 100m to 44m depending on the bridge site. The designs of the new bridges were based upon an 80 km/hr speed

Box 1: Stakeholder Determination

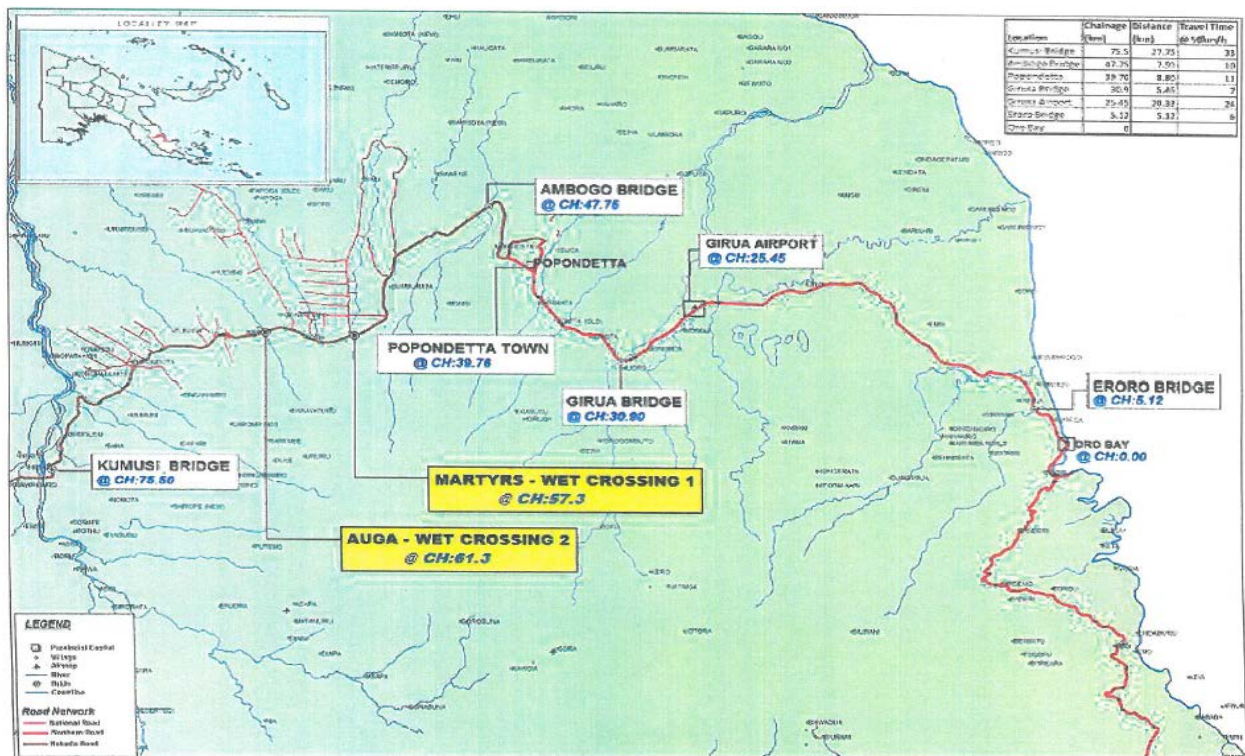
The Governor of Oro Province played a supportive role in facilitating the GoPNG approvals and project start-up. "We didn't put any money in it; what we did was to ensure that what was a gift from the people of Australian people, was delivered. In 2012 when I took office, I had to find out why the bridges hadn't still been built. We went through the process of walking it through the various government departments. The government departments were very helpful. Works Department, Central Supplies and Tenders Board, Prime Minister's Office and NEC, Lands, everybody knew that something needed to be done. I was determined, and we made it happen."

(Interview Oro Governor, Hon Gary Juffa)

environment. All the bridges have been designed for T44 truck loading with provision of T60 over loading as per Department of Works design requirements. The bridge carriage widths are 7.5m with two lanes and 0.5m shoulders on both sides. A 1.2m footpath was provided for pedestrian use, which improves pedestrian road safety and provides accessibility for people with disability. The new bridges were designed to withstand floods of greater magnitude to the flooding which followed Guba and with a 100-year life span.

In 2014, alternate river crossings funded by GoA were put in place in the form of temporary Bailey Bridges to facilitate traffic flow while the permanent bridges were under construction. The total value for the reconstruction of the bridges was PGK141.9 million inclusive of supervision costs. The project was completed by DoW and TSSP on time and under budget. Two additional Bailey Bridges, outside of the contract, were constructed for two additional wet crossings along the Kokoda Highway at Matrys and Auga at no cost. There is now only one small wet crossing between Kumusi and Kokoda. Eroro, Girua and Ambogo bridges were formally opened on 18 July 2016 and Kumusi bridge was opened on 23 November 2016.

Diagram 1: Map of Oro Province and Location of the Reconstructed Bridges



The users of the reconstructed bridges include the travelling public, government, private companies, and non-government organisations and community residents. The four bridges, and connecting roads, link the provincial capital, Popondetta, to the key transport infrastructure services in the province; the main sea port at Oro Bay, the airport at Girua, as well as the airstrip at Kokoda station. The design document identified the following benefits from the project:

- Reduce the transportation time;
- Decrease the transportation cost;
- Diverse mode of transportation (e.g. Pedestrian, Car, PMV and Truck);
- Secure and stable traffic condition;
- Provide a safe and permanent river crossing;
- Remove the obstacles for emergency activities;
- Improve the transportation of goods; and
- Develop the local community.

The government, businesses, non-government organisations and citizens were highly appreciative of the reconstructed bridges. The people of Oro Province expressed deep gratitude and felt that they had been brought out from despair by the two governments.

The project was completed at a time when there was a weakening of the PNG Kina against other international currencies, notably the American and Australian dollar, which were contributing to high domestic prices of imported goods and services. Investments became more expensive and private investors were not starting new projects or expanding operations. Employment was declining, and growth in the non-resource sector was contracting. GoPNG spending had been severely reduced, and there were few funds available for maintenance of transport infrastructure assets. Social expenditure on health and education services was cut and there were shortages of medicine, with some health facilities closed. Service delivery in Oro Province was also affected. However, with the opening of the reconstructed bridges, this encouraged GoPNG, NGOs and businesses to increase efforts to outreach to the people of Oro.

Population

Oro Province has a recorded population of 186,309 (97,188 males and 89,121 females) in the 2011 National Census. The province has an inter-census population growth rate of 3% compared to the overall PNG figure of 3.1% per annum.

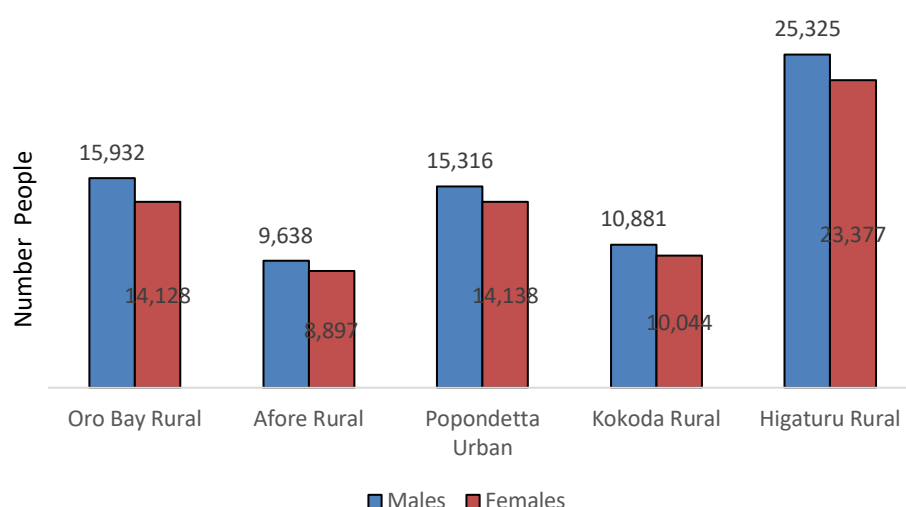
Seventy-nine per cent (77,092 males and 70,574 females) of the total population of Oro live in the five Local Level Government (LLG) areas: Oro Bay LLG, Afore Rural, Popondetta Urban LLG, Kokoda LLG, and Higaturu Rural LLG directly affected by the reconstruction of the bridges.

Box 2: Psychology of Aid

The psychology of the people itself was affected too. When the bridges were not there, the longer the bridges were not built, the people developed a sense of despair that they were forgotten, they were not cared for, so the bridges being there, was a sense of relief that they had people that actually cared for them. And they saw the people that cared for them as being not just our government, but also the Australian Government. We went to the opening, we saw this as a partnership, the people of Australia, this is their gift, and it is tax payers' money. It is in recognition of the sacrifices that we made during World War Two. It developed that really warm sense of camaraderie and of good feeling that there was that partnership there.

(Interview Oro Governor, Hon Gary Juffa)

Figure 1: Local Level Government Areas Directly Impacted by the Bridge Reconstruction



EVALUATION DESIGN

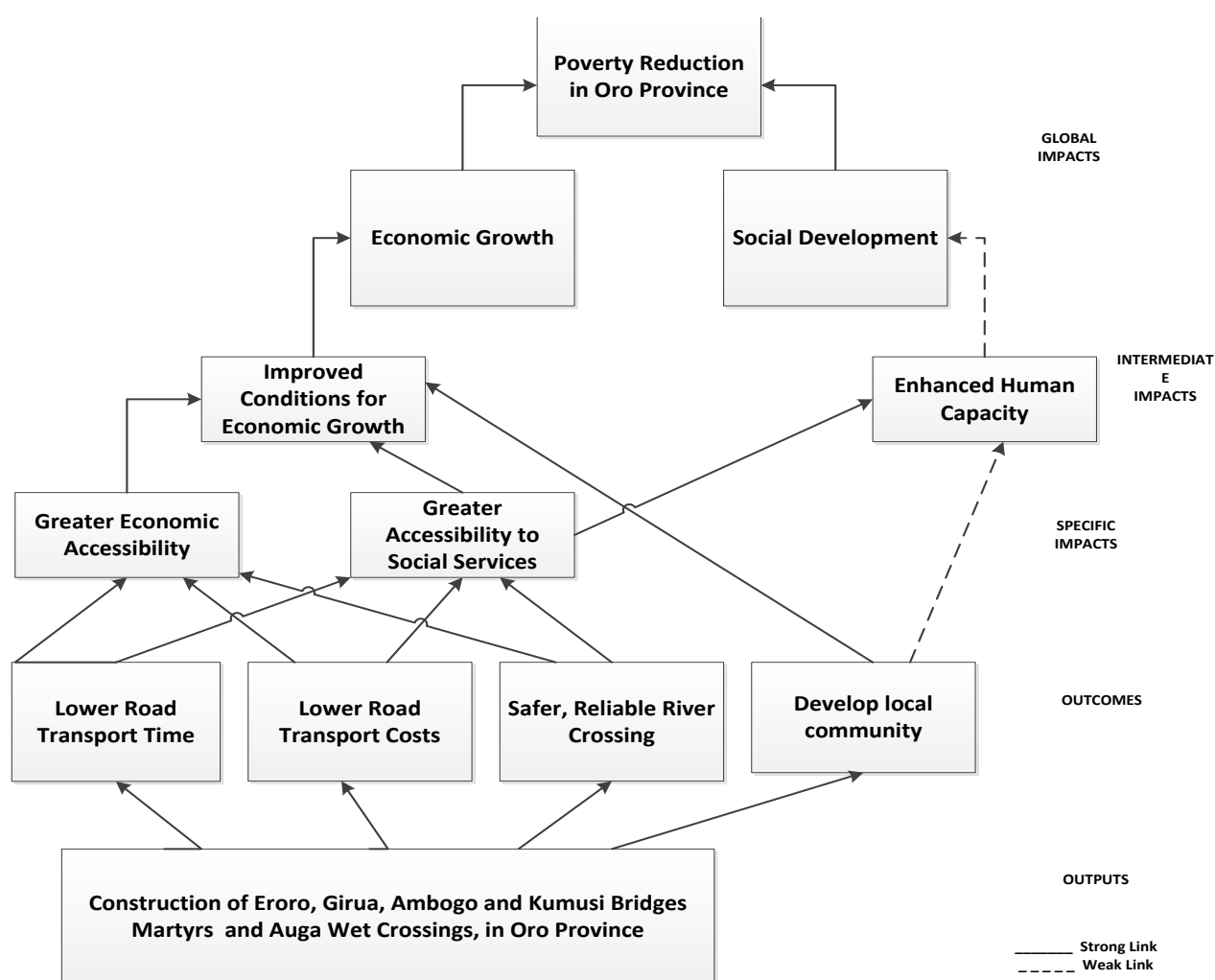
The purpose of the study is to understand and assess positive and negative impacts of the Oro Bridges Reconstruction Project (OBRP) on the local economy; private sector; local communities and citizens; and government and non-government organisations. The Terms of Reference for the study are attached (Annex 1).

The study team was also interested in the extent to which the project may have contributed to overarching goals of poverty reduction, economic growth and social development for men and women in Oro Province.

Intervention Logic

A 'Bridge/Road Intervention Logic' was developed to identify the links between the project outputs, its outcomes and specific and intermediate impacts, leading to the achievement of the high-level global impact of poverty reduction. Diagram 2 illustrates the relationship between the intervention and the intended impacts.

Diagram 2: Bridge/Road Intervention Logic for Oro Bridges Reconstruction Project



This impact study does not assess the efficiency or effectiveness of the inputs and outputs of the OBRP nor the quality of construction. The focus is on measuring the outcomes and impact of the project.

Key Questions

The study is guided by the major evaluation question:

What outcomes and impacts have occurred from the project in transport, agriculture, tourism, local economy, government services, NGOs and communities?

Subsidiary evaluation questions are considered in the report such as:

- Were there any unintended effects of the project?
- Was the project worth the resources it cost?
- What would have happened without the project taking place?
- Are there issues likely to affect maintenance of the bridges and the sustainability of the project?
- What lessons have been learned from the project and the evaluation?

Wherever possible data were disaggregated by sex and location. Annex 2 provides the full list of evaluation questions.

Methodology

Data in this report were collected by the evaluation team over the following six time periods.

Diagram 3: Data Collection Timeline



The study team found most difficulty in gathering official data for the pre-cyclone period such as reliable baseline data about road use, travel times, passenger and cargo volumes and road safety data because of the:

- paucity of pre-cyclone research studies containing relevant data;
- DoW had not collected road user or road condition data prior to Cyclone Guba; and
- whatever data may have been held by Oro Provincial Authorities such as Police data regarding safety and road incidents was either lost or badly damaged during the cyclone and had been discarded.

Rapid Appraisal

A Rapid Evaluation Appraisal Method (Kumar, K. Rapid Appraisal Methods 1993) using a mixed methods approach directed the study. The fieldwork was conducted during two and a half weeks in Oro Province, 28 September – 14 October 2017. The following methods were used in relation to data:

- Document study (Annex 3 lists the documents consulted);
- Key informant interviews (Annex 4 lists the key informants);
- Focus group discussions in villages adjacent to the bridges (Annex 5); and
- Formal and informal surveys including income, PMV operators, business and trade store owners, government and non-government organisations (Annex 6).

Focus Groups

The focus group sessions with villages located close to the bridges were key data sources for the evaluation.

A focus group discussion guide was used to gather views from groups of men and women in selected community sites (Annex 5). The questions were framed around access to essential services, frequency of trips to these services, PMV fares, extension services, and whether the community had

improved in any of the dimensions of poverty or livelihood assets (employment, land, technology, information, credit, education, health services, water, energy, markets, and transport) key to achieving sustainable livelihoods.

Figure 2 indicates that fifteen focus groups were conducted by the evaluation team in five different locations. The focus groups were deliberately divided by the evaluation team on the basis of sex with nine male focus groups and six female focus groups conducted.

Figure 2: Number of Focus Groups by Sex

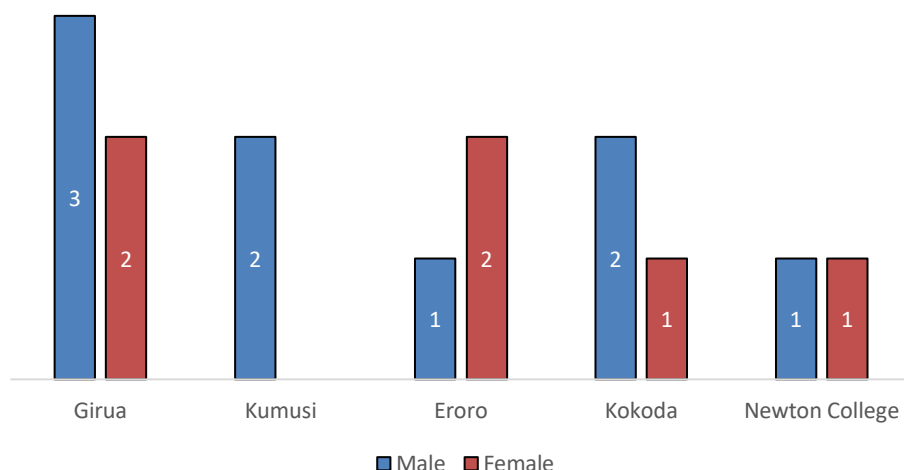
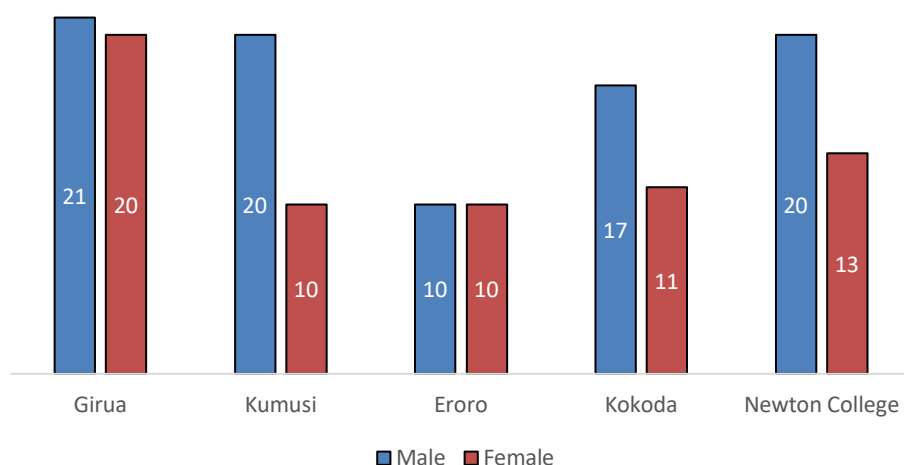


Figure 3 shows the number of participants by sex in each of the focus groups. The total number of participants was 152 of which 88 (58%) were males and 64 (42%) were females.

Figure 3: Number of Participants in Focus Groups



Surveys

Three formal surveys were used in the study: income survey; PMV operators survey; and trade store owners survey.

Individuals and organisations were not willing to share information relating to the monetary impacts of direct kina flowing to local stores; business productivity; and the value of commodity sales.

Key informant interviews were held with representatives from the private sector, government and NGOs

Informal surveys of road users were conducted at bus stops or in markets on an ad hoc basis to broaden the range of responses gathered in focus groups and through formal one-on-one interviews

Data Entry and Analysis

The post-field phase consisted of formalising the interview notes and entering both quantitative and qualitative information into Excel spread-sheets using predesigned formats and codes.

The notes from interviews with key informant interviews were referred to separately during the analysis and writing phases. Secondary data provided by NBPOL, the PNG Ports Corporation, Bank South Pacific, Department of Health, Provincial Division of Education, and Kokoda Track Authority were extremely useful to the study.

There were confidentiality issues surrounding the sensitivity of information disclosed thus informed consent was required especially by enumerator on restrictions to disclose information provided. As written consent was problematic for people and was disruptive to the flow of an interview. The team decided that only verbal consent would be obtained before data were collected.

An analysis of each of the research questions was conducted using both quantitative and qualitative information.

FINDINGS

The timing of the evaluation study was conducted relatively early in relation to the opening of the bridges: just one year after project completion.

There are many factors affecting economic and social activity in Oro Province such as seasonal variations in agriculture; international commodity prices; landowner issues; and general social and economic conditions prevailing in the wider PNG economy at any time.

The study is conscious of this and has avoided direct attribution to improved social and economic conditions from the reconstruction of the four bridges.

Benefits were being generated in the economy and communities as the bridges were being constructed and from when they became fully operational in 2016.

The study has collected data which suggest that the reconstructed bridges have contributed to the recovery of the province on measures which have achieved or exceeded pre-Cyclone Guba levels such as increased palm oil exports from the Oro Bay port; stronger local economic activity; increased school enrolments; increased trekker numbers; and improved NGO access to remote villages.

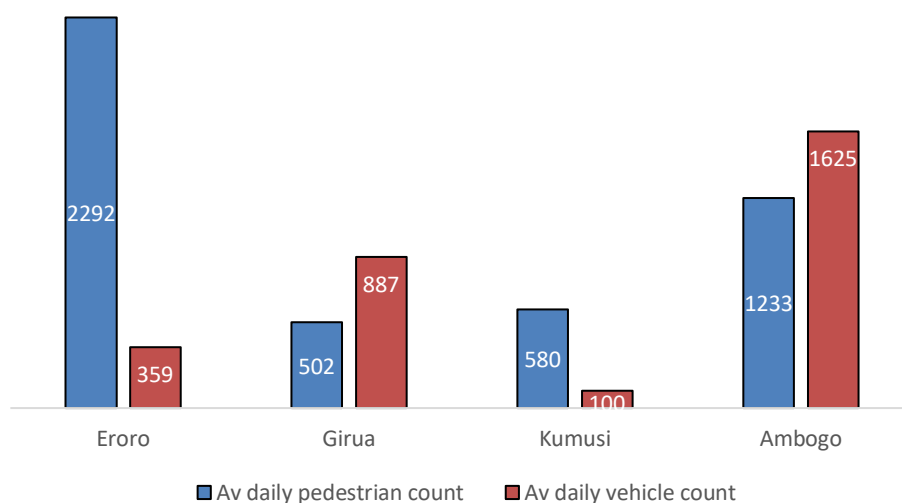
Conditions prior to Cyclone Guba

It was difficult for the evaluation team to establish baseline data prior to Cyclone Guba because many provincial administration records were damaged, lost during the cyclone or never existed.

The report has collected available data from 2005 for of the report which provide a better understanding of conditions in Oro prior to Cyclone Guba.

For example, reliable traffic count data for the four bridges prior to 2016 was unavailable, but data were collected in November 2016 by DoW and TSSP after the completion of the bridges and indicated in Figure 4.

Figure 4: Traffic Count Data for Oro Bridges 2016



The percentage of heavy vehicle use in the daily traffic count was Eroro (53%), Girua (51%), Kumusi (53%) and Ambogo (56%).

Conditions prior to reconstruction 2008-2013

Tropical Cyclone Guba struck Oro Province in November 2007. The impact of the cyclone was devastating for the community. The United Nations Office for the Coordination of Humanitarian Affairs in Papua New Guinea in Cyclone Guba Situation Report No 2 (26 November 2007) indicated houses in some villages were washed away, as well as crops and livestock.

From 2008 to 2013, communities struggled to live. Government services and support systems were disrupted and fragmented. Oro Province was virtually cut off, with most access possible only by air or sea. The provincial capital, Popondetta, with a population of 20,000, had no functioning source of potable water, after treatment plants and tanks were severely damaged. Numerous roads and bridges were made impassable by landslides or washed away by floodwater, including the road to the main airport at Girua.

A State of Emergency declared by GoPNG on 19 November 2007 and GoPNG formally requested assistance of NGOs and diplomatic missions in-country. The government released PGK 50 million (18.5 million USD) to assist affected communities, and 2.6 million USD made available directly to the Papua New Guinea National Disaster Centre. International aid was provided including the setting up of several care centres around the province.

Conditions in Oro from 2014-2016

This section reports on findings of the study from 2014 to 2016.

- Communities
- Private sector
- Agriculture
- Local economic activity
- Tourism
- Government sector
- Non-government sector
- Global impacts

COMMUNITIES

Participants in the focus groups commented on the harsh conditions immediately following the cyclone. The following examples were commonly expressed by all focus groups:

“No vehicle crossings were possible thus all crossing done on inflated tubes, pedestrians, cargo and pretty much anything else that needed to be brought from one side to the other was done on inflated tubes, accidents often happened resulting in loss of life and cargo. Bridge at Girua was tilted and dangerously hanging with people still using to cross.”

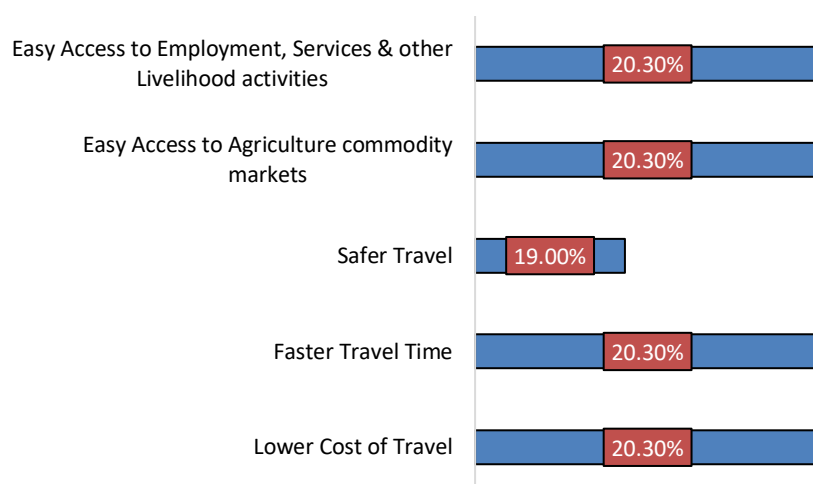
“Floods and rising water entered boarding school dormitory forcing students to disrupt classes. Sheer sight of flooding rising water into areas was terrifying and, crossing was only done by men; children and women, disabilities, and sick people could not cross unassisted by men.”

These comments contrast greatly with those from participants following the reconstruction of the bridges. The following three comments were typical responses from focus group participants.

1. *PMV departure time has changed a lot. In the past PMVs typically depart for town at 1am in the morning. Now they depart at 3am in the mornings.*
2. *The new bridges have made it easier for people to travel to town and back.*
3. *The safety level of travelling to town has improved. People feel safer to travel to town using the new bridge. The safety of goods (cargoes) have improve. People now bring home more dry and undamaged goods.”*

The focus group participants almost all mentioned the benefits of lower cost, faster travel, safer travel, easy for their agriculture commodity, and easy access to work, services and supporting their livelihoods. Figure 5 quantifies the five major themes that the focus group participants provided about their positive experiences with the reconstructed bridges.

Figure 5: Focus Group Responses to Reconstructed Bridges



Easier access to employment and markets

All focus group participants confirmed that they now had easy access to their place of employment, services, and other livelihood activities.

“It was hard for us, vehicles were not going and coming; We struggled to go to the market, we brought the cargo to the road, then we transported the cargo across the river, it is then transported by another vehicle across the river; Now the bridge is steady; When we plan to travel by road, we make it at the designated time; We put into action, this action is for school fees. We know that the bridge will stand strong for a long time; It is strong enough to withstand anything.”

Safer travel

A husband and wife team of transport operators from Girua reported that there was better safety now. All pedestrians use the footpath on the bridge and cars on the bridge road, unlike before. They said that *“there were more travellers, especially women and children; due to safe passage.”*

Faster travel time

All focus group participants confirmed that their travel times were substantially reduced resulting from the reconstructed bridges: *“Without bridges, found it very difficult to meet their everyday needs. Kokoda villagers had to cross about 13 times, before they got to area accessible by vehicles. Often sleeping on the road due to flooded rivers but now it’s just straight trip from village to town and back.”*

“The new bridge has saved us a lot of time to do other things. Before its construction, we used to spend a lot of time transporting and helping people with their cargoes cross the river.”

Lower cost of travel

The Independent Consumer Competition Commission published its approved PMV and taxi fares using a new pricing arrangement in 2014. The approved rural PMV fares for Oro Province were listed for each route based on a set formula. From Popodetta town, the majority of the population were to pay on average around K8.35 one way, the highest fare was K12.80 to Kokoda Station, and the lowest was K0.30 to Orosambo Yard. PMV operators appeared to set their own fares up until the bridges were fully operational and the ICCC fares were enforced. Additional charges were made for cargo, usually K1 or K2 per bag.

An immediate outcome of having the bridges in place according to participants in focus groups, was the reduction in PMV fares, and a higher number of PMVs servicing the routes.

“Many vehicles stopped operating due to faulty problems arising from rivers however with bridge repaired, there are more PMVs on road with lower fares.”

A transport operator explained that when the bridge at Girua was completed, he and his wife bought a new vehicle. *“Bridge completed we bought vehicle. Town to Ajora is K5.00 and Ajora to Oro Bay is K2 plus cargo is K10.00 and Oro Bay is K10.00, total K27.00 one way. But now one way is K10.00.”*

Income and increased competition

While there clearly had been a reduction in transport costs when travelling by PMV to and from villages to town, this had not translated into lower prices for store goods sold in some of the local communities, especially those furthest from Popondetta. At Kokoda, for example, the price for one kilogram of rice remained at K10.00 as it was before the bridges were opened. Similarly, one can of Coke remained at K7.00. An explanation for this was that with increased competition, the volume of sales declined, and prices were maintained to cover the lower sales.

However, for communities closer to town, like Newton College, the price of store goods went down when the cost of transportation decreased.

“...due to competition servicing shops in remote areas thus reducing cost of goods and services accessible to the population. For example, 1kg sugar price went as high as K20 when there was no bridges and road. (Younger males, Newton College)

However not all businesses appreciated the new bridges as people became more mobile and sought value for money from their purchases.

After the bridge was built now there are a lot of businesses running and there is more competition as well as the there are many more foreign stores and they get all the customers and I am not making plenty of money now. Before I use to make more than K100 a day, now I only make more than K30 only which is not good.” (Older male, Trade store owner, Papaki village).

Increased competition and high cost of living has led to people and households to engage in managing multiple income generating activities. A total of nine people completed the income survey form as part of the evaluation study. Their responses indicated that the most common source of income for people was the sale of garden produce at the market, followed by sale of betel nut, cocoa, palm oil from mini-estates, selling cooked food, tobacco sales, running a canteen or trade store, and receiving money from wantoks living elsewhere. These were also activities that generated high income levels of over K2,000 per month for 17 per cent of the respondents.

Figure 6 provides information on the monthly income of respondents at the time of the study. These data are not intended to demonstrate a direct improvement in income as a result of the reconstructed bridges. It provides background data on the range of incomes and the propensity of people to add to their income through multiple small-scale activities and to take advantage of an improved road network in Oro Province in 2017.

Figure 6: Household Monthly Income Levels by Number of Respondents and Amount

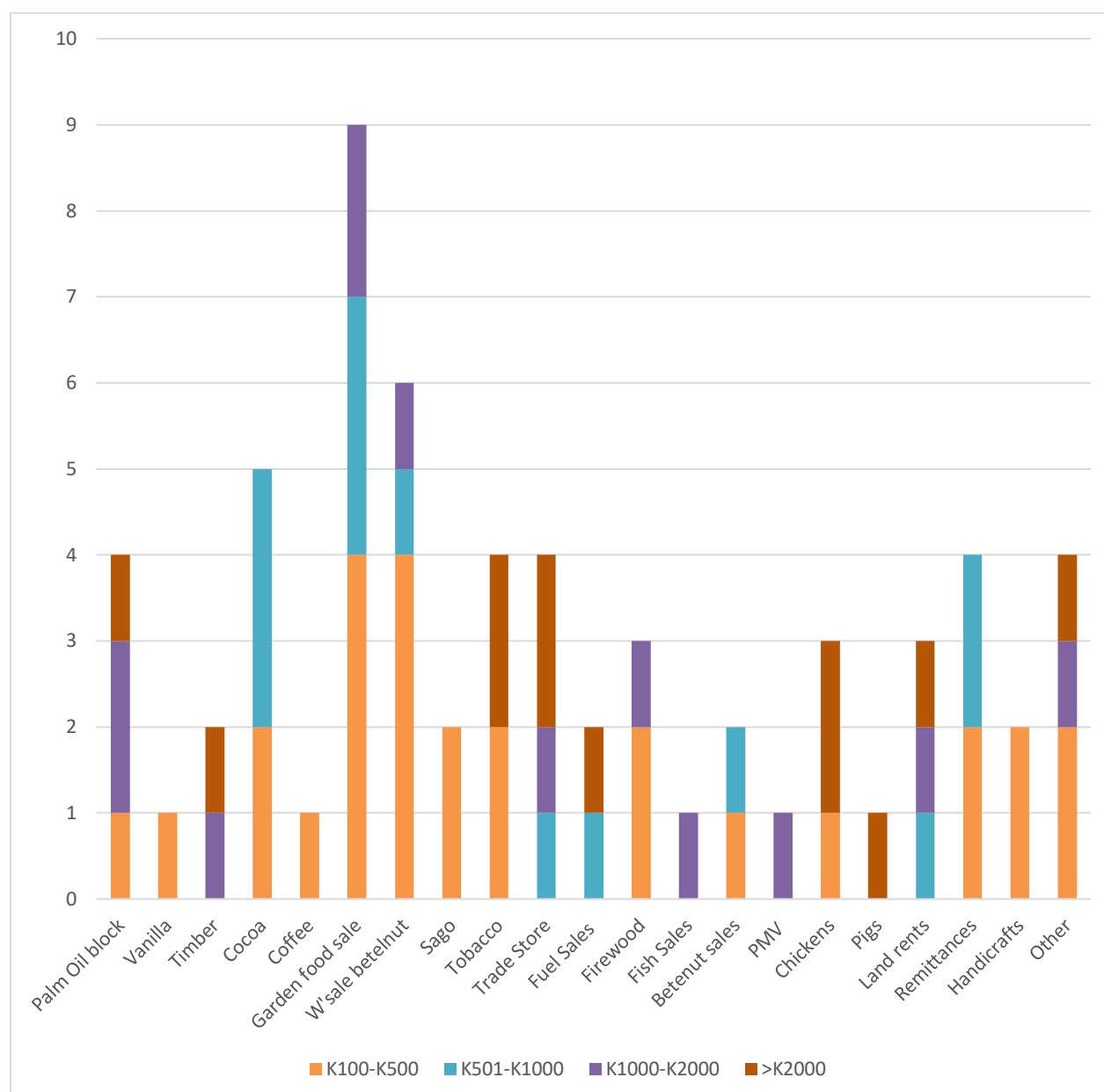
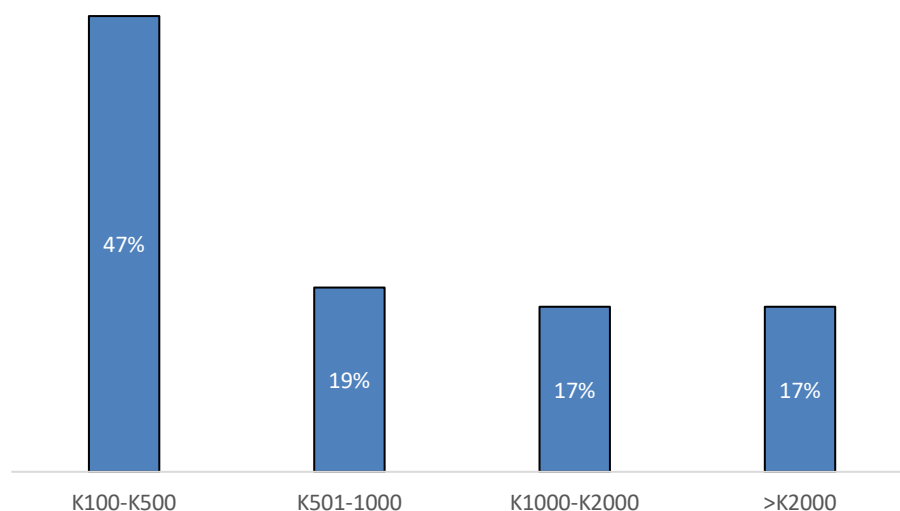


Figure 7 indicates the percentage of respondents by income level. The majority of income survey form respondents (47%) earned between PGK 100 and PGK 500 per month and 17% earned in excess of PGK 2,000 per month.

Figure 7: Respondent Monthly Income Levels as a Percentage



On average, this group were earning PGK 1,065 per month. The average income level for the respondents is calculated to be USD \$9 per day, which is above the World Bank poverty line of USD\$1.90 per capita per day for extreme poverty. PNG however, is ranked as a lower to middle income country by UNDP with a gross national per capita income of USD \$2,386. The poverty line for middle income countries is USD \$4.00 per day per person.

The survey data suggests that those who reside along the highways in Oro, and able to access markets in town, have avoided extreme poverty. Most of the focus group respondents agreed that their income level had increased since the bridges were built. Local people sell their garden produce at various sites including nearby markets and town markets, as well as road side markets, and selling more than once a week (see Figure 9).

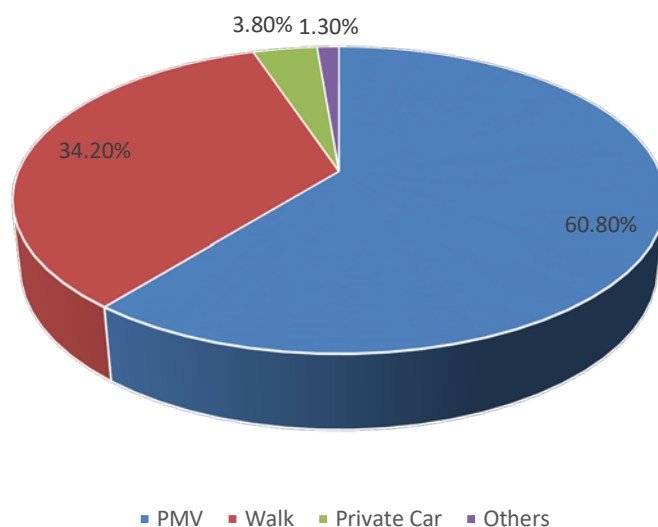
Formal employment opportunities

The reconstruction of the bridges employed some 200 community members in a range of skilled and unskilled jobs that maximised social and economic benefits for local communities from the investment. It was difficult to get data from progress reports on local employment beyond raw numbers of people employed. Focus group participants mentioned that their spouse or son had been employed during the construction phase. The Department of Works was asked for information but advised that the project officer involved had moved on and records were unavailable.

Modes of travel and frequency

Figure 8 indicates the results of the focus group discussion which revealed that most people use PMVs to access services (60.8%), or walk (34.2%), while 3.8% travel by private car.

Figure 8: Mode of Travel to Access Services by Community

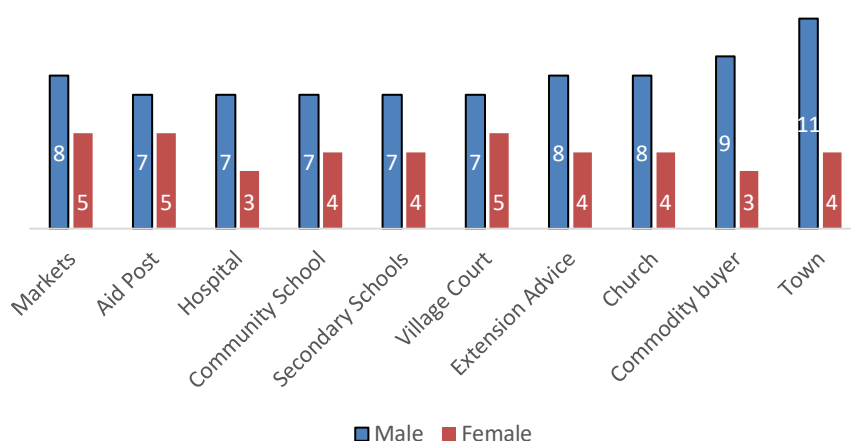


Data on frequency of trips to access services shows that people use the roads and bridges mostly to get to schools, followed by markets and town. People went to the market at least once a week, church, and village court. Individuals made trips to the hospital in town more often (once a month or less), than to the local aid post (at least once a year) which were often without drugs and medicines.

Women's mobility

Males tended to travel more than females. Figure 9 indicates the average number of trips taken in a month by focus group participants. Males were the most frequent travellers to town, school, church, village courts and for purposes of agricultural extension advice and as a commodity buyer. Females made trips to the market, aid post, and to the village court on 3-5 occasions each month. Females tended to make less than half the number of trips to town than males. though females were almost as frequent as males (on average 5 trips by females: 8 trips by males) in order to access markets. Figures from a PMV driver reported that on average there were more females than males travelling to town. Before the bridges were built, women made many fewer trips to access services.

Figure 9: Average Number of Trips per Month by Sex and Type of Service, 2017



Gender and safety concerns

Young women at Girua appreciated their mobility, to be able to travel to town and access services:

“Very happy with the new bridge it makes life easier to go to town for services. Despite previously, we are happy we can travel to town with PMV. Happy this new bridge will last from generation to generation. Happy with the contractor and its workers for constructing this new bridge.”

The community were happy with the new bridges. *“Have (improved) access to markets, safe to get on PMV and pregnant women have benefited.”* (Newton College).

Women in focus groups raised safety issues.

“The bridge footpath has made it safe for children and us (women) to cross the river. The two lane bridge improved the flow of traffic and safe for people to cross the road.”

Older women at Girua Bridge community raised a number of issues surrounding the use of the bridges:

Yes, they do [stop at the bridge]. They stop at the bridge to take photographs. Sometimes men bring women up to the bridge. Tourists also make stops at the bridge to take photographs.

When asked about any problems associated with the new bridges, the young women pointed out some of the bad behaviour of male youth around the bridge at Girua. They also pointed out that some of the ‘table markets’ near the bridge were no longer earning the same level of income because drivers no longer stopped. One young woman pointed out that women do not feel safe at night because rascals take advantage of the darkness.

“Women and girls feel safe to travel on the bridge and road only during the day. The night time is not safe to travel anywhere outside of the village.” (Young women, Girua)

Issues were raised by women that related to road safety and speeding across the new bridges.

“There were three vehicle accidents. A self-inflicted accident involved a young man that climbed the rail of the bridge and fell. In total four accidents. There were no deaths. Some women involved in roadside and informal market experienced loss of earnings because cars are speeding and don’t see us. In the past K200.00. Now K70.00”

Suggestions were made that communities work with the police highway patrol units to create greater awareness about these safety issues to improve driver behaviour as well as hold youth responsible for negative actions around the bridges.

Women involved in transport services

Women are performing jobs and roles that traditionally were male occupations in the transport sector.

Driving and owning PMVs is an area attracting more women because of the improved road infrastructure.

“As a PMV bus owner and operator it is easy for me to go into town to access services and return home. I am happy that it is now easy for me to travel to town to visit family members. It is easy now for pregnant mothers because they can now travel on a PMV bus and it takes less time to go to hospital in town. It is easier for me to go for school meetings and other meetings.” (Older woman, Girua)

There are currently seven females directly involved in PMV operations in Oro Province. The Oro PMV Owners Association said that there was one female driver operating along Route One, three for Route Two, and three on Route Five. Some of them are owners of a PMV. One husband and wife operated a PMV from Girua said that when the bridge was completed they bought the vehicle. There was also a former police woman who now owns and operates a PMV service.

Economic activities and income

Women are very much involved in income generation activities, especially marketing garden produce and other items. Women focus group respondents often reported *“We now have easy access to get to town to sell our garden produce at the town market. Do shopping and return home.”* Families increasingly are relying on multiple sources of income generation activities. This extra income generating work is usually done by women and younger males.

Women keen on using financial services

There was a growing number of women joining and contributing to NASFUND. Many of them are from the oil palm blocks.

“I think women are really serious into going into savings. From our presentations, we have noticed that after the presentation men tend to ask a lot of questions. But when it actually comes to the time of filling in the forms, it is the women who normally go ahead with the filling in of forms and doing the deposits. I see that the women are really serious in savings. And in opening an account with us for savings purpose. They are also consistent in their deposits I would say. They make sure that every time at least they do their marketing, they come and do some deposits in their accounts. So, it is consistent, and their balance continues to grow.”
(Interview, NASFUND representative)

The Oro Oil Palm Growers Association said that they have equal number of members among female smallholders, as with the men. The Association represents 7,000 growers (fathers), 7,000 (mothers), and 7,000 first born sons. They all formally sign up and pay a block membership fee of PGK 10 per fortnight. The association administers the payment into their bank accounts, the money from NBPOL. The Association could also be a channel for women grower's concerns, but this aspect was not investigated.

These are all empowerment factors for women: mobility, able to generate income, accessing savings, loans and credit from banks and financial institutions, becoming involved in traditional male dominated occupations such as becoming police women, owning PMVs, driving trucks, and cash crops. Women also recognize the potential dangers of travel by road, and some negative elements around the bridges. They raise these issues with their husbands, fathers, or can talk to their local counsellor. Older women said they sometimes complain to the police in town. This reflects understanding of how the system is supposed to work and having confidence to speak up about their concerns.

PRIVATE SECTOR

The study focused on PMV operators as a major beneficiary of the reconstructed bridges.

There is an Association of PMV Drivers in Oro. The Association in partnership with the Oro Administration regulates and monitors the routes of PMV operators and have assigned PMVs to each route. An Association representative said that the official passenger price in 2017 was 35 toea per kilometre. The cargo charge is PGK 5.00 for small bags, and PGK 10.00 for larger bags. Kokoda Station is 81 kilometres from Popondetta, with a regulated fare of PGK 28.35. PMV owners were charging PGK 30 for the one-way trip from Kokoda to Popondetta.

Most people said they had good access to services after the bridges were built and pay between PGK1-20 on top of the PMV passenger fare to freight their garden produce to market.

Box 3: Multiple Sources of Income

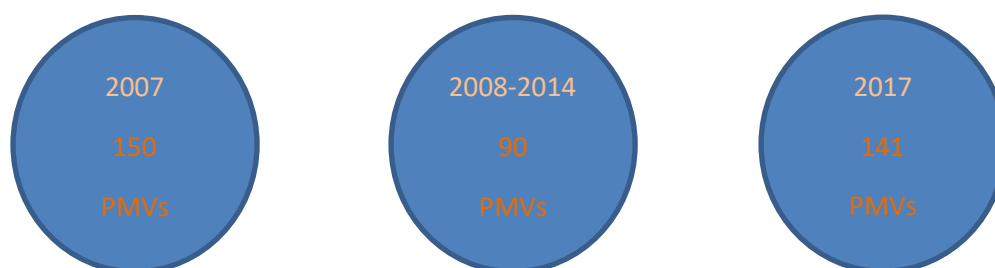
A family on a smallholder palm oil block, can earn around PGK1,000 a month from the sale of oil palm fresh fruit bunches to the NBPOL. The monthly income of one family has been increased as a result of improved road conditions and access to markets by selling garden food at markets on a regular basis: raw garden food (PGK200); cooked food at markets (PGK300); betel nut (PGK200); tobacco leaves (PGK300); chickens (PGK50); handicrafts – brooms and mats (PGK100); and firewood or cut timber (PGK100). All these amount to a total monthly income of up to PGK1,250.

(Interview, young male, East Ambogo).

Increased number of PMVs

The Oro PMV Owners Association, which regulates PMVs in the absence of a Provincial Land Transport Board, supplied information on the number of PMVs servicing the routes. The Association stated that the use of public transportation had increased following the opening of the new bridges. Figure 10 shows that the total number of PMVs in 2007 was 150 vehicles which declined to 90 during the reconstruction phase and has increased to 141 in 2017.

Figure 10: Number of registered PMVs before and after the bridges were opened



The Association representative indicated that the new bridges encouraged local people to invest in new vehicles because of the improved road network in Oro.

Vehicle maintenance costs

An expected benefit of the reconstructed bridges was a reduction in the cost of vehicle maintenance to PMV drivers.

The PMV operator survey inquired about maintenance costs. A frequent response by private companies and transport operators was that although maintenance and repair costs had reduced by 20-30% due to improved transport infrastructure, other costs however had risen that affected operating costs. Items such as cost of labour, spare parts, cost of utilities, cost of fuel, and the cost of communication, and cost of storage, had all increased prices offsetting the reduction in maintenance on vehicles resulting from the new bridges. This meant that without the new bridges, repair, maintenance and operational expenses would have been much higher.

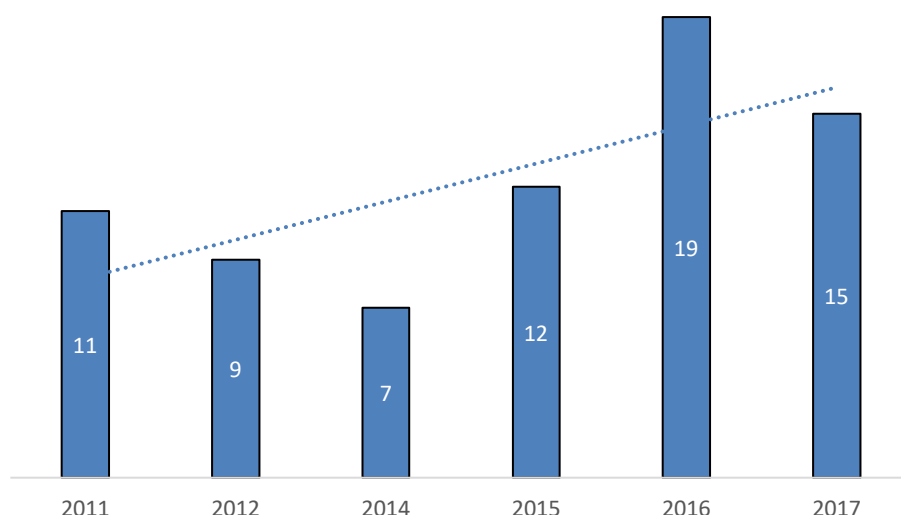
The Oro PMV Association representative reported that many transport operators ordered their spare parts from Port Moresby or Lae. This involved flying to these places to make payment and collect the spare parts. The additional cost of travel or freight would raise the cost of maintaining vehicles. They preferred to buy genuine parts, not the ones that were being supplied by the recently established spare part dealers in town, seen as being “non-genuine”.

PMV operators were asked to indicate the cost of vehicle repairs and responses ranged from PGK 500 to PGK 1,400 per month. The average maintenance cost was K 967 each month. Heavy transport operators such as New Britain Palm Oil indicated that vehicle repairs ranged from K12,000 to K16,800 for a bus and a heavy truck per year.

Investment in new vehicles

The representative from the PNG Ports Authority at Oro Bay reported the number of vehicles imported between 2011 and 2017 and indicated in Figure 11. There has been a trend towards increased investment in new vehicles in Oro Province from 2011 to 2017.

Figure 11: Number of Motor Vehicles Shipped into Oro Province 2011 – 2017



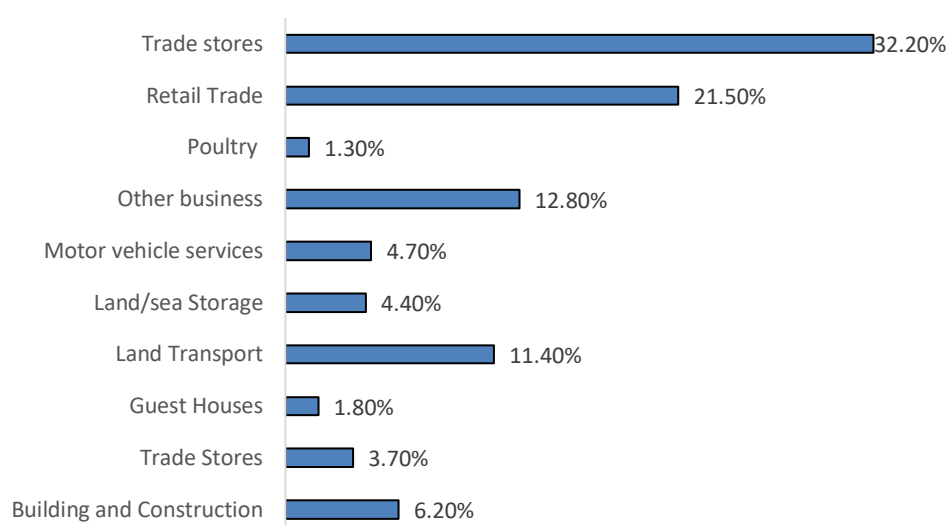
The Ports Authority representative was unable to provide further information about the kind of vehicles imported in 2011 other than they may have been related to specific construction projects or company investment such as in logging or palm oil.

The representative indicated that imported vehicles in 2016 and 2017 were mostly PMV trucks and light vehicles but was not able to provide a breakdown between PMVs and light trucks.

Figure 12 shows data provided by the Bank South Pacific (BSP) loans to SMEs in Oro Province during 2017 (January to October).

A total of 11.4% of all loans went to 'Land Transport', and 4.7% of all loans went to 'Motor Vehicle Services'. In addition, there were 4.4% of loans for 'Land/Sea Transport, Storage' equipment and business, bringing the combined total to 20.5% (161 loans issued to SMEs) were transport related. The data provided by BSP indicates increased investment in transport services consistent with the opening of the new bridges.

Figure 12: Bank Loans to Small to Medium Enterprises 2017



AGRICULTURE

Agriculture is a major export activity for Oro Province involving palm oil, betel nut and cash crops such as peanuts. New agri-business development is being actively encouraged by GoPNG extension officers in recent years.

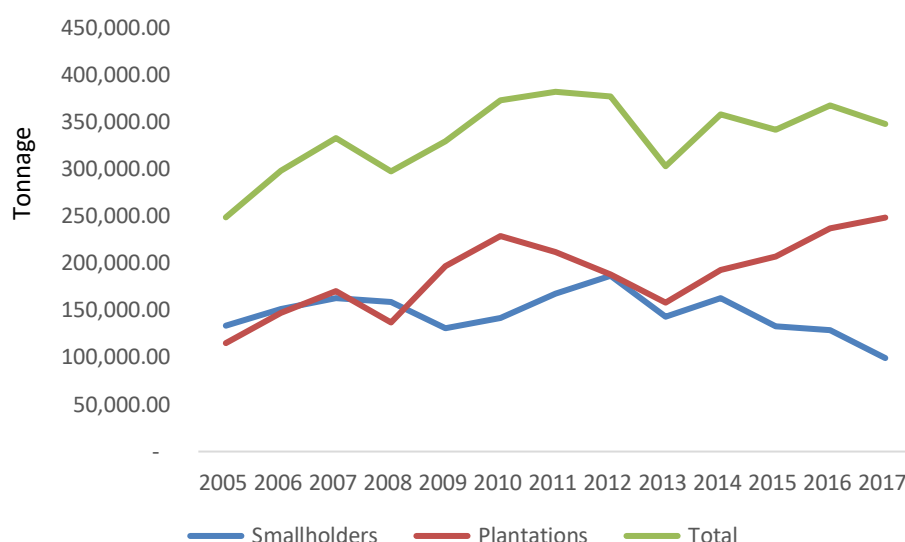
Palm Oil

NBPOL-Higaturu Company (NBPOL) is the largest agriculture activity in Oro Province. The Company saw it as their corporate social responsibility to mobilise and accommodate the expatriate staff of 14 men from Canstruct Construction Company during the construction phase of the four bridges from 2014 to 2016. NBPOL management provided a secure environment and supplied fuel and spare parts for the operations of Canstruct for which they were reimbursed. NBPOL also built a log bridge at Ambogo River in 2013. Locals burnt the log bridge in 2014 during a visit from the Prime Minister Peter O'Neill to demonstrate the difficulties faced by the people.

The fresh fruit from the palm trees is picked up by transport operators that have been contracted by the NBPOL. However, according to a report on the design of a trust fund for smallholder agriculture in PNG, the mill managers need a constant predictable flow of fresh fruit bunches (FFB) to the mills is essential for the efficient production of palm oil. Typical smallholder growers harvest their crops for one to three days every two weeks and take them to the roadside where they are packed in nets, weighed and collected by the trucks for delivery to the processing plants. Collection is scheduled in two-week intervals to coincide with harvesting as the fruit needs to be sterilized within 24 hours of harvest to produce the best quality oil. Furthermore, the managers of the mills indicated that the need for a constant, predictable and on-time flow of FFB from the smallholders to the mills dictates that the method of transporting FFB is solely by the trucks operated by the mills. An alternative provision of transport by many independent haulers, contracted by the smallholder and arriving at random at the mills, would undermine the refining operation. Thus, the mills almost exclusively provide the transport of FFB from the smallholders to the mills.

The data in Figure 13 was supplied by NBPOL and indicates the combined plantation and small holder palm oil production from 2005-2017. Information on sales and profits by the oil palm company was not released by NBPOL, only information on the volume of production. The combined production of smallholders, and the plantation estates in Figure 13 indicates a combined increase of 39.7% in FFB production from 2005 (248,604 tonnes) to 2017 (347,542 tonnes).

Figure 13: Combined and Smallholder and Plantations FFB Production 2005 – 2017



There has been an overall upward trend line in the production of FFB despite seasonal variations and supply issues particularly in 2013. The data does not allow claims to be made that the reconstructed bridges contributed substantially to increased agriculture production in Oro Province. There is evidence that combined FFB production during 2010-2012 and 2014-2017 exceeded the production numbers achieved before the cyclone.

The data shows that after a peak year in 2012, there was a general decline in palm oil production by smallholders in Oro Province.

“During disaster, villager did not harvest their oil palm for a month, thus without source of income but now with roads and bridge they have access to market thus harvest their oil palms for pickup by company and in return earning income. Trip to town was very expensive due to payment of many service providers in-between and high cost of fuel and goods and services; but now all has returned to normal with accessible roads and bridges.” (Younger males, Newton College)

Based on comments made by the Oro Oil Palm Growers Association representative, the role of the new bridges is vital to the smallholders, but there were structural difficulties such as lack of extension, fertilisers, tools, outstanding debts owed to the Company, and the low price received that affected productivity. These were factors outside of the influence of the bridge infrastructure.

The existence of the newly reconstructed bridges enabled NBPOL to continue the collection of fruit, delivery to the mill, and transport to the Port at Oro Bay in a timely manner. The NBPOL representative stressed that the company needed to meet their quotas agreed to with buyers and took measures to ensure that there was no reductions in palm oil produced and exported. Figure 13 shows that as smallholder production declines, NBPOL production increased from year 2013 onwards.

The NBPOL mill reported that they charge the smallholder only the total input costs of the trucking of their fruits, without making any profit on the transport operation. The transport charges are per ton of FFB regardless of distance. They are about PGK 55/ton in Popondetta. The representative from NBPOL said that about 10% of the independent haulers has been contracted to outside local operators and added that collection of the fruits and delivery to the mill is an activity that is greatly influenced by the presence of the bridges.

Maintenance of vehicles

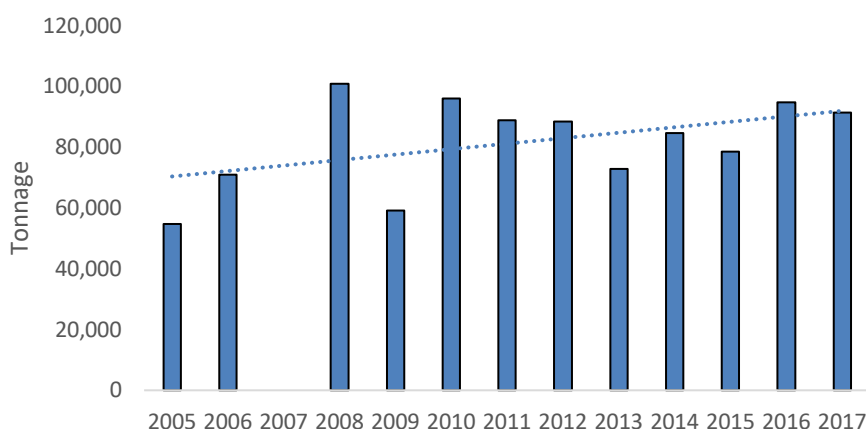
The former CEO of NBPOL estimated that vehicle maintenance costs for the company had reduced by about 30% once the reconstructed bridges were opened, and that maintenance costs had increased by up to 50% when the bridges were out.

Shipping agriculture products

Figure 14 provides statistics supplied by NBPOL on the volume of palm oil shipments from the Port of Oro Bay Port. The trend line indicates an upward improvement in shipping tonnage. The data show a significant increase of 21.4% in the combined volume of Crude Palm Oil (CPO) and Palm Kernel Oil (PKO) of 54,815 tonnes in 2005 and 91,288 tonnes in 2017. Data were not available for 2007.

These figures indicate that the NBPOL was able to maintain its production levels and was successful in overcoming the challenges of getting the produce across the rivers to the Port immediately after the cyclone. The reconstructed bridges have nonetheless contributed to the continued hauling of palm oil from the Company mill to the Port of Oro Bay on a regular basis.

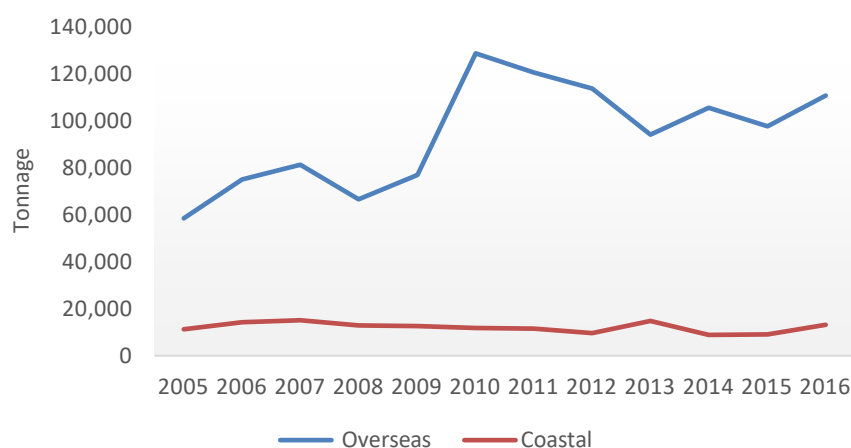
Figure 14: Total Crude Palm Oil and Palm Kernel Oil Shipped from Oro Bay Port 2005-2017



Increased incoming and outgoing cargo

Agriculture products are not only being hauled to distribution points, but also incoming cargo to support economic development in retail and wholesale; construction projects; and goods for government and private use.

Figure15: Outgoing Cargo from Oro Bay Port in 2005 - 2016



PNG Ports Authority provided data in Figure 15 shows that overseas shipments increased from 58,494 tonnes in 2005 to 110,811 tonnes in 2016 of which 95.9% was palm oil. The peak shipment was in 2010 after the cyclone but prior to the reconstruction of the bridges indicating that the palm oil industry found ways to deliver cargo through wet crossings as necessary.

NBPOL used several strategies including using other roads, building a log bridge at Ambogo River, and used tipper trucks rather than flat backs, as it was easier to load and off-load the oil palm fresh berries. They would use bulldozers to pull the trucks through the river. When it rained and the rivers flooded, the company had difficulty getting the palm oil transported to the wharf at times. There was always an environmental risk that a truck could overturn and get 30 tons of oil washed down the river; but this never happened (interview, former General Manager, Higaturu).

The export of general cargo through Oro Port by coastal shipping increased from 11,199 tonnes in 2005 to 13,260 tonnes by 2016. The growth in cargo volume handled through the Oro Bay Port has shown little change indicating flat growth in the Oro economy over the past decade.

LOCAL ECONOMIC ACTIVITY

The economic benefits flowing from the reconstruction of the bridges are: increased income for farmers and companies. The increased incomes from the sale of garden produce, palm oil, cocoa, betel nut and many other items, such as kerosene, firewood, poultry, has created demand for purchase of goods and services from the retail and wholesale shops for food, household goods, building materials and hardware, clothes and the transport services. This, plus the increased number of construction projects around the province, has generated flows of economic benefits including the retail and wholesale sector, the building and construction industry, and the financial services sector.

New agri-businesses

Information on new formal agri-businesses since the bridges were opened was not readily available, and only 1.6% of the Bank South Pacific SME loans were approved for poultry business projects (Figure 12 earlier). However, anecdotal information revealed that there was high interest in starting informal agricultural business activities.

There has been a significant increase in the volume of goods being transported by PMVs since 2016. Representatives of the Oro PMV Owners Association reported that each day about 400 bags of betel nut were being transported to the market in Popondetta and to Gona on the coast to be shipped by dinghies to Lae. Much of the betel nut was grown in Kokoda. One bag is a 20kg rice bag, at a sale price of PGK 80-100 per bag, generating between PGK 32,000 – PGK 40,000 per day. That amounts to some PGK 11.6 million income to betel nut growers in a year. This is a new 'agri-business' that was perhaps only small-scale before the bridges were opened; and has since 'taken off'.

Other fresh produce that were increasing in popularity were peanuts and taro. The visits by landowners seeking commodity advice from GoPNG extension officers has stimulated new agri-businesses. There were 3-4 open- back land cruisers transporting 3-4 50 kg bags of raw peanuts (chicken feed bags) from Afore to the market in town, five days a week. The Division of Agriculture and Livestock (DAL) in the Oro Provincial Administration said that they had distributed the taro suckers/tubers of the new National Agricultural Research Institute (NARI) variety which matures every 3-4 months, compared to the older variety which matured in 6-9 months. The DAL officer also mentioned that he had been delivering fermenter materials to cocoa growers, rice machines, and setting up satellite nurseries around the province. Completion of the bridges has made a big impact on farmers. He reported that he had up to 10-20 clients a day seeking his advice on cash crops and tree crops.

"Before people didn't want to go to Popondetta because of the difficulties that they had faced crossing the rivers. But now that the bridges have been constructed, more people are going back and forth to Popondetta town as well as more big trucks bringing in timber and more materials. The High School in Kokoda now has two brand new double classrooms built. And there are some new staff houses for

the teachers. Economic activities have grown, there are a lot of the marketing activities going on in Kokoda, trade store owners are able to go into town to get stock and come back to Kokoda. Small trade store owners have increased their businesses.”
(Chairman, Kokoda Trekking Authority)

Retail and Wholesale Businesses

Although sales and profit information were not made available by the business houses in Popondetta and NBPOL there are indications that the retail and wholesale businesses are prospering since the reconstructed bridges were opened. BSP loans to SMEs in 2017, reveal that 32.15% of loans were approved for trade store businesses and 21.54% approved for retail trade.

Figure 12, in an earlier section of the report, provides further details on loans to SMEs attributed to the opening of the new bridges and increased economic activity.

Best Price Retail and Wholesale representatives reported that there had been increased wholesale purchases by SMEs and consumers. Nevertheless, the business company reported that before the new bridges were opened, there had been 2 to 4 shipments per month. Now, after the bridges were opened, there were 8-10 shipments per month. The company had two container trucks; they did not invest to purchase additional trucks to deal with the increased shipments, but instead used the same two trucks continuously to transport goods from Oro Bay to Popondetta. This particular company was the sole distributor in the province for Nestle products and Coca-Cola products. Though some SMEs were now starting to go direct to Lae to place their orders, suggesting increased competition in the retail sector.

NBPOL representative said that there had been an increase in the number of expressions of interest to do business with the Company, but the company had remained constant, staying with the same number of contractors it had been using all the time. There were certain standards that needed to be applied which existing contractors were familiar with.

Financial Services

There has been a dramatic increase in demand for financial services in the Province with the fully functioning bridges in 2016. For example, data provided by the Bank South Pacific (BSP) show that loan approvals rose from five in 2013 to 165 in 2017; and the number of loans to SMEs by BSP increased from five in 2013 to 161 in 2017.

Representatives from the financial services sector in Oro explained that since the new bridges were in place, MiBank and others were able to conduct increased outreach to rural areas, especially palm oil estates to promote their financial products.

Box 4: Bridges Reduce Costs

“Before the disaster, I had a trade store and before the bridge was built, I use to carry my cargo on my shoulder. The vehicle brings us to the edge of the river and we transfer our cargo by the tubes. We have pay K21 to for them to transfer our cargo by the tubes to the other side of the river. It cost about K350 to go and bring my stock for the trade store in town and come back to the village. In one month, we made 6 trips to go and buy the cargo and come back for the trade store.

After the bridges were built, the cost of buying the cargo in town and coming back home to the village has cut down my costs. Now we just use the PMV to go to town and bring the cargo for the trade store. Now it’s K30 plus my cargo money, it cost only K3 for each of my cargo to be transported in the PMV. Now we only have 3 trips in a month to go into town to purchase the stock for the trade store. Now I have money saved up to pay for school fees for my children, and not just money to pay for the cargo like before the bridge.”

Older male, Trade store owner, Papaki Village

The People's Micro Bank Branch in Popondetta, representative said that the organisation had conducted a lot of awareness in rural areas about their micro-finance products in the past two years, but especially since the bridges had been opened. In the last 9 months of 2017, People's Micro Bank generated over PGK 5 million in savings and issued K3 million in loans. They offered loans of up to K100,000 though PGK 1 million had recently been approved for one customer. The most popular product was the transport loan for the purchase of a PMV or truck by 60-70% of bank's clients.

National Superannuation Fund Ltd or NASFUND representative said they had also undertaken awareness throughout Oro Province. Two of its main products, Eda Supa and NASFUND Contributors Savings & Loan Society (NCSL) were proving to be popular. Eda Supa is a voluntary superannuation savings account for workers / individuals who are currently outside of the superannuation net by virtue of their status as being self-employed, operating a small business, working in a small establishment less than 10 employees, farming in cash crops or recipients of landowner royalties. It caters for anyone who is earning some form of income and who want to save in a superannuation environment. The minimum contribution is PGK 20 anytime within three months. The NCSL product offers its members a range of services includes a selection of savings accounts and personal loans at very low interest rates. "This facility allows members to save money on a regular basis to cater for the everyday financial commitments that are always confronting the average Papua New Guinean workers. Events such as funeral expenses when a family member passes on, bride price, motor vehicle registration, water bills and school fees are a few notable ones. NCSL also allows members to borrow against their savings at very low interest rates." Those who are members of Eda Supa can become a member of NCSL.

Construction

The BSP loans to SMEs in 2016, 6.8% were approved for construction projects. This is also a growth area though no detailed information was available. However, there are a number of large construction projects that have been completed or commencing implementation in the last two years (2015-2017) which have benefited from the new bridges and transporting equipment and raw material to construction sites. These include:

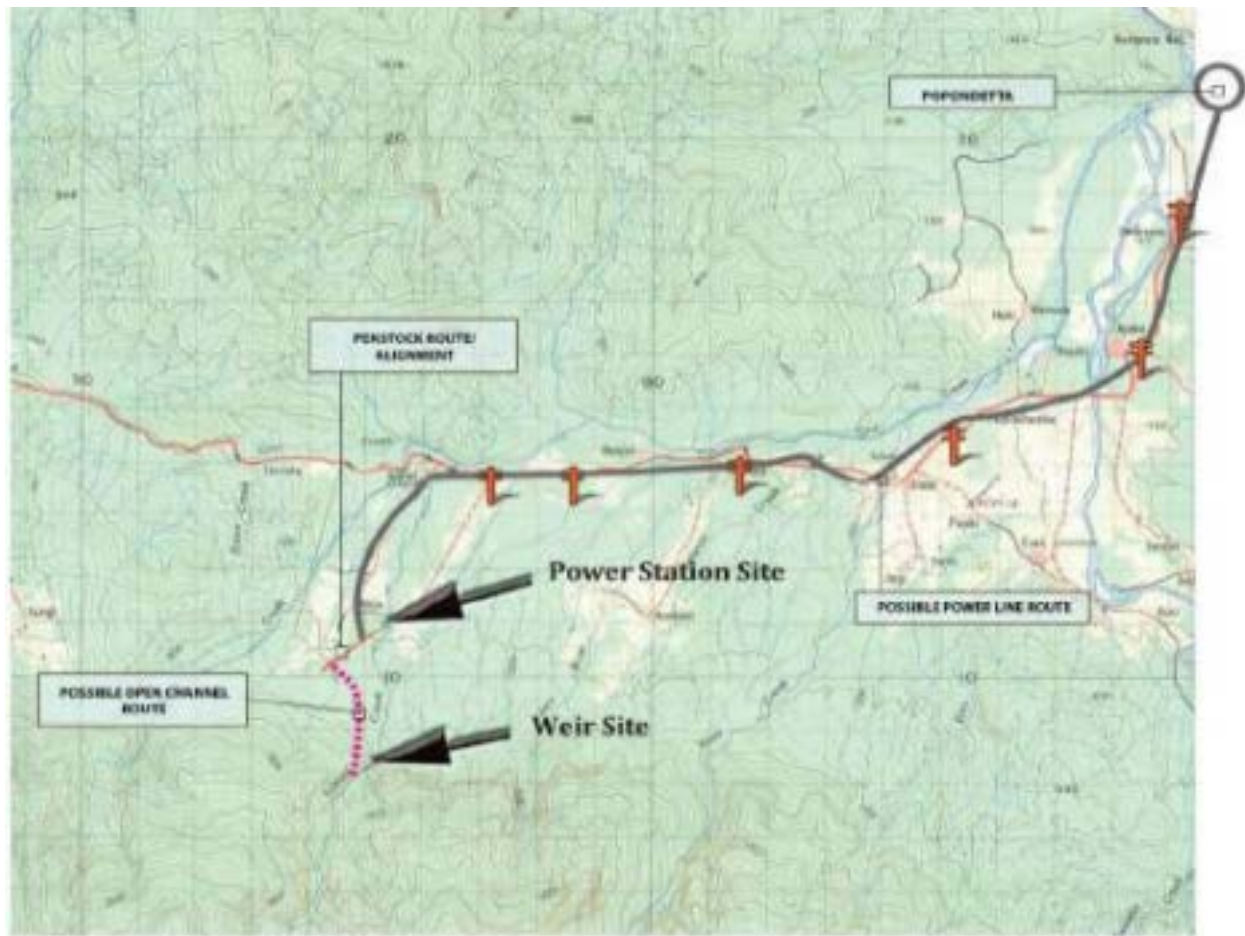
- The Girua International Airport;
- PNG Power construction of Divune Hydropower Project at Kokoda;
- The completion of three Secondary Schools in the province;
- The completion of a new operating theater at the Popondetta General Hospital;
- New office complex for the Provincial Executive Council building;
- Scoping completed for the sealing of the road to Embara, Kumusi to Kokoda;
- Rural Electrification Program from Girua to Oro Bay; and
- Treasury staff houses at Oro Bay.

Furthermore, the Provincial Planner mentioned that *"There was a lot of construction going on from betel nut money. There are 3 hardware houses in town compete and the prices are coming down."*

National Government agencies in partnership with the Oro Provincial Government, have been planning several large construction projects over the last five years, one of which is the PNG Power construction of Divune Hydropower Project at Kokoda. Construction of the Divune Project commenced the first quarter of 2017. The project will rely very much on use of the four reconstructed bridges. The electricity project aims to reduce poverty and support economic growth through provision of enhanced access to income opportunities and basic social services. The Project aims to: (i) provide reliable source of power for urban communities, provincial government and commercial establishments in Popondetta town centre; and (ii) connect rural communities, agri-industries, government's basic social facilities (schools and health posts) in the region. The Divune Project will develop a 3.0 MW hydropower run-of-river project on the Luwini Creek at an altitude of 460 m on the lower northern slopes of the Owen Stanley Range in Oro Province of PNG. Electricity will be

reticulated (routed / evacuated) by a 33 kV transmission line to Popondetta and Kokoda which are 65 km and 20 km west and east of the project site, respectively.

Diagram 3: Location of Divune Hydropower Project and Possible Power Line Route



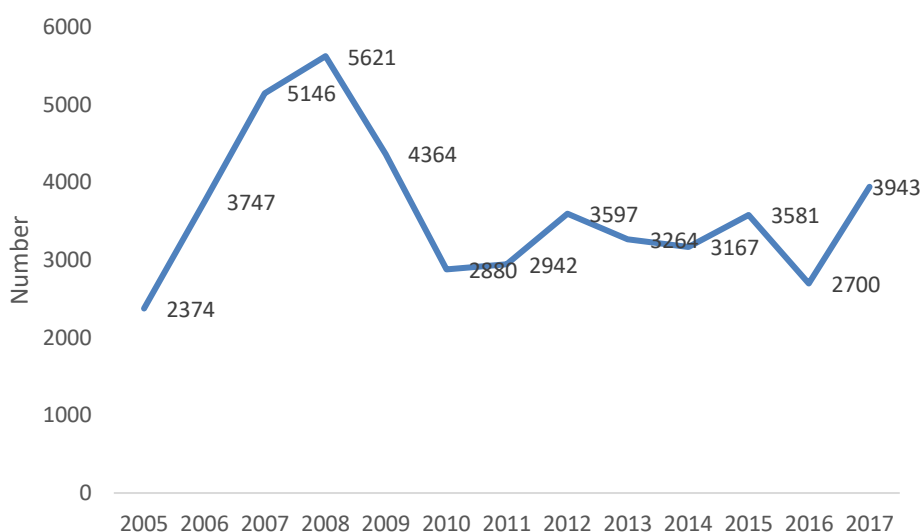
Kokoda, Sheet 8480, Papua, 1:100,000 scale, 40m contour intervals, based on 1973 aerial photography

TOURISM

PNG's primary tourism products are trekking, diving, cultural village stays, World War II history and surfing. Oro Province offers almost all of these products, especially on the Kokoda Trail, and at Tufi Resort.

Trekking along the Kokoda Trail is one of the most popular tourist activities in PNG. The Kokoda Track Authority (KTA) provided statistics shown in Figure 16 on the number of trekkers on Kokoda from 2005 to 2017. The number of trekkers remained high at 5,621 in 2008, the year after Cyclone Guba. There was a sharp decrease in numbers to 2,880 in 2010 following an airplane crashed on 12 August 2009 in the Kokoda area. There was a gradual rise in numbers in the following years, then sharply declining in 2016 after an American female tourist was raped on the Kokoda track in January 2016. The number of trekkers has since increased to 3,943 in 2017 and the KTA expect this to exceed 4,000 trekkers in 2018.

Figure 16: Number of Trekkers on Kokoda Track 2005 - 2017



The Chairman of the KTA explained that 50% of trekkers indicated in Figure 16 walk from Port Moresby in the south to Kokoda in the north following the direction of the original wartime Kokoda Trail. After completing the track many of these trekkers fly out from Kokoda Station back to Port Moresby. Five Australian tour operators reported that three of these companies usually walked the Owers' Corner to Kokoda route, while two other tour operators usually did the walk from Kokoda to Owers' Corner.

KTA indicated that the remaining 50% of trekkers commence their trek from the Kokoda station having flown through Girua Airport. However, four of the five tour operators reported that they flew out of Girua Airport, and only one tour operator flew out of Kokoda station. There are daily flights by both Air Niugini and PNG Air to and from Girua Airport. PNG Air provides two flights a day four days a week to Popondetta.

According to the KTA representative, the bridges have saved a lot of time and difficulty for those trekkers who choose to fly through Girua airport: *"The presence of the bridges has given us an upper hand to plan for tourists."* Certainty and efficiency are key driving factors in the tourism industry. The new bridges provide this. Transport services have benefited from the rise in trekker numbers, including airlines and PMV operators.

Five Australian tour operators completed a survey which revealed that each year on average there have been 2.1 male trekkers to 1 female trekker over the last ten years. The highest ratio was 3.3 males to each female trekker which was recorded for 2016. The number of female trekkers significantly increased from a total of 10 in year 2008, to 134 in year 2017, a twelve-fold increase. For male trekkers there has been a fourteen-fold increase from 25 in year 2008 to 377 in year 2017.

When asked if the reconstructed bridges made a difference to the number of trekkers and to cost, the tour operators said that it was faster and safer, and that cost reduction had been minimal. *"Honestly no increase to trekker numbers or reduction in cost but it makes the ride faster, safer and less likely to delay from flat tyres."* (Kokoda Tour Operators Association Membership Manager)

There are new tourist sites and products that are also being promoted in Oro Province by tour operators because of the improved transport infrastructure. Spirit of Kokoda offers a 3-4 day package 'Buna to Gona' tour along the coast, in addition to the 8 day 'Kokoda to Owers' Corner' and 'Owers' Corner to Kokoda' treks. The Kumusi River also has some historical wartime significance, so there is a brief stop-over at the Kumusi Bridge on their way up to Kokoda. There are at least two other tour operators offering 'new' products.

After the bridges, there have been many changes, schools and infrastructure. We have had more supplies coming in and that has helped in the increase of the number of trekkers. It has also helped in means of goods and services, improvement of guesthouses and camp sites.” (Chairman, Kokoda Track Authority).

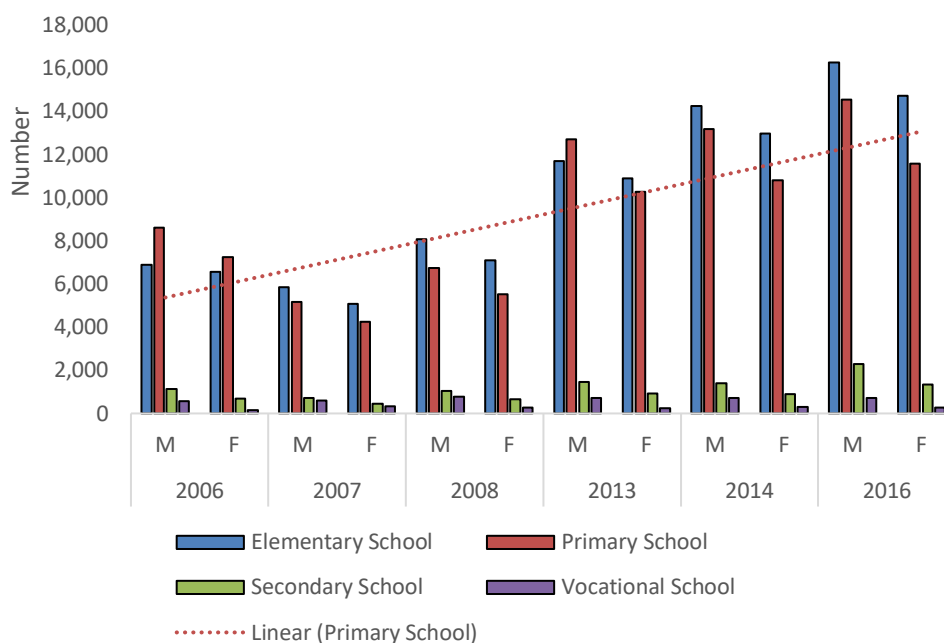
GOVERNMENT SECTOR

The recent investments into transport infrastructure, including the reconstructed bridges and improvements at Girua airport, have strengthened the enabling environment in the Oro Province. The Oro Provincial Planner explained that the officers of the administration travel more often to and from local level government areas now that the bridges have been opened than in the past with difficult wet crossings and delays waiting for suitable transport. Government officers organise and attend LLG meetings in LLG areas, carry out medical drug distribution, and conduct village court training in most of the LLGs. The LLGs representatives, inaccessible by road, are flown into Popondetta and planning and coordinating development projects activities has increased.

Education

The Education Statistical Bulletins from 2006 to 2016 provide data for school enrolments.

Figure 17: School Enrolments by Level and Sex 2006-2016

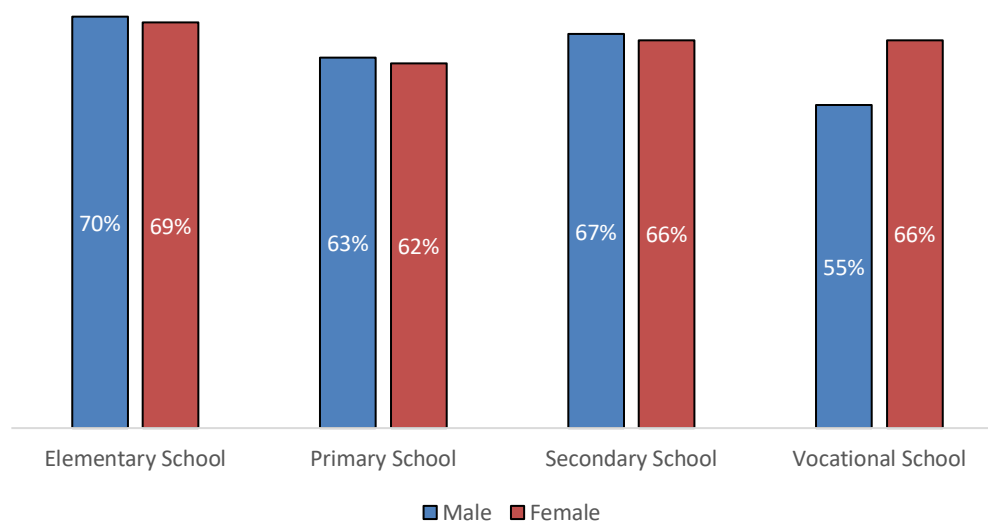


There have been significant increases in the number of children attending school at all levels of education from 2006 to 2016. The trend is upwards.

GoPNG education policy accounts for the significant changes in enrolments with the introduction of the Tuition Fee Free Policy in 2013. The installation of temporary Bailey bridges in 2014 and the completion of the four bridges in 2016 have contributed to the increased enrolments assuring parents of the safer passage of children to and from school.

Figure 18 shows the large percentage increases in enrolments is similar at each level of education for males and females from 2006 to 2016.

Figure 18: Percentage Increases in Enrolments from 2006 to 2016



Health

Provincial Health Office provided statistics which shows that more people are receiving health care. In 2016, 58% of health centres received at least one supervisory visit by the provincial or district program management staff. This was a large improvement from only 21% in 2014 and 30% in 2015. The Department of Health Sector Performance Annual Review rated Oro (Northern) Province as being the 'Most Improved for Inputs' for 2016. This covers budget allocation per capita, proportion of health facilities with functioning radio and telephones, the percentage of months that facilities do not have stock-outs of selected supplies, and the percentage of hospitals that have three of the five key specialties.

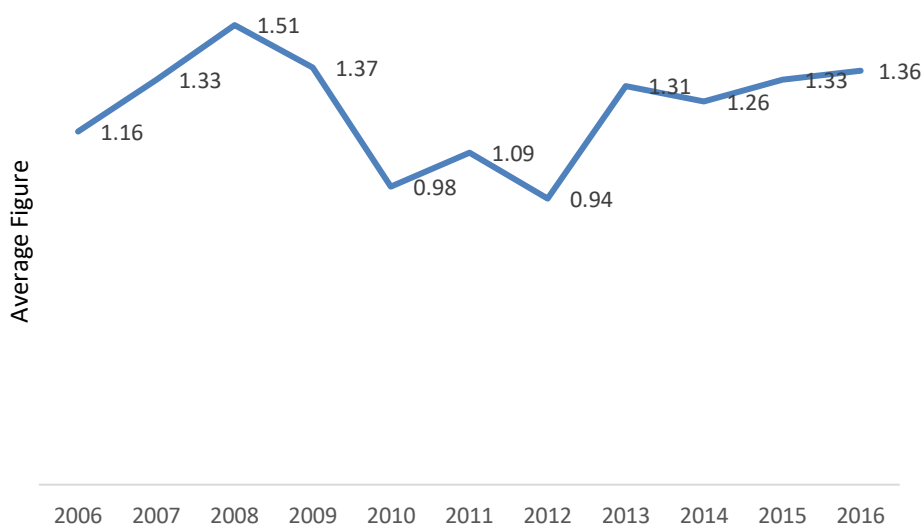
The data are inconclusive and contradictory at times. The 2016 Sector Performance Annual review showed that there was little improvement in the outreach clinics per 1000 children under 5 years of age; the ratio was 26 in 2012 and 27 in 2016 (although there was a higher rate of 30 in 2014). The under one-year old child measles immunisation rate was 98.35% in 2012 prior to installation of temporary bridges only to decline to 46% in 2016: the year the bridges were opened.

The evaluation team collected data from the National Health Information System, and from the Oro Provincial Health Information Officer. The intention was to analyse data to see if there were any correlations between health data and the reconstruction of the bridges. Four measures were used:

- Average Outpatient Visits;
- Antenatal Visits and Deliveries;
- Supervised deliveries; and
- Child malnutrition.

Figure 19 indicates an increasing average number of outpatient visits from 2006 to 2008. There was a decline over the next five years before increasing showing a substantial increase in 2013 when temporary bridges were in place and work commenced on the new bridges in 2014.

Figure 19: Average Outpatient Visits per Person per Year in Oro Province 2006-2016



Antenatal maternal health indicators are provided in Figure 20. Antenatal visits declined sharply in 2014. Supervised deliveries of babies showed an increasing trend up to 2014 and then also declined in 2014. This is consistent with the downward trend nationally; Child Fund's report states that despite laws and programs to encourage supervised births, only 40 per cent of women in PNG gave birth at a health facility with a specialised birth attendant in 2016 down from 44 per cent in 2012. In Oro Province the share was 35 per cent in 2016, down from 41 per cent in 2012.

Figure 20: Antenatal Visits and Supervised Deliveries, Oro Province 2006-2016

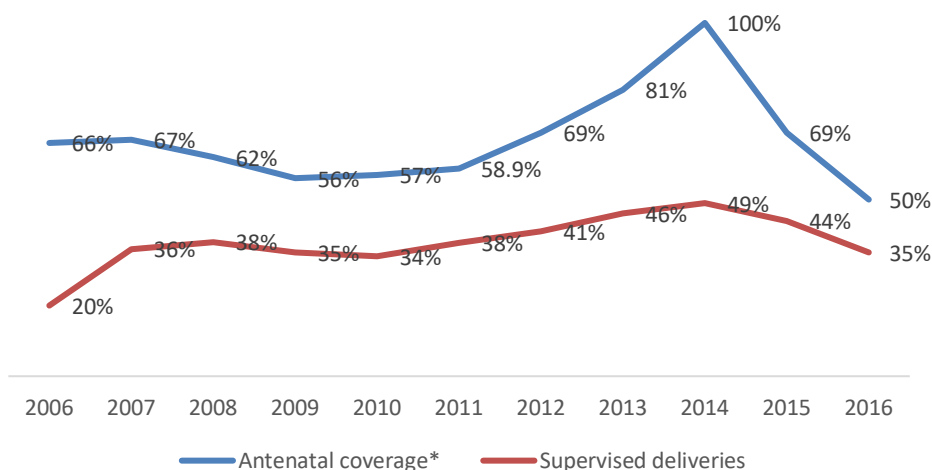
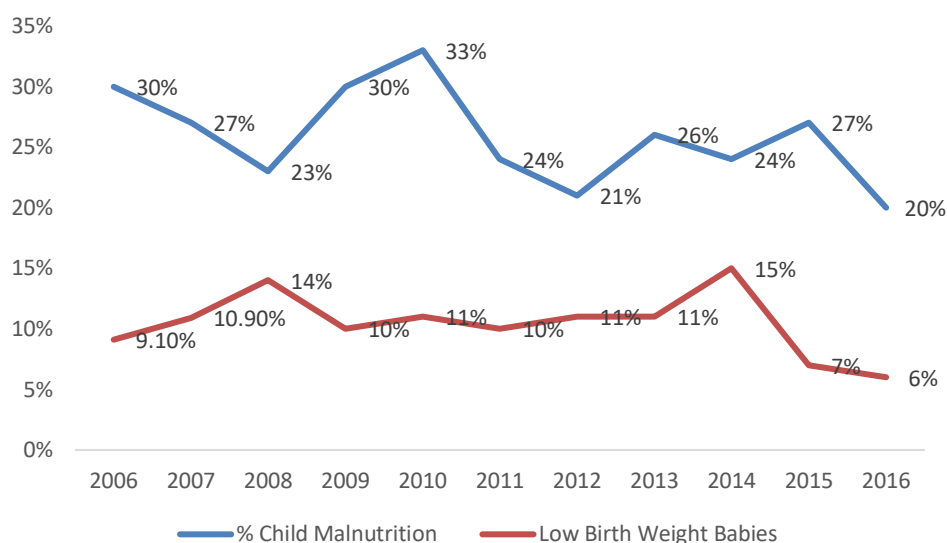


Figure 21 indicates data about malnutrition in children from 2006 to 2016 sourced from the National Health Information System. It is difficult to isolate clear trends in the data although child malnutrition increased sharply after the Cyclone and the consequent devastation of gardens and food sources in Oro.

Figure 21: Percentage of Children with Moderate and Severe Weight for Age Malnutrition, Oro Province 2006-2016



In order to make a link between health data and the reconstruction of the bridges it would be necessary to have data available from health facilities in those LLGs along the Kokoda Highway. Deterioration in child immunisation rates and ante-natal visits by mothers, could be occurring in rural districts such as Afore and Kira LLGs which are remote with poor road infrastructure, affecting outreach by health workers. Nevertheless, two-thirds of the population reside within the Kokoda highway corridor, which should be using the new bridges to deliver services to these people. The benefits of the new bridges may be underestimated due to other factors affecting health service delivery such as availability of medicine, funding and personnel.

Law and Order

Focus group participants commented that law and order problems increased post cyclone as criminals took advantage of the conditions in Oro in 2008.

“Drivers of company trucks were held up. Costs went up by 20-30% as companies paid local villagers to carry goods across the river. They used an ‘off-load and re-load’ delivery system. Sometimes landowners would not allow drivers to cross over with their vehicles. Landowners demanded rent while their trucks were parked for one or more days waiting for the flood to go down.” (representative of private business, Popondetta).

The law and justice sector in Oro Province is very active with its training and coordination of village courts, juvenile services, and police plans. A new juvenile remand facility for Oro province was opened in June 2016. The Provincial Police Commander reported that the new bridges have had a significant impact on Police operations. They had dramatically increased the number of arrests and convictions. Now there were about 70 prisoners in the cells. Before the bridges were opened for use, there were only about 20 prisoners daily. Previously, they had to drive the vehicles across the rivers, or walk across to get to the victim. They lost about half of their fleet, five out of ten police vehicles. “Our movement is very flexible and efficient these days.” The Police have recently drawn up a structure for highway patrols, new posts at Kokoda, Sangara, Oro Bay, and at Barige High School, as well as at Girua Airport. Oro Police have re-established their police stations at Saio, Oro Bay, on the way to Afore, and at Isorova, along the Kokoda track. With the assistance of the national government, the MP for Sohe will build a 20-person barracks at Kokoda Station.

Road safety

Another focus group respondent raised issues about road safety after the bridges were officially opened. There was a tendency for drivers to speed on the roads and across the bridges.

“It is not safe for girls and women because male drivers of vehicles and PMVs are careless and too crazy. They do not have respect for women. They treat mothers badly like how they treat young (single) girls. I do not think there is any benefit for road safety. Nine days after the bridge was opened, we witnessed a traffic accident. The driver of the vehicle was careless. The drivers of vehicles do not take precautions when crossing the bridge. They do not slow down the vehicles when they cross. They cross the bridge at high speed.” (Older women, Girua)

The Provincial Police Commander said that on 9 January 2017, 13 people died in a major road accident from a collision between a PMV and a NBPOL company truck close to the Ambogo bridge. Both vehicles had been speeding. Another accident occurred when a man sleeping on the side of the road was run over. Apart from these, road accidents are low. Over-loading vehicles, speeding of PMVs has been widespread. Law enforcement has set up a highway patrol unit to monitor the traffic, educating drivers and passengers.

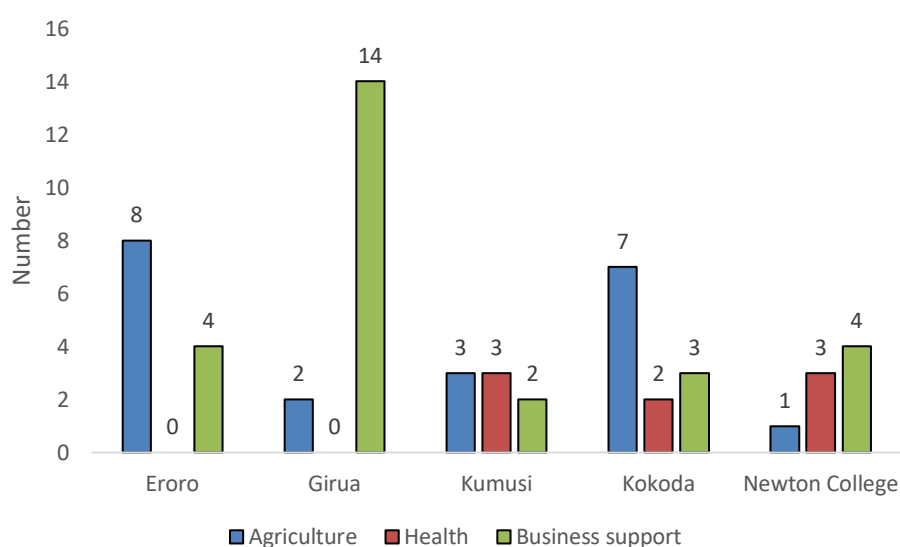
The Police Commander mentioned that women are more flexible and listen to the commands given by Police on the roads. Oro Province has four female officers in the Family and Sexual Violence Unit, one staff officer in charge, one at the Duty Counter, and one as a Crime Scene Investigator, totalling seven police women in Oro Province.

Community perspectives on government services

Respondents at the five focus group sites perceived that there were improved extension activities in small business support, agriculture, and to some extent, health with the opening of the bridges.

Figure 22 provides the perceived increase in the number of visits by government extension services to each location from focus group participants. The data indicate that Girua, closer to the government administrative centre of Popondetta, provided a higher count, especially access to extension services related to business, commerce, and financial services information. Eroro and Kumusi communities received more attention by outreach activities by government (and others) to do with agriculture. Kumusi and Newton College experienced extension services at a lower level.

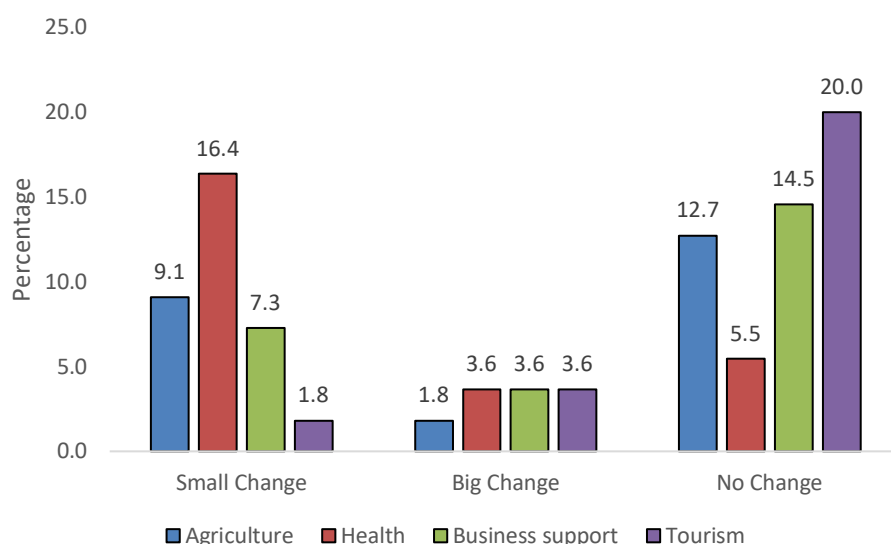
Figure 22: Government Extension Services Support to Communities 2017



Data from the focus groups participants in Figure 23 show that there was no or little change in the delivery of government services to their communities (53% said that had seen 'no change' and 35% said there had been a 'small change') since the reconstructed bridges were opened.

The comments about the big changes specifically mentioned financial services conducting small business training, awareness about financial products, cocoa seedlings issued to farmers, and seeing more visitors coming more often (tourists).

Figure 23: Perceived Level of Change in Government Extension Services by Sector 2017



NON-GOVERNMENT SECTOR

The impact study interviewed six civil society organisations based in Popondetta, as well as at Kokoda. The Salvation Army, Oro Family and Sexual Violence Action Committee (FSVAC), the Oil Palm Growers Association, the Oro PMV Owners Association, Anglican Newton Theological College, and the Kokoda Track Foundation based at Kokoda. Many of these organisations are actively engaged in delivering training, awareness and advocacy on key issues such as domestic violence, law and order issues, promoting income generation activities, and delivering health and education services.

The Salvation Army has been running a care centre at Pongani, since the cyclone disaster. They also operate a health centre there. They have another Centre along the North Coast at Aure and another centre up at Waru in the Higaturu LLG. Pongani and Aure are both located in the Oro Bay LLG area.

The Salvation Army have done training with the young people and some to do with the 'Restorative Justice'; they developed a training manual and are trying to collaborate with the law and justice agencies in Popondetta. In the development program they are also working with DAL to promote get the people at the Care Centres to produce cocoa and rice.

"It affected the stakeholders' performances in a big way. It slowed down a lot of our outreach programs, you couldn't go to the places that you wanted to go because of the challenges that were faced crossing the wet-crossing and during the rainy season. It was practically impossible to bring services to the people, especially our health services. During the rainy season, there would be flooding and that made it difficult and risky for the officers. The bridges have restored that and that has helped in improving our outreach programs." (Representative, Salvation Army – Popondetta).

The Oro Provincial Law and Order Committee have received reports from the Senior Provincial Magistrate about the increased crime across Oro Province. Increased incomes from palm oil have coincided with some negative outcomes such as the consumption of alcohol and home brew.

When asked “Since the new bridges have been built, what kind of social problems have you been experiencing?”, several community focus groups stated that the improved transport infrastructure gave easy access to youth to homebrew and drugs, “swearing, fights, tok nogut. Disturbing the community.”

“There is increased number of incidents of abuse of home-brew and alcohol in all parts of the province. There are two sides of the coin, its good in a way, it has increased the opportunity to earn more but people need to learn to spend their money in ways that can enhance their living and not spend it on alcohol that causes disturbances in the community and society. The PPC has his hands full right now and listening to the Magistrate it is a very big challenge.”

“We have partners with good intention where you want to restore, but how do we restore these important structures and how best do we use it to best enhance positive living?” (Representative, Salvation Army).

The Oro FSVAC described the services that people are coming in to seek information or counselling.

“The bridges have made it possible for us especially in terms of doing awareness. And with the new laws that are in place, FSVU is concentrating on the many issues that mainly affect the women and children... This gives the opportunity for those to come forward and report their cases... Since the dissemination of the information, a lot of cases have been reported and that there a lot of cases being reported. The bridges have made that possible for the information to be spread to the rural areas.

The bridges have linked the people from the rural areas to come into town, and that are aware that there are services are available. When children run into the law, or they are abused they come to the FSVU. The community leaders come into get more information to help their communities.

After the bridges, [FSVAC] has increased the number of clients, they have 5-10 clients per day.

They come all the way from the districts, from Kokodo, Afore, Oro Bay, Tufi and Kira. Kira is very remote because there is no road links, but they still have about two clients from Kira making their way for help from the FSVU. (Representative, Oro FSVAC)

Civil society organisations work with government and development partners to address a range of social and economic needs. They require a lot of support to address the emerging social problems in the community.

The available statistics show that PNG has an adult literacy rate of 62 percent. Mobile cellular subscriptions in 2014 were 44.93 per 100 people, with 9.38 percent of the population with access to internet. There is limited access to transport and communication services to rural areas, many different languages, and a culture preferring face-to-face interaction for engagement with community, business or government officials. These communication factors can severely constrain implementation of development programmes, as well as for the individual or group voice in development activities or to take up grievances. For almost ten years, the Oro government faced major challenges in communicating and assisting its people. There is clearly a demand for services provided by NGOs, as people come to town seeking help from NGOs; the reconstructed bridges, combined with cheaper transport service allows them to do so.

GLOBAL IMPACTS

Poverty

There is no official definition of poverty in Papua New Guinea (PNG), although the concept “poverty of opportunity” is often used, referring to a lack of access to education and health services and to income-earning opportunities. There is some popular resistance to the very notion of poverty in PNG, including from political elites. This is because of an assumption that all native Papua New Guineans are customary landowners and therefore have a right to a life of “subsistence affluence” in the rural village communities to which they already belong or to which they could easily return. In recognition of the widespread informal social safety nets provided by access to productive land assets, assessments

of poverty in PNG have typically not been solely based on cash incomes but have also taken account of the economic value of subsistence production. For the 2009–2010 HIES, a “cost of basic needs” poverty line was determined, calculating the cost of an individual consuming 2,200 calories per adult equivalent per day plus the cost of essential non-food items such as clothing. Under the methodology described above, the Asian Development Bank, Country Partnership Strategy 2016-2020 maintains a national poverty rate in PNG of approximately 37 per cent.

There is a direct link between poverty and transport in PNG. As the recent Asian Development Bank Strategy highlights, “The rural nature of PNG’s poverty profile amplifies the consequences of a lack of access to transport infrastructure within the country, which continues to be identified as a major driver of poverty. For instance, remoteness and the inaccessibility of roads has been found to be the primary determining factor of village income levels and poverty.”

In 2015, Oro Province was reported to have a Composite MDG Indices of 0.611 in 2010 by the Department of National Planning and Monitoring, National Population Policy 2015-2024 with MDG 1 Poverty and Hunger index of 0.780 (related to employment indicators) and a nutrition index of 0.430, with the index of 1.0 being the best situation and 0.0 being the worst. The first part suggests that Oro Province is faring better than the national poverty rate, but second part of the poverty indicator, reveals that Oro Province was not very well off nutritionally, when measured in 2010.

There are several LLGs that have no access to roads, or to the main highways such as Cape Nelson Rural, Afore Rural, Safia Rural, Tamata Rural and Kira Rural LLGs, representing 30.6% of the total population. This signifies that many people do not have the financial resources to improve food supply generating a state of vulnerability and poverty among a large proportion of the population.

Poverty alleviation

The evaluation team inquired in the fifteen focus group sessions who believed that their access to a range of services had improved since the opening of the bridges.

A total of 131 focus group participants provided yes/no responses to whether they had better access to eleven poverty measures since the reconstruction of the bridges.

Figure 24 shows that 91 respondents (69%) answered positively and 40 (31%) responded negatively to the eleven measures. Disaggregated sex data were not collected. The highest responses were access to education, health services and transport. Education and health services did not receive any negative responses.

Figure 24: Response Count on Access to Services

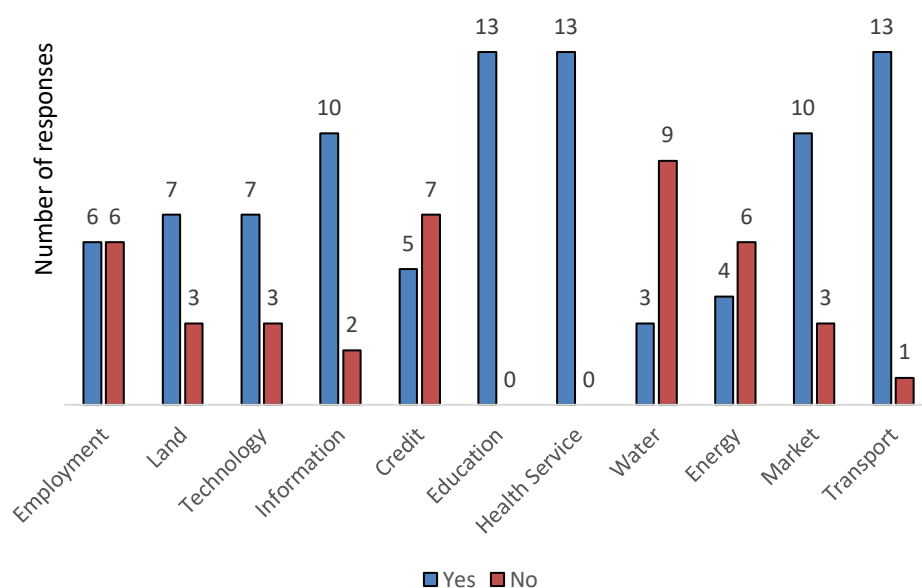
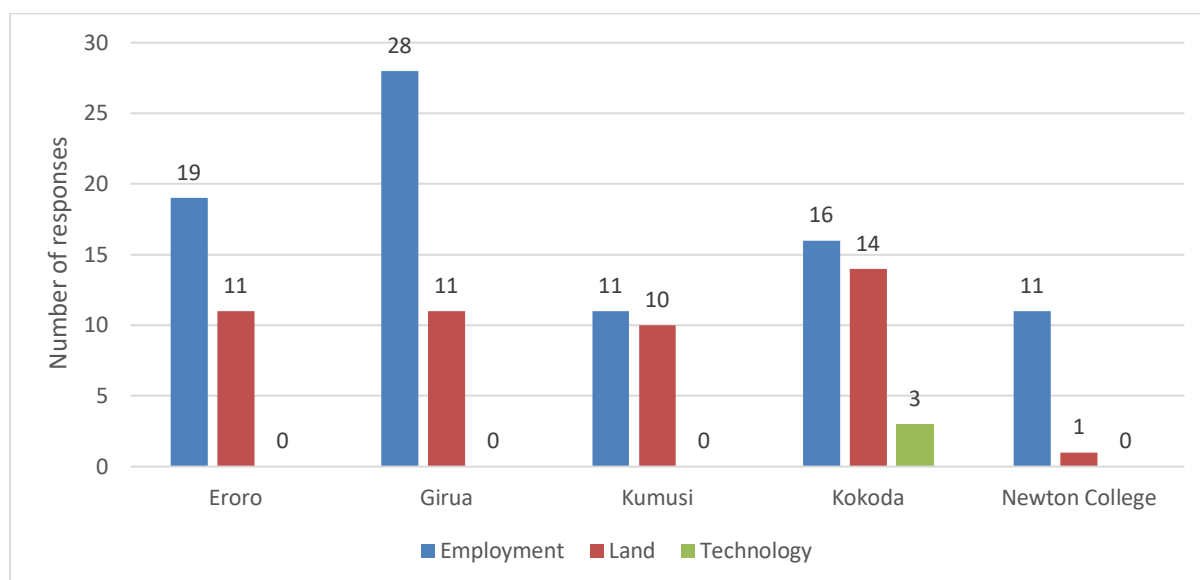


Figure 25 indicates that 135 respondents from the five focus group locations surveyed responded that access to employment and land had improved since the opening of the bridges. Girua, for example, had the highest number of counts for employment which includes informal productive employment as well as formal wage jobs. Participants at Kokoda identified improved access to employment and land to exploit resources such as forestry, for gardening, changing land use, or securing land tenure.

Focus group participants indicated less improvement in access to technology since the opening of the bridges.

Figure 25: Response Count on Access to Services by Focus Group Location



SUSTAINABILITY

Sustainability of the bridges is largely based on funding being provided by the national government to maintain the bridges on annual basis. The DoW Deputy Secretary advised that about PGK100,000 per year had been allocated to maintain the 4 reconstructed bridges. He said that PGK10.5 million had been provided through TSSP to maintain the Northern and Kokoda Highways in 2017-2019. The national government contribution is uncertain for future years due to funding cuts to the Department's budget. DoW will be developing a 3-5 year plan beyond 2019. He noted that Oro Provincial Government was not in position to assist with funding for the maintenance of the bridges and connecting national roads. Under the National Budget for 2017, Oro Province, under the recurrent conditional grants to Provinces and LLGs, Transport/Infrastructure Maintenance Grant: PGK4,064,700 was appropriated in 2017. No projections for future years was given. As the representative from the Oro PMV Association asserted, *"The roads must be maintained, otherwise the bridges will not serve their purpose."*

Ronald May noted in 2015 the tendency in PNG to promote big new projects at the expense of maintenance and ongoing running costs of existing assets and activities. Failure to maintain state assets – roads, schools, housing, vehicles and other equipment is a particular cause of infrastructure degradation in Papua New Guinea. The provincial government is taking steps to put aside funding for maintenance of the bridges and encourage the communities to take ownership of the bridges.

When asked, "What would have happened without the Oro Bridges Reconstruction Project?"

The DoW representative summed up what the majority of citizens in Oro Province would say: *"Basic services would not have been met. Everything would have been very slow. Trekkers would not have had access. The bridges broken, was like a hole in the bucket."* In other words, development efforts would be unsustainable in Oro Province without the reconstructed bridges in place.

VALUE FOR MONEY

Is the project worth the resources it costs? Having only been completed for one year, the benefits that have been generated are tremendous. The Oro Reconstructed Bridges Project has had an immediate impact on saving people lives, improving the health of infants and children, contributed to empowering women, giving a boost to the economy, and enabled the government to begin to improve service delivery. The ORBP has assisted the people of Oro Province in its mental wellbeing, as well as physical health. As one business representative expressed:

"The bridges only opened late last year. The progress is very, very slow. I think after two to three years we will see positive outcome. People are still starting all over again. It takes time to get there."

LESSONS LEARNED

A number of lessons have emerged from the evaluation study for different stakeholders:

Oro Provincial Administration

- Although the National Department of Works was responsible for implementation, the Oro Provincial Administration has taken the initiative to carry out awareness among the communities near the four bridges to look after the bridge, to make sure that others do not deface the bridge by graffiti or inappropriate behavior.
- The current Provincial Governor is taking measures to put funds aside for maintenance of the bridges. Every effort should be taken to foster and build maintenance culture in the government as well as community.
- The Provincial Police are aware of the increased speeding along the highways and is undertaking highway patrols to monitor activities along the road including the bridges. They are speaking with PMV drivers, and other vehicle owners, about speed limits, managing cargo weight, and number of passengers.
- There have been unintended negative effects of the improved transport infrastructure related to increased income (from improved economic conditions). Increased income is seen to lead to inability to manage money properly, increased alcohol consumption, both leading to a rise in traffic accidents and domestic violence within families and the community.
- Children and youth to be more aware of road safety at the village or in school and avoid playing on the bridge or road.
- The Local Level Government or Ward Councilor to take more responsibility for controlling inappropriate behavior around bridges such as dumping rubbish, violence, alcohol consumption, prostitution, sale of illegal items etc.

Project Management Supervision Consultancy

- The Project Management Supervision Consultancy (PMSC) and contractor developed a strong relationship with the community and provincial government. Measures were taken to manage any potential negative relations with the community. The support provided by the former manager of NBPOL to the contractor was a model for partnership between locally-based companies and short-term construction firms.
- PMSC encourage organisations to promote safety on and around bridges.
- PMSC encourage organisation to improve financial management among women, men, youth, and transport operators.

- PMSC encourage organisations to promote maintenance first for transport infrastructure assets amongst key stakeholders.

CONCLUSION

The Oro Reconstructed Bridges Project is highly successful. The community and key stakeholders were deeply grateful for the four reconstructed bridges. Interviews with community focus groups, key informants, businesses and government representatives showed positive emerging impacts for beneficiaries. These include improved transportation services such as more PMVs, shorter travel time between destinations, more frequent trips to markets and town, improved access to health facilities. Government operations in the sectors of law and justice, health, rural electrification, and transport services such as port and airport services, are combining to provide an enabling environment for further government outreach and for a conducive business environment.

Business activity appears to have increased since the bridges were opened; government and the private sector can plan with confidence and deliver goods and services, including transportation of people safely and reliably. There have been increases in use of financial services, the volume of cargo being shipped into and out of the province has taken an increase compared to lower levels in previous years, there has been an increase in the number of PMVs operating, sustained number of trekkers to Kokoda, and informal business activities by farmers, roadside markets, selected small businesses, and diversification of income generation activities by oil palm smallholders.

Villagers can now bring their garden produce and cash crops into town (coffee and cocoa) and can harvest their oil palm for pickup by the company, and in return are earning an income. The trip to town was very expensive 'before' due to payment of many service providers in-between and high cost of fuel and goods and services; but now all has returned to normal with accessible roads and bridges, and reduced PMV fares, and maintenance costs.

For economic activity, the trend is a very positive one. Improved access to markets, to information, to financial services, and agricultural inputs, is leading to increased sales and income received.

At every level of schooling, enrolments have increased. Initially this was due to the Tuition Fee Free policy, but then a spurt in school enrolments are seen during the time the bridges were reconstructed, indicating improved participation in education due to improved access, especially for secondary school students who had to travel much further than primary school children.

There has been major increase in the number of outpatients visiting health facilities, especially around the time of the new bridges were built. The number of outpatients throughout the Province rose to its highest level of 28,691 in 2016, coinciding with the year of opening of the new bridges. The level of attendance at outpatient clinics rose from 21,077 persons in 2013 to 28,691 people in 2016, by 36% a substantial increase.

A key indicator of poverty is child health, and these indicators especially low birth weight babies, were showing an immediate improvement in 2016.

Women are experiencing greater mobility, and able to access services better than during the time when the bridges were down. Women, along with men, are diversifying their income generating activities to earn more income. Women are taking up jobs and roles that were traditionally male dominated occupations such as policewomen, and transport operators. Women in Oro Province are being empowered. On the other hand, the indicators for women's maternal health in terms of accessing antenatal care and supervised deliveries, has deteriorated to 35%. This trend is well below the national average of 40 per cent in 2016. While the newly reconstructed bridges in Oro has removed a severe infrastructural difficulty, an indicator such as the state of maternal health, reveals that there are many other constraints affecting the management of development in the province.

ANNEX 1: TERMS OF REFERENCE

Terms of Reference

1. There was no baseline established prior to the commencement of the project. A baseline of key indicator data will need to be gathered from existing sources some 1-2 years prior to Cyclone Guba. An initial activity requires the collection of quantitative and qualitative data to construct a baseline of key indicator data prior to the commencement of OBRP to assist in assessing the impact of the investment. Key indicators should include, amongst others and where available, road conditions, traffic counts, travel times, passenger and cargo volumes, passenger charges, user perceptions, road safety and road incidents prior to Cyclone Guba. Data may be available from PNG national and provincial government agencies, project reports, the private sector, and community and citizen perceptions of road transport in the past.
2. Assess the cost effectiveness of the OBRP investment, recognising the contribution of investments made by the private sector and government, to improve trafficability between Oro Bay and Kokoda.
3. Using data collected, assess any outcomes and benefits, or otherwise, of the OBRP investment at a macro level for the economy of Oro Province.
4. In consultation with key stakeholders, determine and assess the nature and extent of direct outcomes and benefits, or otherwise, of the OBRP investment to key stakeholders such as the transport, agriculture, and tourist sectors; small to medium enterprises; employers, employees, and government and non-government organisations, including Civil Society Organisations and faith based organisations.
5. Select two villages, in consultation with TSSP, that are directly impacted by the investment and collect citizen experiences and perception data and determine and assess the outcomes and benefits, or otherwise, for local communities and citizens of the OBRP investment.
6. Assess the impact of this investment on men, women and children.
7. Identify unexpected outcomes of the OBRP investment and assess the impact on relevant stakeholders.
8. Identify and assess any issues likely to affect maintenance of the bridges and the sustainability of the OBRP investment by government and the private sector.
9. Describe and analyse the process and progress of the OBRP infrastructure investment determining what worked well and what did not, and lessons to be learned for similar investments in PNG.
10. Complete appropriate reporting protocols to be negotiated with the TSSP.

Key Research Questions

Key research questions are expected to focus on the following areas of interest to TSSP:

- Economic
- Private sector
- Transport
- Agriculture
- Tourism
- Men, women and communities
- Government
- Bridge and Road Maintenance
- Capacity Development
- Lessons learned

ANNEX 2: EVALUATION QUESTIONS

Evaluation Objective	Research questions (Data was disaggregated wherever appropriate based on sex and location)
<p>Outcomes and impact objective:</p> <p>A. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the transport sector?</i></p>	<ul style="list-style-type: none"> • Has there been a reduction in vehicle maintenance costs? • Has there been an increase in the number of PMVs servicing the routes? • What has been the extent of re-investment in new vehicles and equipment? • Have there been increases in the volume of crops hauled to processing and distribution points? • What is the trend in commercial operating costs? • Are women involved in transport services?
<p>B. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the agriculture sector?</i></p>	<ul style="list-style-type: none"> • How has the palm oil industry supported the reconstruction program? • What economic benefits have accrued to agriculture from reconstruction? • Have any new agri-businesses started up since the bridges were opened? • How have women and girls benefited?
<p>C. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the tourism sector?</i></p>	<ul style="list-style-type: none"> • Has bridge reconstruction changed patterns of tourism arrivals and trekking on the Kokoda Trail? • Have there been any changes in the volume and value of supplies for trekkers purchased in Popondetta or airlifted by trekking companies or trekkers themselves from Port Moresby? • What economic benefits have accrued to the tourism sector from re-construction? • Has there been an increase in supplies for trekkers in Popondetta? • Any particular impacts on women and girls?

<p>D. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the economy?</i></p>	<ul style="list-style-type: none"> • What are the financial costs and the economic benefits flowing from the reconstruction of the bridges? • What are the monetary impacts of direct kina flowing to local stores and accommodation during construction? • What are the monetary impacts of direct kina flowing from local employment during construction? • Are locals who worked on the project now more employable? • What has been the impact of the bridges on small and large scale business development along the highway? • Have there been unexpected outcomes on economic activity? • Has there been an increase in business productivity? • (Sales, flow of goods and services, volume and value of commodities) • What would have happened without the Oro Bridges Reconstruction Project?
<p>E. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the government?</i></p>	<ul style="list-style-type: none"> • What have been the effects of bridge reconstruction on provincial, local level government and community planning? • How has the provision of government services to rural areas improved? • What data are available relating to the extent of road incidents before, during and upon completion of the investment? • To what extent will activities, results and effects be expected to continue after the donor funding for the OBRP has ended? • What impact did the reconstructed bridges have on the national and provincial investment and/or recurrent budgets? • What plans has the DOW developed to improve connecting roads and to protect the new assets? • What would have happened without the Oro Bridges Reconstruction Project?

<p>F. <i>What outcomes and impacts have occurred as a result of the Oro Bridges Reconstruction Project - In the community and NGOs?</i></p>	<ul style="list-style-type: none"> • Have wider project objectives been met, such as poverty alleviation, health, income increase in the short time frame? • What are the trends in health and education statistics? • What are the trends when disaggregated by sex? • Have Non-Government organisations increased community based initiatives over the past 2-3 years?
<p>Counterfactual</p>	<ul style="list-style-type: none"> • What would have happened without the Oro Bridges Reconstruction Project?
<p>Sustainability</p>	<ul style="list-style-type: none"> • Identify and assess any issues likely to affect maintenance of the bridges and the sustainability of the OBRP investment by government and the private sector.
<p>Lessons learned objective</p>	<ul style="list-style-type: none"> • Lessons learnt resulting from the conclusions of the evaluation.

ANNEX 3: DOCUMENTS AND PUBLICATIONS

Documents

Oro PMV Association – Number of Public Motor Vehicles (PMV) registered operators: Between 2008 – 2014; 2016-2017 periods. Number of PMVs operating on rural routes. Current number of female PMV drivers/operators. Current official prices for passengers and for cargo.

PNG Ports Corporation: Oro Port Annual Throughputs: Annual statistics 2011-2016.

Department of Health National Health Information System data for Oro Province, 2012 – 2016.

Education statistics – Oro Education Performance Status Progress Report for 2016. Enrolment statistics for 2013.

Kokoda Track Authority – Annual Statistics 2007 to 2017: Number of Trekkers

Oro Growers Association for Oil Palm: summary data of smallholder block members for selected Pay Periods for - September 2017, October 2013, and February 2011. Higaturu Oil Palms – Smallholder FFB Price Calculation for April 2016

National Population Census 2011 – Population by Local Level Government, Northern Province.

Bank South Pacific: Number of business loans each year (2012-2017) in Oro.

Department of Treasury: 2017 Budget Estimates of Revenue and Expenditure: Appropriation and projections for TSSP Phase 2, National Bridge Maintenance, and for the Maintenance of National Roads – Kokoda Highway.

Higaturu Company fruit collected to the mill (FFB) from out-growers and plantations. Volume of CPO and KPO transported to port.

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- Oro Provincial Administration. (2006). *Provincial Education Plan 2006-2015*.
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- Soso, C. (2017). 'Oro Education Performance Status, Progress Report' December 2016, Standards Branch, Oro Provincial Administration, Division of Education. Unpublished
- Project documents supplied by the TSSP:
- The TSSP Department of Works Project Design Document
- Relevant monitoring and progress reports
- SMEC Funding Agreement with the Project Management and Supervision Consultant (PMC)
- Monitoring and Evaluation Framework.

ANNEX 4: KEY INFORMANTS

Number of Interviewees	Organisation(s)	Location	No. of Females
1	New Britain Palm Oil Limited (former GM)	By phone	
1	Kokoda Track Authority	Port Moresby	
1	PNG Trekking Adventures	By phone	1
1	PNG Ports Authority, Oro Branch	Oro Bay	
1	People's Micro Bank (NDB), Oro Branch	Popondetta	
1	Best Price Retail & Wholesale	Popondetta	
1	Agmark Limited, Oro Branch	Popondetta	
1	NBPOL – Higaturu	Popondetta	
1	Oro Guest House	Popondetta	
2	Provincial Department of Works	Popondetta	
1	Oro Provincial Planning Office	Popondetta	
1	Provincial Police Office	Popondetta	
	Nasfund, Oro Branch	Popondetta	

1	Agriculture Division Office	Popondetta	
1	Health –Disease Control & Emergency	Popondetta	
1	Provincial Health Office	Popondetta	
1	Provincial Education Office	Popondetta	
1	Village Court Zone 2	Eroro	
1	Prov. Monitoring & Evaluation Office	Popondetta	
2	Department of Works	Port Moresby	
1	Office of the Governor, Oro	Port Moresby	
1	Oro Family & Sexual Violence Action Committee	Popondetta	1
2	Oro Grower's Association for Oil Palm	Popondetta	
3	Oro PMV Association	Popondetta	
1	Salvation Army	Popondetta	

ANNEX 5: FOCUS GROUP DISCUSSION GUIDE

1. Describe your experience after Cyclone Guba when the bridges were washed away and when you tried to reach services from 2008?

What are some of your experiences you can remember about those trips?

2. After Cyclone Guba, from 2008 to 2014, how did you cross the river? How often would you cross the rivers to go to town or access services?

Activity	Number of person trips per month	Average travel time	Average cost
Markets			
Aid Post			
Hospital			
Community school			
Secondary School			
Village Court			
Extension advice			
Church			
Commodity buyer			
Town			

3. What good news stories can you tell us about the new bridges?

4. How have travel times improved with the opening of the new bridges?

SERVICES	ESTIMATED DISTANCE	MODE OF TRANSPORT	DURATION OF TRIP	FREQUENCY	ACCESS RANKING	COSTS	COSTS
		1.walk 2. PMV 3. private vehicle 4. other	1.<30 min 2.30-60 min 3.60-90 min 4.90-120 min 5.120 min+	1.Few times each week 2.Once a week 3.Once a fortnight 4.Once a month or less 5.A few times each year 6.Never	(how do you rate accessibility to the service) 1. Good 2. Fair 3. Poor 4. Affected by seasonal rains	Passenger Fares	Cargo charge
Markets							
Aid Post							
Hospital							
Community school							
Secondary School							
Village Court							
Extension advice							
Church							
Commodity buyer							
Town							

Any comments about the changes or trends?

5. *Have the new bridges assisted people with disabilities and HIV/AIDS?*

What is your experience, or what have you observed?

6. *Do you see more children going to school now, and with greater safety with the new bridge in place?*

	Fewer going	About same number	More attending
Number of children			

7. *Since the new bridges were constructed, has there been improved access to extension services or outreach? If yes, what type?*

Scale	Small change	Big change	No change	Comments
Agriculture				
Health				
Business support				
Tourism				

8. *Have there been any improvements in service delivery to your community or to you individually since the construction of the new bridges?*

Has access to following different dimensions changed with the new bridges?

Poverty Dimension	Factors related to rural access	Yes	No
Employment	Better means of transport. Time distance and cost		
Land	Distance/time/energy to fields		
Technology	Private sector suppliers e.g. ICT, processing equipment		

Information	Coverage by extension workers. Radio, telephones, postal		
Credit	Location of credit facilities		
Education	Schools accessible		
Health Services	Health centres accessible		
Water	New water supply equipment		
Energy	Access to electricity. Supply of wood		
Markets	Roadside markets set up		
Transport	Transport services, number of vehicles, PMVs		

Comments

9. *Were any of you employed by the construction company that built the bridge or any other group to provide services to them? If yes, what kind of work? And for how long?*

Comments by those who actually were employed – Get name and contact details for separate interviews

11. *Since the new bridges have been built, have any of you increased contact with other social groups to improve your livelihood? Which groups or institutions?*

Scale	Small change	Big change	No change	Comments
Interpersonal relationships				
Membership of networks				
Links with institutions				
Groups or committees				

Government				

13. *Since the new bridges have been built, what kind of changes been made in the way you use your land for gardening, forests, or using your natural resources for tourism, mining?*

Activity/Scale	Small change	Big change	No change	Comments
Market gardens				
Forests				
Palm oil cropping				
Tourism				

14. *How have women benefited?*

15. *How have children (up to 17 years of age) benefited?*

16. *What have been the benefits for road safety?*

18. *Since the new bridges have been built, what kind of social problems have you been experiencing?*

20. *Since the new bridges, have there been any accidents, death, or loss of earnings experienced?*

21. *Do women and girls feel safe travelling on the bridges and roads without fear of gender-based violence? If no, why?*

23. *Do transport operators make stops at the bridges? For what purpose*

24. *Do you raise issues relating to the bridge or road with your Counselor? Or with any other committee or authority? Who do you go to? What are the main issues?*

Closure

Thank you very much for coming today. Your time is very much appreciated and your comments have been very helpful.

ANNEX 6: FORMAL SURVEYS

Income Survey

1. Do any household members receive income from the following? What are the sources of monthly income for your family?

Source of income	How much income does your family receive each month?	Is this an increase since the time after Cyclone Guba happened?	
		YES	NO
Palm Oil Mini-Estate			
Vanilla			
Timber			
Cocoa			
Copra			
Coffee			
Selling garden food at markets			
Selling cooked food at markets			
Betel nut (wholesale)			
Sago			
Tobacco			
Trade store			
Kerosene sales			
Fuel sales (diesel/petrol)			
Firewood			
Fish sales			
Petty trading (smoke, beer)			
PMV enterprise (car or boat)			

Chickens			
Pigs			
Land rents			
Remittances (money from wantoks living elsewhere)			
Handicrafts			
Woodwork			
Other?			

17. Where do you sell your produce most frequently?

- a. Roadside market _____
- b. Nearby market _____ (nearest town market)
- c. Distant market _____ (further away town market)
- d. Town market _____

18. How often do you sell your food crops at your most frequently used market?

- a. more than once a week
- b. once a week
- c. several times per month
- d. other, explain

19. How much do you pay to hire the vehicle per trip? _____ kina

20. What type of vehicle do you use most often to transport your products to market? (circle)

PMV – Bus or Truck

Private – Car, Bus or Truck

21. How much is the bus fare/transport cost for transporting goods? _____ kina per _____ unit

22. What is your average market income per trip?

Food crops Cash crops

- a. Roadside market _____ kina _____ kina
- b. Nearby market _____ kina _____ kina
- c. Distant market _____ kina _____ kina

23. How many people are in your household? _____ Total _____ Male _____ Female _____

24. How many times in two (2) weeks do you go to the market? _____ times per 2 weeks

25. From one market trip, how much do you earn? _____ kina

26. What are other the sources of monthly income for your family

a. Seasonal labour? _____ kina.

b. Monthly salary income (if any) _____ kina

c. Other sources of income _____ kina (e.g. services and small business income such as sewing, repairs, mechanics, carpentry, etc.)

27. Total average family monthly income? kina _____

28. Average income from all sources during the past 12 months (one year). Please indicate all sources of income, even temporal ones, for all household members. Remember to indicate whether the income was generated by a male (M) or a female (F) household member.

Source of income Gender (M/F)

Frequency Kina Total kina

*END THE HOUSEHOLD INTERVIEW BY THANKING THE PERSON(S) FOR THEIR TIME.
RESEARCH ASSISTANTS – YOU ARE NOT FINISHED! PLEASE ANSWER QUESTION 51
BEFORE YOU COMPLETE THIS HOUSEHOLD. MAKE A FEW NOTES BEFORE YOU GO TO THE
NEXT HOUSEHOLD AND PLEASE MAKE AN ASSESSMENT OF THE FOLLOWING:*

30. Relative to other households in the village/community, would you categorize this household

as: Well off/rich? Average? Poorer than average? Circle your response.

Use such criteria as land holdings, type of the house, assets, etc.

Water and sanitation facilities?

Quality of housing?

THANK YOU VERY MUCH FOR YOUR TIME AND SHARING OF INFORMATION FOR THIS
SURVEY

PMV Operators/Transport Providers (Cargo) Survey Instrument

This questionnaire is being administered under the Social Impacts Study of the Transport Sector Support Program (TSSP), financed by DFAT. We would like your assistance in providing us with information about road transports.

Date of the interview: _____

Road name _____ Name of Village/Province _____

Name of Enumerator: _____

Name of PMV Business /Name (person interviewed): _____
(owner or works for the owner)

Gender of the respondent: (Male/Female)

Is the husband or wife present during interview? Yes/No/Single-headed household ____

Age of respondent: _____

Occupation of respondent: _____

Educational status of respondent: _____

Number of children (own and adopted, alive ones, ones still living in the same house): _____

Date: _____

Start time: _____ End time: _____

1. Which is the road you most frequently use?

Origin _____ Destination _____

Frequency, Distance and other figures

Day	from	To	Distance	Number of passenger	Number of females	Number of males	Number of children	Number of cargos
Sun								
Mon								
Tue								
Wed								
Thu								

Fri								
Sat								

4. How many stops do you make to pick up passengers _____ pick up freight _____
5. Do you stop / spend nights at truck stops? Yes/No If yes, how often _____per month
6. What type of vehicle do you drive? a) Car b) Bus c) Minibus d) Light Truck e) Medium Truck
f) Heavy Truck g) Tractor-trailer h) Tractor
7. You are:
 - a) the owner of the vehicle, b) renter of the vehicle, c) driving a vehicle hired by the government
 - d) work for government, e) hired to drive vehicle (private sector)
8. If you are the owner: how many vehicles do you own? _____
9. If you are the renter: what vehicle leasing fees do you pay per month? _____
10. If you are the renter or a driver: who usually pays for the vehicle repair – you or owner?
 - a) Renter/driver b) Owner
11. How much do you pay on average for your vehicle repairs?
 - a) Per month kina _____ b) Per year kina _____
12. What is the fuel cost/litre? _____ (kina) petrol / diesel (please circle)
13. What type of cargo do you usually carry?
 - a) Passengers, b) Food c) Non-food (please specify _____)
 - h) What is the freight fee you charge on your most frequent route? _____(kina)
18. Do you allow passengers throwing rubbish from your PMV? Yes No
19. If you carry passengers, how many passengers on average per trip? _____
20. Do you stop for passengers along your route?

Yes: why _____

No: why not _____
21. If you make stops, how many passengers do you get per stop that is not your primary (i.e., final) destination? _____(number of passengers)
22. Do you drive on the roads that go to the villages away from the road you use most often? Yes/No
 - a) if yes, specify which roads _____ to what villages _____and why _____
23. If yes to 22, which of these roads would you like to see repaired? _____

And why? _____
24. How much do you earn per month by operating this vehicle? _____(kina)

Trade Store Owners Survey Instrument

We represent the Social Impacts Study managed by the Transport Sector Support Program (TSSP) financed by DFAT. We would like your assistance in providing us with information about road transports and the prices of some of the main commodities.

Date of the interview: _____

Road name _____ Name of Village/Province _____

Name of Enumerator: _____

Name of Trade Store /Name (person interviewed): _____
(owner or works for the owner)

Gender of the respondent: (Male/Female)

Is the husband or wife present during interview? Yes/No/Single-headed household ____

Age of respondent: _____

Occupation of respondent: _____

Educational status of respondent: _____

Number of children (own and adopted, alive ones, ones still living in the same house): _____

Date: _____

Start time: _____ End time: _____

1. What is the road you use most often to transport goods? From _____ To _____

2. How many times did you transport goods along that road during the last month? _____

3. Do you transport goods on the roads that go to the villages away from the road you use most often? Yes/ No

b) Yes, specify which roads _____ to what villages _____

4. If yes to #3, which of these roads would you like to see repaired? _____

Why? _____

5. How far do you transport your goods on the road that you use most often? _____ kilometres

6. Do you own the vehicle(s) you use for transporting your goods? Yes No

7. If you hire vehicles, 'How much do you pay for hiring? _____

8. What type of cargo do you usually transport?

a. food

b. non-food (please specify _____)

9. How much are you currently paying for the transportation of your goods?
_____ kina

10. How much do you earn per month from the trade store? _____ kina

11. Which would be the benefits of an improved road?

a) Easier and faster movement

b) Reduction in transportation cost

c) Other

Please complete the middle column of the table for the trade store price in this village. Please make sure you have the price from the provincial capital in the far right column. Collect the prices first in the villages and then the prices of the same products in the provincial capital.

Commodity / unit Trade Store Price Provincial Capital Price Package of salt Sugar 1kg Rice 1 kg
 Soap bar Petrol 1 litre Kerosene 1 litre Tinned fish Tinned meat

Commodity	Unit Trade Store Price	Provincial Capital
Package of Salt 500 g		
Sugar 1 Kilogram		
Rice 1 Kilogram		
Soap bar		
Tinned fish (large tin)		
Tinned meat (large)		
Petrol 1 litre		
Kerosene 1 litre		