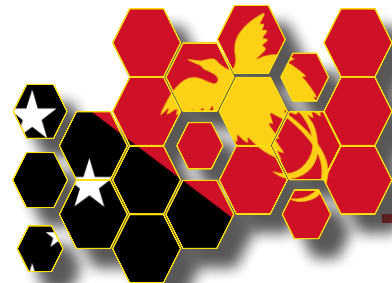




Empowered lives.
Resilient nations.



Seeding Social Enterprise in Papua New Guinea



FOREWORD

Papua New Guinea is one of the fastest growing economies in the world. Given the abundant endowment of natural and mineral resources, extractive industries thrive in the country enabling citizens to subsist on the growth that is generated. The economy has received a further boost from the positive political environment and government support in recent times. Further, a number of development partners from across the globe are likely to remain engaged with the country's progress over the next decade. There is however tremendous scope for socio-economic and broader human development throughout the country: 85% of the population remains unbanked; less than 15% of the population has access to electricity; 60% of the population does not have access to safe drinking water; approximately 40% of the population struggles with basic literacy and numeracy; and around 36% of the population is still living in poverty.

Increasing government expenditure and development assistance alone will not suffice for economic growth and sustainable development of PNG in the long-run. It is heartening to note that a number of entrepreneurs in the economy have identified this as a business opportunity. They have set off on an entrepreneurial journey with ideas, research and pilot projects that aim to create impact through generating new skills, jobs and improved livelihoods, searching for private sector solutions to the many development challenges that the country faces. The potential growth of these impact enterprises can be attributed to three reasons. Firstly, the population of PNG is comparatively young with a large pool of people who are employable. Secondly, over the last few years, disposable incomes have increased greatly in many parts of the country and this has increased the demand for goods and services. Rural-urban migration has led to a change in consumption patterns, and created new opportunities for local businesses to meet these changing demands. Thirdly, the government, national organisations - such as the faith groups together with development partners are actively supporting various social sectors in PNG. If these conditions sustain, PNG has the potential to see a well-developed and profitable impact enterprise ecosystem in the future.

UNDP Papua New Guinea commissioned this landscaping report "Seeding Social Enterprise in Papua New Guinea" to highlight the market potential, opportunities, challenges, and spaces for impact enterprises in PNG across six sectors: agriculture, clean energy, education, financial inclusion, healthcare, and water and sanitation. The report also presents findings from a survey of 80 social enterprises operating in PNG and discusses case studies of successful social enterprises from Africa that address similar challenges and can be replicated in PNG.

This analysis shows that there is enormous market potential for social enterprise activity in each of the six sectors. Improvement in ICT infrastructure and the increasing penetration of mobile money are two key factors that are likely to encourage impact entrepreneurship. However, considerable challenges exist and sector experts believe that for these enterprises to sustain and grow, they will need support in various forms. Some of the areas that require further work include setting up incubator platforms, improving access to finance, encouraging seed and crowd funding possibilities, and improving governance. If the challenges in these areas are successfully addressed through initiatives like the Kumul GameChangers programme, the future for social enterprises in the country is likely to be promising.

We hope that this Report will help to stimulate more discussion throughout the country on these issues and that this in turn will lead to more action to create new opportunities for Papua New Guinean entrepreneurship. Together we can create a better environment for enterprises to thrive and make a stronger contribution to the country's development.



Roy Trivedy

ACKNOWLEDGEMENTS

This report documents findings from research on the emerging impact enterprise landscape in Papua New Guinea (PNG). We are grateful to UNDP for this opportunity to study this new and exciting market.

We are indebted to entrepreneurs who shared their experiences in setting up impact enterprises in PNG. We are very thankful to the experts in PNG, who gave us time for conversations and shared insights on different sectors and the business environment in PNG. We are also grateful to impact enterprises from Africa, who shared their experiences for creating the global case studies featured in this report.

Special thanks to Sweta Sud and her team at PNG Institute of Banking and Business Management Inc. and the Kumul Game Changers team for their support for our impact enterprise survey.

Authors (The Consulting & Research Team, Intellectap):

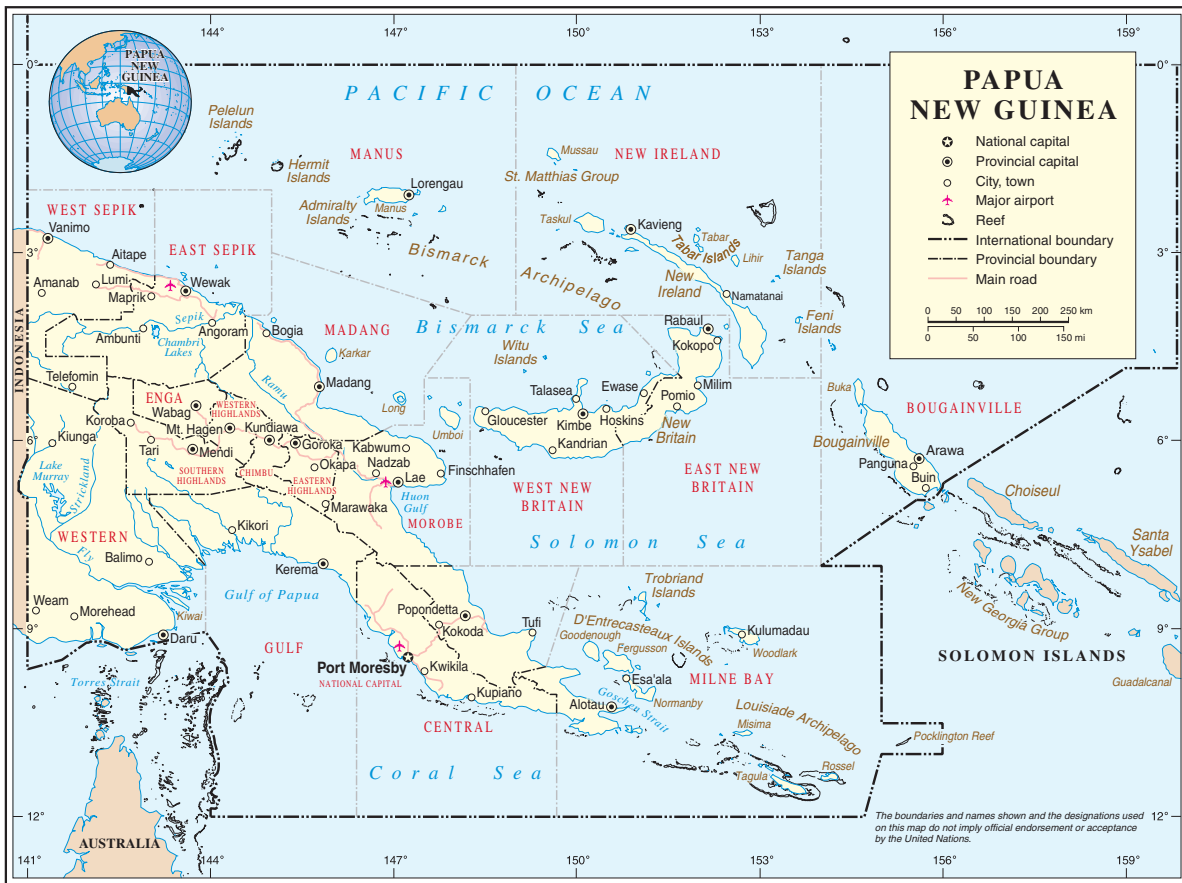
Usha Ganesh, Priyanka Kohli, Saurabh Sinha, Yoshita Arora, Sasmita Patnaik, Anuja Kaushal, Shreejit Borthakur

Senior Advisors:

Tenzin Keyzom Ngodup (UNCDF), Nisha Dutt (Intellectap)



| | |
|--------------------------------|-----|
| HIGHLIGHTS OF THE STUDY | 7 |
| INTRODUCTION | 14 |
| SURVEY FINDINGS | 22 |
| AGRICULTURE | 30 |
| CLEAN ENERGY | 44 |
| EDUCATION | 56 |
| FINANCIAL INCLUSION | 70 |
| HEALTHCARE | 88 |
| WATER AND SANITATION | 104 |
| FINAL NOTES | 116 |
| ANNEXURES | 118 |



MAP OF PAPUA NEW GUINEA: <http://www.un.org/Depts/Cartographic/map/profile/papua/pd>

Globally, the endeavor to achieve inclusive growth includes the participation of the private sector – be they large corporations or small for-profit impact enterprises that engage with low-income populations. The latter, in particular, are seen to provide traction for employment creation, provide necessary accountability, wider ownership and avenues for returnable capital to catalyze inclusive growth. Governments as well as donor and development finance institutions are, therefore, keen to create ecosystems that support these inclusive businesses.

Papua New Guinea is marked with diversity – its geographic landscape is unique as well as difficult with mountainous interiors, volcanic islands and forests. It is also a country of cultural diversity with around 7.4 million people speaking over 800 languages. Among the world's first farmers, the country has a history of human settlement for around 60,000 years. PNG has been a completely independent nation since 1975, and seen a stable government since 2012. With an annual GDP growth rate of 5.4%, it is one of the fastest growing economies in the Oceania region. Over 80% of the population is dependent on agriculture for their livelihoods and over 85% of the population is rural.

PNG is also confronted by a multitude of challenges – 85% of the population is unbanked, only 13% of all households have access to electricity, and the country has a high maternal mortality rate of 220 maternal deaths per 100,000 live births. In addition, 60% of the population survives without improved drinking water sources, and more than 80% of the population does not have access to improved sanitation facilities. PNG has limited infrastructure for providing quality education, healthcare, water supply, sanitation, electricity, telecommunications and formal financial services. The lack of basic facilities and low level of development is reflected in PNG's human development index rank (2014) of 157 out of 187 countries.

The need for basic services has encouraged several young and first generation entrepreneurs to pilot, research and innovate solutions to meet development challenges. Some of these impact enterprises are running successful operations while others are

engaged in smaller pilots, and yet others are at the idea stage. While many of these impact enterprises are operating in the agriculture sector, our study of enterprises in the pre-revenue stages (ideas, research and pilot) indicates that several ideas in the education (schools as well as skill development and vocational education), healthcare, financial inclusion and ICT sectors are waiting in the wings to take off.

The current impact enterprise activity in PNG, particularly visible in the idea and pilot stages, is fueled by some broad enabling trends. These drivers of impact enterprise growth include a young population and increasing urbanization ushering other changes such as the shift to a cash-based economy and changing consumer preferences. Enabling regulation and infrastructure could further support improved connectivity and growing flow of information and awareness. Concerted efforts from the Government as well as donor and development finance institutions to build a strong ecosystem of financial and non-financial support to these fledgling enterprises will ensure the foundations of a robust impact enterprise landscape in PNG.

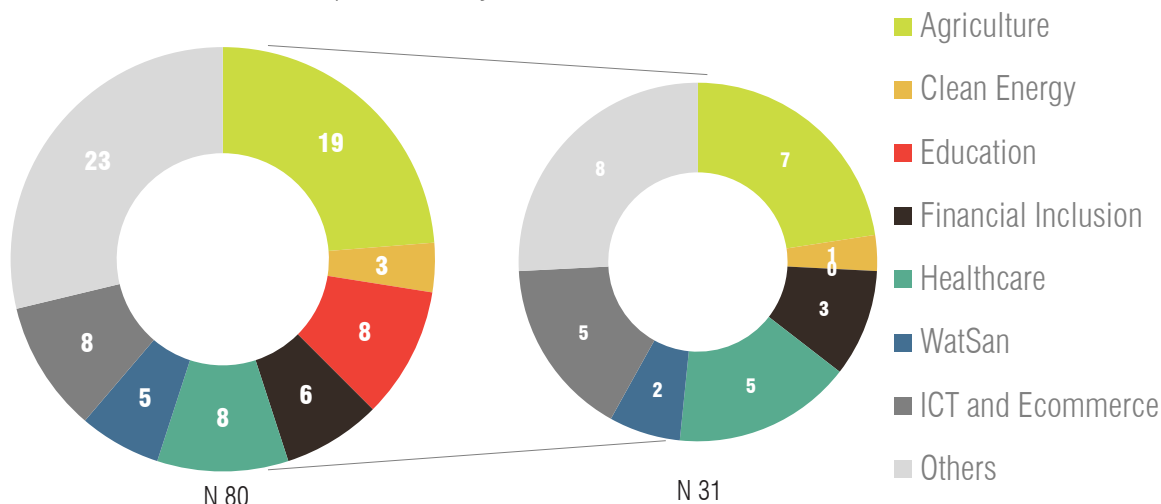
Understanding impact enterprises in PNG

The Kumul GameChangers Competition invited entrepreneurs to share their ideas and business models and provided them a platform to showcase their ideas to raise funds, receive strategic planning support and mentoring, and access to global networks. The competition also brought into the spotlight an emerging impact enterprise movement in PNG – it received over 300 applications from entrepreneurs with ideas ranging across all impact and potentially high growth sectors.

Of these, our team surveyed a sample of 80 enterprises from the six focus sectors: agriculture, clean energy, education, financial inclusion, healthcare, and water & sanitation. Detailed survey responses from 31 enterprises helped us understand their challenges, growth drivers, motivations and future plans.

Most impact enterprises in the survey are young, with average

Figure 1: Sector wise distribution of enterprises for survey



operational period of less than a year. They earned less than 100,000 PGK last year. Interestingly, many of the entrepreneurs hold graduate and post graduate degrees. Despite a robust employment market that is willing to pay a premium for local skilled personnel, there seems to be a growing interest among the skilled talent pool in PNG to tap emerging opportunities and create positive social and environmental impact through their own organizations.

Most of the 31 enterprises are located in the Papua, Momase and Highlands regions. Their key customers were individuals and households, followed by small and medium business owners and large companies. Access to timely and adequate finance was identified as the biggest challenge for most entrepreneurs, followed by infrastructure availability and mentorship support. Entrepreneurs identified a strong and growing local customer base as their biggest driver for growth, followed by enabling government policies and subsidies, and increasing urbanization. In terms of supporting interventions, most enterprises suggested that access to investors and funders were very relevant, as were technical or specialized skills and mentoring support. Limited availability, high cost and poor knowledge of the relevance of these support services and activities constrained many enter-

prises from accessing them.

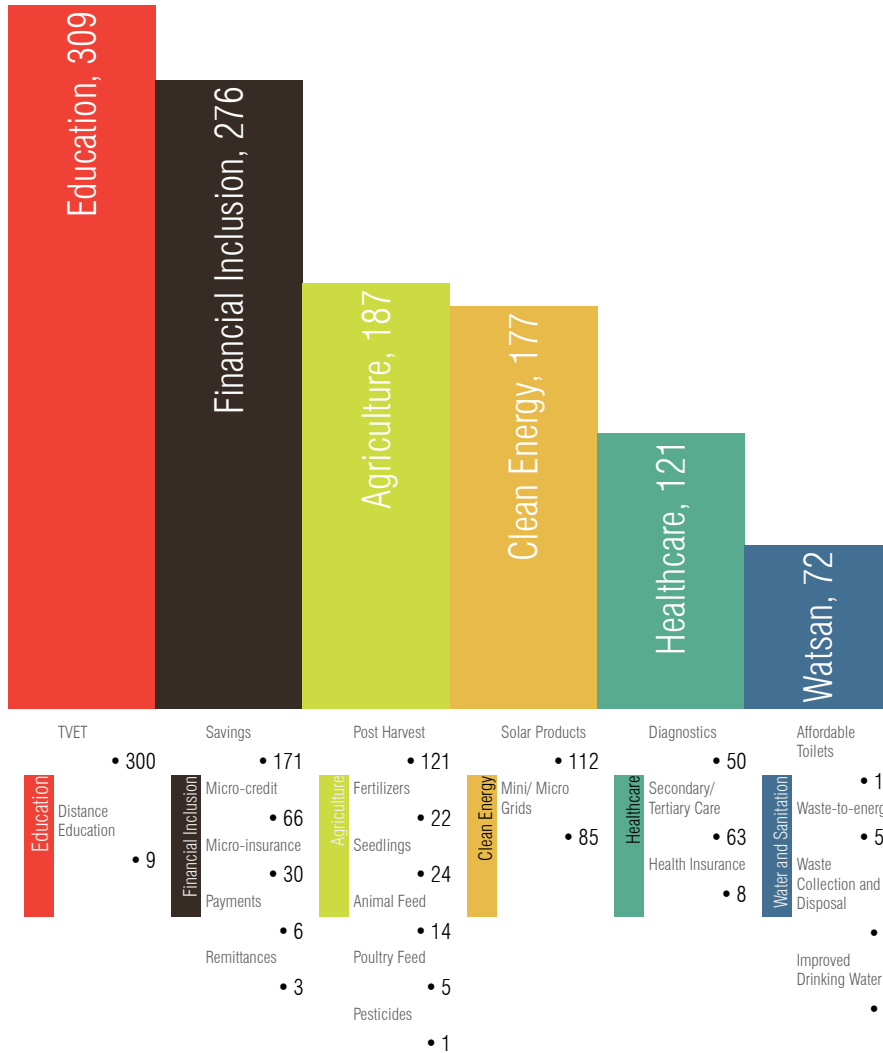
Estimating the market potential for impact enterprises

The team also attempted to estimate the market potential for these impact enterprises in some of the high potential segments. Given the nascent market, these estimations are top-down and serve as the baseline or starting point for further analysis.

The estimations were arrived at considering the number of potential customers that constitute the low-income population needing a particular product or service in PNG, the average price that the customer is willing to pay and an estimate of usage for a specific period of time. The market potential is the estimated market size that impact enterprises can realize in a particular sector or sub-sector in PNG. (For details on market estimation, please refer to the annexure)

Given the high proportion of youth and employable population, the technical and vocational training segment has a sizable catchment of potential customers. Limited education infrastructure has led to high cost of higher or vocational education. Thus, the

Figure 2: Market size estimation for impact enterprises in PNG



All figures are in US\$ (mn)
For details on market estimation, please refer to the Annexure

education sector has a high potential market estimation (US\$309 mn), but will need significant investment in content and physical infrastructure as well as ICT before impact enterprises can tap into this growth.

Savings and credit services to include the unbanked would help mainstream these neglected populations quickly. Urbanization and rural migration highlight the need for efficient remittance and payments services.

Similarly positioned, the financial inclusion sector (US\$276 mn) reflects the limited reach of the financial infrastructure and the shift from a subsistence-based economy to a cash-based one.

Agriculture (US\$187 mn) indicates strong market potential in segments such as post-harvest food products, fertilizers, seeds, animal feed and pesticides. This sector appears to be relatively

easier for impact enterprises, which is also validated by the scores of idea and revenue stage enterprises in the post-harvest segments of this sector.

Despite abundant natural resources and the low levels of electrification, the clean energy (US\$177 mn) sector is yet to see strong operational presence of impact enterprises. As the base requirement for efficient provision of ICT and other technology enabled services, energy is a critical growth sector. Limited customer awareness and the high initial investment required from entrepreneurs act as deterrents to impact enterprise activity. The sector could reach its potential with improved access to finance from small enterprises.

With a strong government presence, the healthcare sector (US\$121 mn) indicates the limitations of physical healthcare infrastructure to reach remote rural areas. For improved outreach, healthcare requires private sector participation in the diagnostics and secondary or specialty care segments to achieve last mile reach by leveraging ICT.

The water and sanitation sector indicates the least market potential (US\$72 mn), as there is limited willingness to pay for services that are either considered to be the responsibility of the government or are traditionally free. Since this sector requires significant consumer education, there is a strong presence of donor and grant making organizations, which could further distort the market for for-profit enterprises seeking to charge a fee for their services. There is however, potential in waste-to-energy, improved toilets and safe drinking water solutions.

Identifying opportunities and white spaces

While the market potential estimation indicates strong unmet demand in all the focus sectors, not all sectors can support impact enterprise activity immediately. While some are constrained due

to high capital requirements, others are limited by poor infrastructure and ICT development. We identified white spaces that seemed to currently pose relatively lower barriers to entry for impact enterprises in the focus sectors.

Agriculture has the largest potential for employment, and also supports the largest proportion of population. With lower regulatory barriers, we see growth opportunities for impact enterprises in the post-harvest food processing and distribution as well as in pre-harvest agri-value chain activities such as provision of inputs, technology and extension services. In the livestock segment, impact enterprises can tap opportunities in animal and poultry feed. However, the sector faces significant infrastructural constraints. Lack of infrastructure in PNG is not only limited to the road network for effective transportation of the produce, but also extends to the post-harvest infrastructure such as warehouses and cold storage facilities.

Clean energy remains a largely untapped market, particularly given the low electricity access in PNG. Enterprises providing clean energy products or services in PNG may find difficult to reach out to customers in remote, rural areas in the absence of civil infrastructure. Impact enterprises can tap opportunities in the solar lighting products and mobile charging solutions segments. Mini/ micro grid services have good potential in PNG, given adequate institutional and government support.

The number of students seeking elementary, primary and secondary education is high due to the sizable young population in PNG. There is significant demand for technical and vocational education as well as distance learning. Most elementary, primary, secondary and tertiary schools are owned and managed by the government or by the church, while for-profit private sector schools predominantly serve the high income population. Lack of internet and communication technology also constrains expansion of existing delivery platforms. Impact enterprises that

support educational institutions, as well as those with innovative business models such as affordable schools could tap into the potential of this sector.

Inaccessibility of formal financial institutions and poor financial literacy has led to low financial services penetration in PNG across regions. Informal credit is common among low-income communities; formal micro-credit currently caters to only 0.4% of the total population. Micro-insurance demand is low due to presence of strong community support systems. Domestic remittance services are largely informal, and are utilized by migrant workers who send money to their families in rural areas. Impact enterprises could provide last-mile solutions for financial services of commercial banks and microbanks. They can also tap into opportunities in technology enabled solutions for remittances and payments.

Poor healthcare indicators and increase in non-communicable diseases drive the demand for treatment services. Drug distribution and treatment services are primarily provided by the government, while there are some private hospitals in urban areas. Low-cost hospitals that adopt a hub and spoke model can be effective in reaching out to underserved communities in remote locations. Last mile pharmaceutical retail presents opportunities for impact enterprises, while pharmaceutical manufacturing also has significant potential for development.

Until early 2015, there was no comprehensive water and sanitation (watsan) national policy in PNG. Lack of awareness about improved watsan products and services, and the resulting low demand constrains private sector activity. As government investment is inadequate to meet the growing watsan needs in PNG, public-private partnerships present opportunities for the private sector. Drinking water supply and rain-water harvesting have high potential, while waste treatment and recycling services such as

conversion of waste to energy has significant opportunities for impact enterprises.

There is potential for enterprises that focus on women empowerment and youth employment. As nearly half of the country's population is below 25 years of age, there is demand for employment opportunities. PNG is also witnessing a surge in youth led enterprises across various sectors including agriculture, clean energy, education and ICT.

Women are largely engaged in the informal sector and contribute to more than 50% of the workforce in agriculture. Other sectors which have seen women participation in business include transportation, construction, hospitality, microfinance, energy, and media. The Government supports cooperatives to strengthen the role of women through training in business skills, farm economics and management. Promotion of women entrepreneurship in PNG is also a key focus area for many development and donor institutions. Associations such as Business Coalition for Women, PNG Women in Business, Business Women Forum are promoting economic, social and holistic transformation of women entrepreneurs through business knowledge and skills training programs. However, despite these initiatives, the participation of women in the formal sectors remains low.

Each of these sectors and segments meet critical and basic needs, particularly among low-income populations, and contribute to better quality of life and employment creation. As we conclude our analysis, we are keenly aware of the fact that we have only scratched the surface of this promising space. There is a need to follow this overview effort with detailed reports on each of the sectors that delve deeper to identify ways to grow impact entrepreneurship, and white spaces in specific enabling support initiatives in PNG. We hope this report helps inform these initiatives and marks the beginning of a rewarding journey ahead.

INTRODUCTION

Private sector enterprises, particularly businesses that provide affordable products and services or generate income and employment opportunities for low-income communities, are seen as key stakeholders in catalyzing sustainable growth in developing countries. Indeed, governments are recognizing that entrepreneurship has a multiplier effect, increasing incomes and income earning opportunities for others. Hence, providing an enabling environment for their growth and development is high on development agendas today. This said, developing economies face unique and often extremely difficult challenges that hinder such an enabling environment. The United Nations Development Programme (UNDP) seeks to encourage private sector participation in such environments to break the cycle of low growth and low development. This research focuses on one such emerging economy in the Pacific, Papua New Guinea.

With an annual GDP growth rate of 5.4%,¹ Papua New Guinea (PNG) is one of the fastest growing economies in the Oceania region. An agrarian economy, over 80% of the population is dependent on agriculture for their livelihoods. The economic growth of PNG is largely driven by extractive industries such as mining and natural gas. Despite robust economic growth, PNG faces a multitude of challenges - 85% of the population is unbanked, only 13% of all households have access to electricity, and the country has a high maternal mortality rate of 220 maternal deaths per 100,000 live births, the quality of education is poor and the country is prone to regular natural disasters. In addition, 60% of the population survives without proper drinking water sources, and more than 80% of the population does not have access to improved sanitation facilities.

PNG is also one of the least urbanized countries in the world with

nearly 85% of its 7.3 million people living in rural areas. It has limited infrastructure for providing education, healthcare, water supply, sanitation, electricity, telecommunications and formal financial services. The lack of basic facilities and low level of development is reflected in PNG's human development index rank (2014) of 157 out of 187 countries².

The government of PNG aims to improve the state of education, health, law and order, level of poverty, gender inequality, and environmental sustainability as a part of its millennium development goals. Some of the development indicators include reduction in the proportion of people without sustainable access to safe drinking water by 50%, reduction in the maternal mortality rate by 75%, reduction in the under-five children mortality rate by 65%, achievement of universal primary education, and reduction in the incidence of malaria and other major diseases. In 2014, the PNG government invested about PGK150 mn (US\$0.05 bn) on SME and agriculture development, PGK1.8 bn (US\$0.7 bn) on healthcare and PGK1.9 bn (US\$0.4 bn) on education.³ However, other development sectors such as clean energy, water and sanitation received limited investment.

Several donor and multilateral organizations such as Department of Foreign Affairs (DFAT), United Nations Development Programme (UNDP), Asian Development Bank (ADB) and New-ZealandAid support socio-economic development in the country. However, as reflected by PNG's measures against key socio-economic indicators, government expenditure and donor aid combined are not adequate to ensure sustainable development. Private sector participation, particularly impact enterprises or for-profit businesses that focus on the low-income population can help in achieving these development goals.

DEVELOPMENT OF DISTRICT DEVELOPMENT AUTHORITY

The disparity in the indices for health, education, literacy and employment suggests that there is considerable variation in the level of development in the rural and urban areas as well within provinces of PNG. While urban centres such as Port Moresby and Lae, and provinces such as Bougainville, Manus perform better on many social indicators such as high literacy rates and access to improved sources of drinking water, the highly populated rural areas in the Highlands region have not progressed on most of the development indicators. Historically, development efforts were often directed towards certain provinces or urban centers that were already performing well in comparison to other provinces.

In 2013, creation of District Development Authorities (DDAs) in PNG was proposed to serve three purposes: ⁴

- Ensure greater decentralization in allocation of government funds from provinces to districts
- Locate more decision making with local people especially in rural areas
- Provide greater co-ordination of development activities at the local district level with a focus on rural areas

This amendment is expected to decentralize the fund allocation process and provide direct allocation of government funds to the DDAs. This initiative is expected to benefit people at the grass-

roots level as the DDAs would have access- to funds which can be directed to improving the infrastructure in rural areas. Healthcare and education are expected to improve as funds will be available for setting up aid posts and health centers as well as primary schools. In addition, the initiative will prioritize infrastructure development activities such as construction of roads, bridges, establishment of mini/micro electricity grids, improved water and sanitation facilities.

However, the policy faces a few implementation challenges. The district authorities might not have the capacity to effectively utilize the available funds and decision-making is often politically driven from the center or provincial level. Further, funds are often released late in the financial year with a 'spend it or lose it' policy, which does not provide the DDAs with the required timeframe for planning and spending the allocated funds.⁵ The incentive to spend hastily can result in purchase of expensive equipment instead of rehabilitating an aid post or a primary educational institute. Further performance of many DDAs is also being hampered by duplication of functions and lack of clarity on the roles and distribution of responsibilities at provincial and district level.



INTRODUCTION

EMERGING IMPACT ENTERPRISE ACTIVITY

The need for basic services has encouraged several young and first generation entrepreneurs to pilot, research and innovate solutions to meet development challenges. Some of these enterprises are running successful operations while others are engaged in smaller pilots, and yet others are at the idea stage.

Analyzing the sectoral spread of enterprises that are established and operational, PNG seems to follow the trend that is observed in other developing countries, with stronger impact enterprise activity in relatively unregulated sectors that have high and expressed unmet demand, and that impact the largest proportion of the population – agriculture and energy. The agriculture sector has the most impact enterprise activity primarily in the production of fresh produce, cash crops, meat and poultry. While a number of impact enterprises operating in the solar energy space offer solutions to overcome the inadequacy of grid electricity in PNG, these tend to be expensive, and the enterprises are largely concentrated in and around urban areas. Impact enterprises are also present in sectors that can scale and create employment for low-income populations such as marketing, retail, engineering works and e-commerce.

Sectors in which the Government has greater control through regulation or through the presence of state owned enterprises such as healthcare, education, and financial inclusion have limited impact enterprise activity. For instance, there are very few private hospitals providing affordable healthcare. Similarly, in the education sector, there are a few impact enterprises operating in the distance education and the vocational education space. In financial inclusion, impact enterprises primarily operate in the micro insurance segment. Water and sanitation sector has limited impact enterprise activity primarily due to high cost of

What are Impact Enterprises?

For profit: They operate as independent businesses with the goal of generating profit.

Base of the economic Pyramid (BoP) focus: Business operations directly improve the lives and livelihoods of those residing at the BoP by increasing access to critical goods and services for BoP consumers and Improving the productivity, output quality or market linkages for BoP producers.

Enterprise criteria:

Employees: 3 to 150

Turnover: PGK0.1 mn to PGK15 mn

Borrowing: PGK1.5 mn

Organization status: Registered

operations in the rural areas and the presence of not-for-profit donor aid and grant programs.

However, an analysis of enterprises in the pre-revenue stages (ideas, research and pilot) indicates that several ideas in the education (schools as well as skill development and vocational education), healthcare, financial inclusion and ICT are waiting in the wings to take off. A strong ecosystem to provide financial and non-financial support to these fledgling enterprises will ensure the foundations of a robust impact enterprise landscape in PNG.

WOMEN EMPLOYMENT & ENTREPRENEURSHIP

The total economically active population in PNG is estimated to be about 3 million, and around 35% of these are women.⁶

Research has shown that narrowing the gender gap in employment could increase household income in PNG by as much as 14% by 2020.⁷ Currently, a large number of women in PNG are engaged in informal activities.

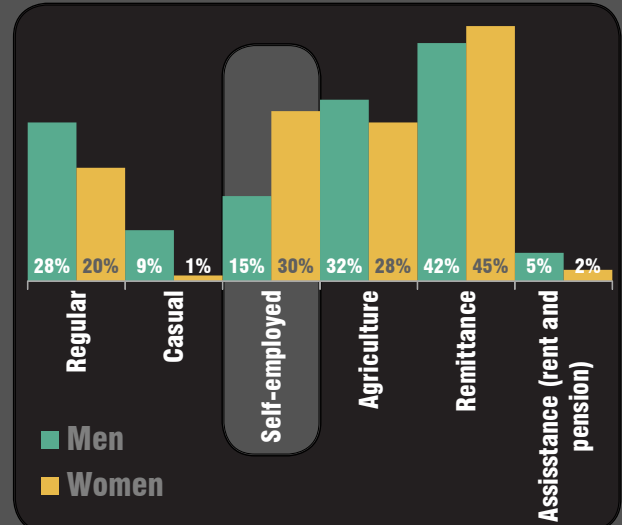
The percentage of self employed women in PNG is estimated to be twice that of self-employed men. However, women are generally engaged in traditional activities, which are largely informal in nature such as small scale production and sale of fresh produce, betel nuts, fishery products, bakery food products or, working as tailors and weavers. Women employment is steadily increasing in formal businesses and sectors such as health and education. For instance, in 2013, 27% of primary school principals were women compared to 13% in 2002. The number of female teachers also increased sharply from 27% in 2002 to 55% in 2012.⁸ In the healthcare sector, share of female clinic managers⁹ increased slightly between 2002 and 2012 from 36% to 41%, and women health workers constituted over 50% of the total health workers in 2012.¹⁰

Smallholder agriculture accounts for the largest women participation rate in the informal sector. PNG is largely an agrarian nation and women contribute to more than 50%¹¹ of the work-force in agriculture. In terms of economic value, farming of fruits and vegetables, which is largely the responsibility of women in PNG, is valued at PGK145 mn (US\$55 mn) per year.¹²

The Government is supporting cooperatives to strengthen the role of women through training in business skills, farm economics and management. As a result, more women are being appointed as trainers and model farmers.

Other sectors which have seen women participation in business

Figure 3: Sources of income in PNG



Source: GSMA, VISA, BFA, Unlocking the potential women and mobile financial services in emerging markets

include transportation, construction, hospitality, microfinance, energy, and media.¹³ The transportation sector is witnessing an increase of women entrepreneurs. Niugini Aviation is the first women owned Aviation Company in PNG. Ruth Undi, Niugini's founder owns a fleet of 3 planes and aims to improving the connectivity to remote areas.¹⁴

Promotion of women entrepreneurship in PNG is a key focus area for many development and donor intuitions. Associations such as Business Coalition for Women, PNG Women in Business, Business Women Forum are promoting economic, social and holistic transformation of women entrepreneurs through business knowledge and skills training programs. Access to capital is also being improved through various measures – the National Development Bank (NDB) in PNG has established the Women in Business Desk, and has seen over a 1000% growth in loans to women owned and managed companies in the last 4 years.¹⁵

Women entrepreneurs in PNG often face challenges in terms of business knowledge, lack of angel or seed investment ecosystem, inadequate access to equity or debt capital and social pressures when seeking to operate independently within the largely clan-based society system in the country. Initiatives and aid programs to promote women entrepreneurship in PNG have been making some inroads, but the presence of women in the formal sector is very limited.

PNG Women in Business (founded by Janet Sape) received the license from Bank of PNG to transform into a non-bank financial institution, Women Microbank. The Women Microbank aims to offer financial services customized to the need of low-income women. In order to inculcate the habit of saving, women are required to undergo compulsory financial literacy training and have a track record of at least six month savings before they can access loans. The bank has helped nearly 13,000 women with financial literacy trainings and with access to loans.

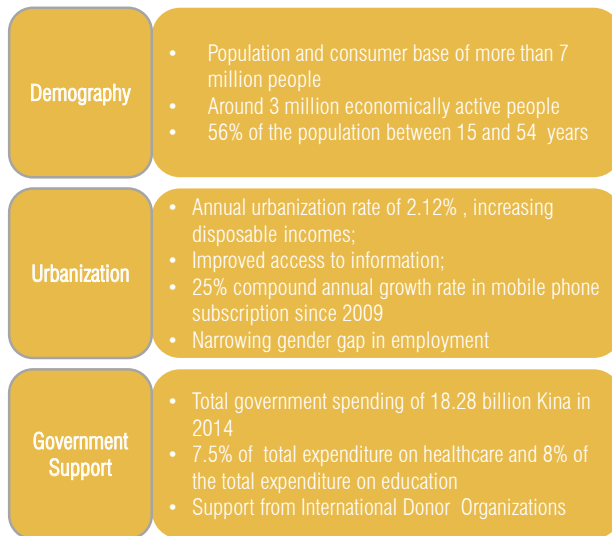
Table 1: Policies and Projects to promote women entrepreneurship in PNG

| Policy/Projects | Key stakeholders | Objectives |
|------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Providing Access to Finance for SMEs Project ¹⁶ | World Bank, Government of PNG | <ul style="list-style-type: none"> Developing a risk sharing facility (RSF) in partnership with local financial institutions Providing technical assistance for financial institutions Providing capacity building facilities for SMEs, particularly those owned by women Capacity building for the PNG government to implement and monitor the project |
| Community Development Scheme ¹⁷ | Australian Aid | <ul style="list-style-type: none"> Supports North Sibu Rural Women's Finance Project |

IMPACT ENTERPRISE GROWTH DRIVERS

The current impact enterprise activity in PNG, particularly visible in the idea and pilot stages, is fueled by some broad enabling trends. These drivers of impact enterprise growth include a young population, increasing connectivity and growing flow of information, and concerted support from the Government as well as donor and development finance institutions.

Figure 4: Growth drivers for impact enterprises in PNG



Potential to reap the demographic dividend

About 50% of PNG's population is under the age of 25 years. The sizable population in this age group is expected to contribute to an increase in the demand for basic services such as improved food quality and water, health and sanitation services, technology enabled access to financial services and better education infrastructure, particularly vocational training. Given the significant proportion of population that is employable, demand for employment and job creation is also in the spotlight. In the absence of adequate jobs for all, it is likely that the spurt in demand for products and services will encourage a number of first generation entrepreneurs to explore new businesses; further

supporting PNG's potential to reap the demographic dividend.

Changing consumption and behavior patterns due to increasing customer awareness.

Increasing urbanization, along with improved access to information through ICT, has led to greater flow of information and better access to products and services. As more people move to urban areas in search of work, there is a growing prevalence of nuclear families. PNG's erstwhile subsistence-based economy is shifting to a cash-based one. Higher disposable incomes and changing consumption patterns further create opportunities for small local businesses to meet demand that remains unfulfilled by imports alone.

Government and donor support

Government support and initiatives of development finance institutions and donors underpin the growth of impact enterprise activity in PNG. The government aims to transform PNG into a middle income country by 2030 and Medium Term Development plan (MTDP) 2011-2015 is the first step towards achieving this goal. MTDP aims to develop the transport infrastructure, use available land for infrastructure development; improve availability and access to energy, clean drinking water, primary healthcare and education; and improve the law and order situation of the country. The government also aims to spend PGK1.1bn (US\$0.4 bn) on road and bridge infrastructure to improve the accessibility and connectivity within PNG.¹⁸

Various donor organizations such as DFAT, UNDP, ADB, and NZAid, have been actively involved in sectors such as healthcare, education, water and sanitation, and energy to enable inclusion of all socio-economic groups of the society as well as increase consumer awareness on various parameters of health and education.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Information and communication technology (ICT) holds great potential for establishing a service delivery mechanism in PNG that can reach isolated communities and resolve operational challenges for last mile delivery. Currently, however, access to mobile connectivity and data services remains a challenge.

Development indicators on ICT infrastructure in PNG are the lowest in the Oceania region, although mobile phone penetration is currently 41%, and is growing at a CAGR of more than 25% since 2009.¹⁹ The uptake of internet is very low with only 6.5% of people having access to internet and data services. Radio²⁰ services in rural areas and television²¹ services in urban and semi-urban areas are the other two important sources of communication for many households.

The ICT sector in PNG faces several challenges that inhibit its growth and its application for social development. High costs of internet connection and data services make it difficult for small and medium enterprises and individuals in the country to avail of these services. Infrastructure challenges such as inferior bandwidth and low availability of skilled labor make it difficult for enterprises in the sector to scale their operations.

The quality of voice and data transfer is very low in the semi-urban and rural areas resulting in network outage and disruption of services. The PNG government and ICT regulator, NICTA²²

have undertaken several projects to improve ICT infrastructure and have launched initiatives such as 'International Girls in ICT Day' and distance education programs to improve technological awareness in the country.

Globally, ICT has broken down geographical barriers and increased access to services, lowered the cost of products and services and increased employment opportunities for low income communities. In the agriculture sector, impact enterprises have developed customized mobile solutions to improve farm productivity through measured use of inputs such as seeds/ fertilizers/ pesticides. In the education sector, ICT has been utilized for improving the quality of classroom teaching in primary schools through digital media content. Mobile money platforms and virtual banks could play a key role in enhancing financial inclusion in PNG. Many of these solutions are being implemented in other developing countries, and can be replicated in PNG.



KEY CHALLENGES FACED BY IMPACT ENTERPRISES

A high proportion of private sector enterprises in PNG operate in the informal sector²³ due to perceived challenges in formal registration and control from government or regulatory bodies.²⁴ This, overlaid with difficulty in accessing basic requirements such as finance, electricity and technical support combine to create a challenging business environment.

Inadequate Infrastructure

Lack of basic support infrastructure and utilities such as roads, electricity, safe water supplies, tele-communication, and banking facilities is a major deterrent to private sector activity in PNG. Limited access to markets and the lack of linkages between rural areas and urban centers poses challenges for small and medium enterprises. High crime rates also constrain impact enterprises from providing their services in rural and remote areas. Effective ICT infrastructure could be a potential solution to overcome various physical infrastructures related challenges. However, mobile and internet penetration is low due to limited telecom infrastructure and high cost of broadband and internet services. For instance PNG has a low penetration of mobile internet (7%) and less than 50% mobile penetration.²⁵

Human Resource Capacity Constraints

Inadequate availability of semi-skilled and skilled personnel affects the cost and quality of services provided by impact enterprises. For instance, a large number of skilled healthcare personnel in PNG are from other countries due to limited avail-

ability of local talent. It becomes financially unviable for small enterprises to pay high salaries to these professionals and provide the service at affordable rates to low-income communities. Large organizations in PNG invest in training, which is not always feasible for small impact enterprises. Unable to attract and retain skilled personnel, impact enterprises often end up delivering inconsistent quality and access, further exacerbating their limited chances of survival.

Information Asymmetry

As is typical of an emerging market, private sector enterprise in PNG is challenged by lack of awareness and information, both, on the demand and the supply side. On the supply side, entrepreneurs are constrained by limited availability of documented data in understanding consumer demand. On the demand side, consumers are unaware about products and services and how they can improve the quality of life, and often, demonstrate low willingness to pay. Impact enterprises therefore have to additionally invest in educating the customer, not only about the product, but also about the sector, need for these services and the necessity to pay a price for their use. This delays their time-to-market and scale-up schedule and affects their chances of becoming sustainable and viable.

TRANSPORTATION

PNG fares poorly on various indicators of transportation access and infrastructure development. The road density²⁶ in PNG was estimated at five km in 2004²⁷, one of the lowest in the world. In the last decade there have been some improvements in road construction with major cities being well connected through highways. However, road connectivity between Lae and Port Moresby, the two key economic and population centers, is poor. Lack of adequate transportation infrastructure has affected connectivity, disrupted access to essential public services in many parts of the country and hindered economic growth, as transporting goods and providing services becomes difficult, unsafe and expensive. There are only around 50 transportation service providers in PNG²⁸ largely catering to demand from the extractive industry players, with a limited presence in impact sectors such as agriculture.

The air and sea transport network in PNG is relatively well developed with the presence of nine sea ports and nine container terminals as well as nearly 30 small airports²⁹ for transportation of cargo as well as passengers. Container port traffic has grown at CAGR of nearly 6.5%³⁰ in the past 4-5 years indicating a good growth in export oriented sea transport infrastructure in the country. However, a majority of the sea transport is utilized for export and import of goods, with less focus on the movement of products within PNG. Air transport, in terms of registered carrier departures has grown at a CAGR of nearly 9.5% in the past 3-4 years.³¹ Cargo movement through air transport is, however, at very nascent stage within PNG.

Poor transportation infrastructure affects the sustainability of impact enterprises too. In agriculture, the movement of fresh produce from farm gate to markets and to the end-consumers is critical. A less developed transportation system puts local farmers at a disadvantage when they attempt to sell their crops at major urban centers of PNG. Availability of optimal storage spaces is another major challenge as cold storage and warehous-

Supply of essential medicines to remote locations in PNG

In PNG, where it is extremely difficult and expensive to serve rural communities, small unmanned aerial delivery vehicles (UAV) hold promise for essential services delivery.

A few enterprises such as Matternet have successfully piloted these aerial vehicles to transfer TB diagnostics kits between villages in PNG. The UAV can be controlled completely through a mobile app, making it very convenient for health workers with low technical training

ing facilities are not well developed. A few independent agencies such as Fresh Produce Development Agency (FPDA) report that up to 50% of the food produced in PNG is lost in the post-harvest phase due to poor storage and inadequate transportation facilities.³² Transportation in PNG is also important to provide extension services and inputs to farmers in the villages to improve their farm productivity

Development of transportation facilities could improve the uptake of healthcare and financial services in PNG. Bank agents and other intermediaries find it difficult and uneconomical to reach out to potential customers in remote rural areas, especially in the Highlands region, due to lack of transportation facilities. It is also difficult to transport essential medicines and provide basic healthcare services to many rural locations in PNG. Patients from rural areas often have to travel more than five hours³³ to get to the nearest medical facility. The situation worsens in the rainy season as most of the unpaved roads in rural areas are not navigable, and vehicles carrying medical supplies are stranded mid-way.

The government has increased spending on infrastructure projects. In 2014, it was estimated that nearly PGK 2.7 bn (US\$ 1bn) was spent on infrastructure projects in PNG accounting for nearly 15% of total government spending.³⁴ In addition, several projects run by development and donor agencies aim to improve transportation infrastructure in PNG and promote entrepreneurship in the sector.

Table 2: Policies and Projects to Improve Transportation Infrastructure in PNG

| Policy/Projects | Key stakeholders | Objectives |
|------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Road Maintenance and Rehabilitation Project (RMRP) ³⁵ | World Bank, Government of PNG | <ul style="list-style-type: none"> • Restoration and maintenance of over 1,300 km of national roads • Strengthen capacity of small- and medium-sized contractors and provincial administrations for road maintenance |
| Transport Sector Support Program (TSSP) ³⁶ | Australian Aid/ Australian Government | <ul style="list-style-type: none"> • Develop transport infrastructure sector in Papua New Guinea including roads, airports and ports • Develop capacity of local companies for construction and maintenance of transport infrastructure |

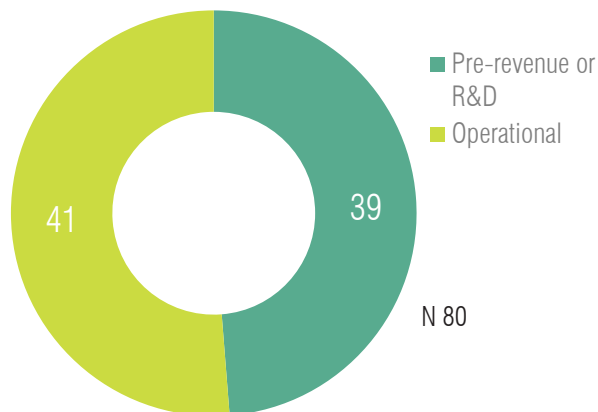


SURVEY : IMPACT ENTERPRISES ACTIVITY IN PNG

The research team conducted a survey to understand the nature of impact enterprises and the challenges faced by entrepreneurs in PNG. The sample comprised 80 enterprises selected from a larger pool of over 300 enterprises that had applied for the Kumul GameChangers Competition, a combined initiative of the UNDP, the Kumul Foundation, Australian Aid and Australian High Commission. The competition provides a platform for impact entrepreneurs to showcase their ideas to raise funds, receive strategic planning support and mentoring, access to global networks, and better media visibility.

The survey analysis was conducted in two parts. The team first analyzed information collected from applicants through their applications in the Kumul Game Changers Competition. We filtered 41 enterprises that were registered and were engaged in commercial operations in the six focus sectors – agriculture, clean energy, education, financial inclusion, healthcare and water & sanitation. A detailed survey questionnaire was sent to these 41 enterprises. In the second part of the analysis, we examined the

Figure 5: Stage of operations of surveyed enterprises

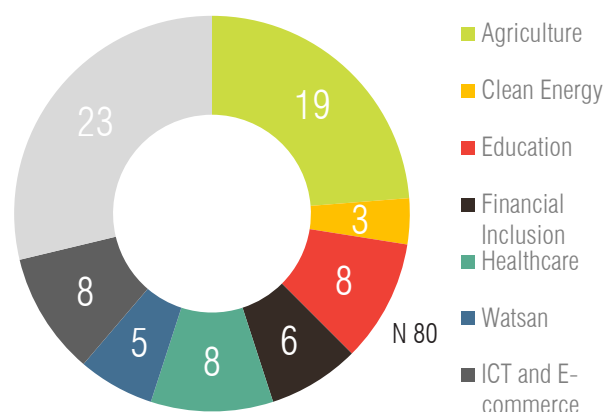


Source: Intellectap Analysis

applications of 42 finalists of the Kumul Game Changers Competition. While a few enterprises overlapped and were among our set of post-revenue enterprises, most of these finalists were at the pre-revenue stages. We sent out the survey questionnaire to these pre-revenue stage enterprises as well, in order to gather additional data about them. In all, we received completed survey forms from 31 respondents. Some of the following analysis draws from information we received from the 80 application forms, while in others, we have drawn information from the 31 responses to the detailed survey questionnaire

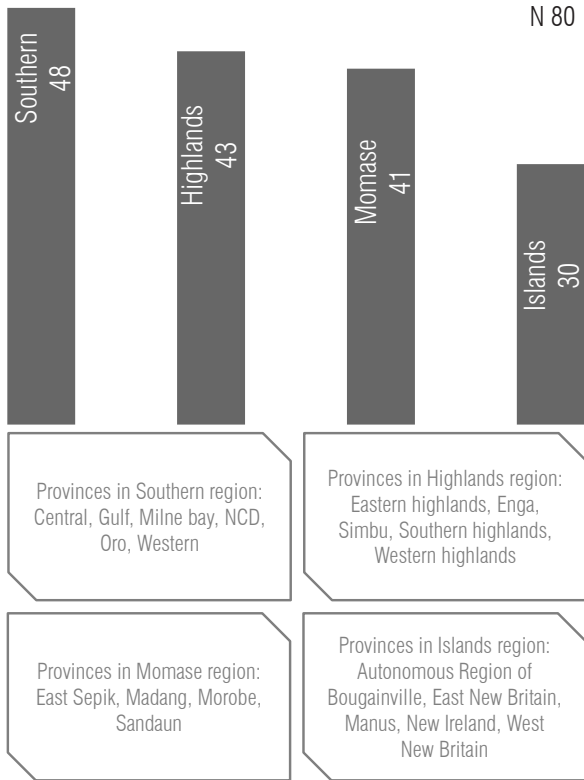
The 80 enterprises in the sample were from a wide range of sectors. In total, 49 enterprises were from the six focus sectors: agriculture, clean energy, education, financial inclusion, healthcare, and water & sanitation. There were 8 enterprises in the ICT & e-commerce sector, while 23 enterprises were from other sectors such as marketing & retail, transportation, engineering, and construction.

Figure 6: Sample size by sector



Source: Intellectap Analysis

Figure 7: Geography of operations



Source: Intellectap Analysis
*Multiple Response Question

Figure 8: Sample size by target market



Source: Intellectap Analysis

In terms of geographic distribution, we found that the 80 enterprises were well-distributed across the different regions of PNG. Most of these enterprises were operating or planned to operate in the Southern region, while the concentration was the least in the Islands region. 22 out of 80 enterprises planned to operate in all regions of PNG.

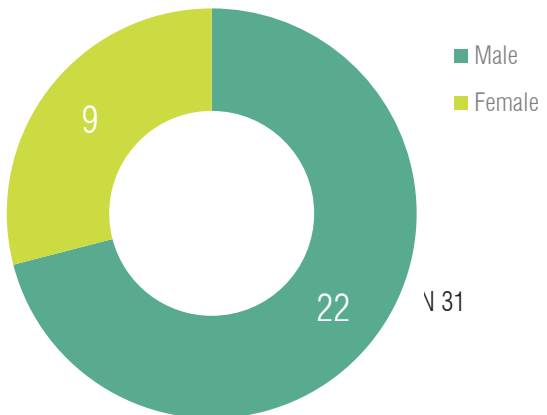
More than 60% of the surveyed enterprises planned to target both, urban and rural markets. Six enterprises planned to target international markets in addition to rural and urban markets in PNG.

ABOUT THE ENTREPRENEURS

Gender (Senior Management)

Among the respondents to the detailed survey, it was observed that there were more men in senior management or entrepreneurial roles in comparison to women. Of the 31 enterprises that responded, 22 were founded by or had only men in senior management positions

Figure 9: Gender(Senior Management)

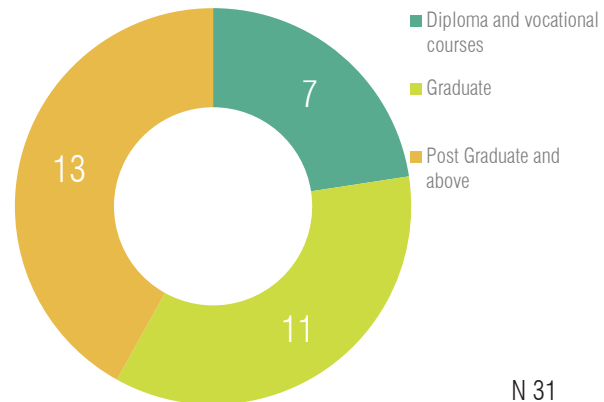


Source: Intellectap Analysis

Education

Many of the entrepreneurs held post graduate degrees. Of the 11 graduates, 9 have a background in management, economics, commerce, sociology and/or engineering. A majority (27 of 31 entrepreneurs) were also first generation entrepreneurs. This was a particularly interesting finding, given that skilled talent is in great demand for employment. It also indicates a growing interest among the skilled talent pool of people in PNG to tap emerging opportunities and create positive social and environmental impact through their own organizations.

Figure 10: Educational background



Source: Intellectap Analysis

Motivation



Source: Intellectap Analysis *Multiple Response Questions

Despite coming from varied educational and family backgrounds, the entrepreneurs had similar motivations for setting up their own enterprises. The graph below ranks the most common motivations cited by entrepreneurs for starting their own enterprises. Findings indicate that most entrepreneurs were pursuing a personal dream or business idea that encouraged them to set up an impact enterprise, followed by the urge

to benefit from growing opportunities (in emerging markets with vast unmet demand) in PNG. Reflecting the changing expectations from careers among the millennial generation, the third motivation was greater independence and flexibility. For many entrepreneurs (28 of the 31 respondents), it was a combination of two or more such reasons that encouraged them to venture into this field.

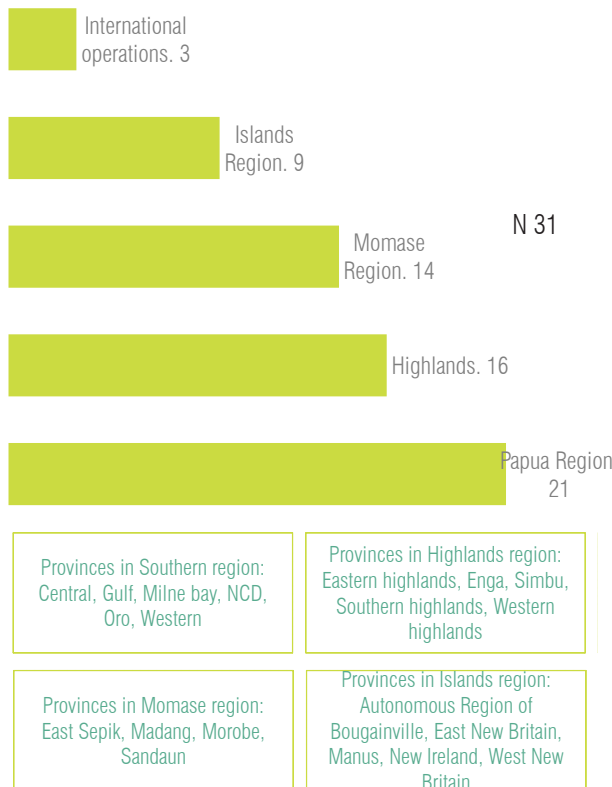
ABOUT THE ENTERPRISES

The debate over finance first and impact first approaches in the impact enterprise landscape continues, although most practitioners recognize that these philosophies are intertwined. Most of the enterprises (17 out of 31) responded that maximizing profit was the best way to maximize impact in the long-run. However, ten enterprises believed that it is more important to focus on impact then on profits and revenue.

Geography of Operation

Of the 31 enterprises that responded to the detailed survey, 18 enterprises operated in only one region. Since 12 of these enterprises were less than a year old, it is likely that they would expand to newer geographies over time. Many enterprises (13 out of 31) operated in more than one region. The highest concentration of enterprises was in the Papua Region (21 enterprises operating in the region). There were a few enterprises (6 out of 31) that reported a presence in 4 or more regions (of these, 2 operated in the ICT sector) indicating business models that could scale.

Figure 12: Geography of Operations of surveyed enterprises*

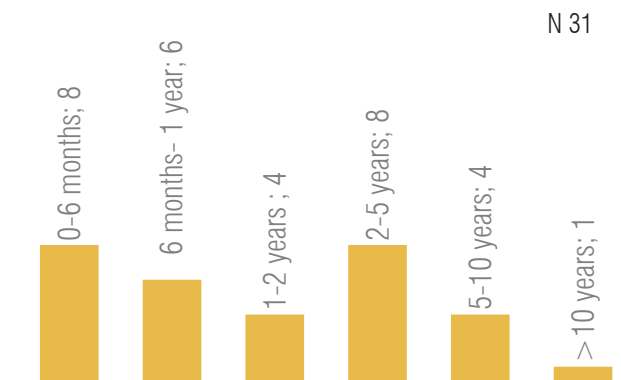


Source: Intellecap Analysis *Multiple Response Question

Vintage

Most impact enterprises that responded were young, with average operational period of less than a year (14 out of 31), closely followed by enterprises active for 2 to 5 years (8 out of 31). There was only one enterprise in operation for more than ten years. Women employment is yet to gain ground, as 29 of 31 enterprises have less than five women employees. Only one enterprise had more than 20 female employees.

Figure 13: Age of Enterprises

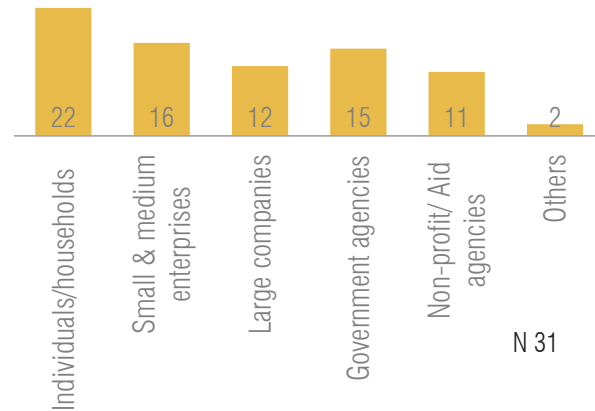


Source: Intellecap Analysis

Primary Customers

The key customers for most enterprises were individuals and households, followed by small and medium business owners and large companies. Most enterprises whose key customers were individuals or households also stated that their maximum interaction with poor/low income population was as customers, indicating that their businesses focused on mitigating the challenges in access and affordability that the low-income population faces.

Figure 14: Primary Customers*

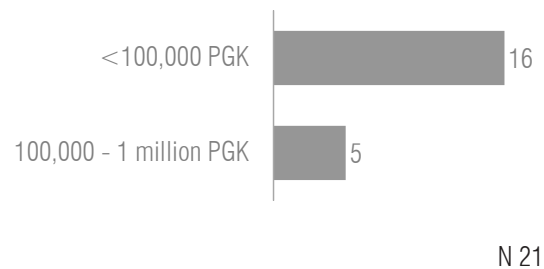


Source: Intellectap Analysis*Multiple Response Question

Revenue

Of the 31 respondents, 21 respondents reported their revenue in the last fiscal year. All these enterprises earned less than 1 million PGK (US\$ 370,500) in the year and a majority of the enterprises (16 out of 21) earned less than 100,000 PGK (US\$ 37,050) every year.

Figure 15: Revenue of enterprises in last fiscal year

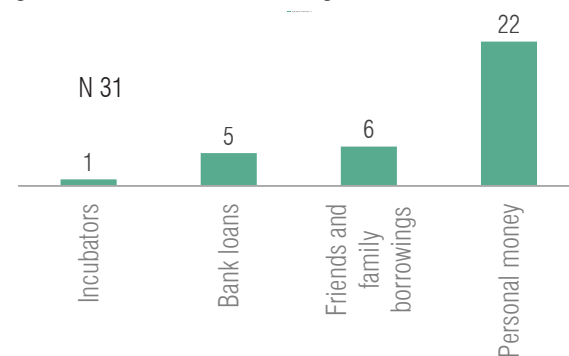


Source: Intellectap Analysis

Sources of Funding

As with all start-ups, 22 out of 31 entrepreneurs reported investing their personal money to start the business, supported by family and friends. Only 5 entrepreneurs availed bank loans. For most entrepreneurs, it was a combination of these sources along with occasional funding from donors, fellowships and impact investing funds.

Figure 16: Initial sources of funding*

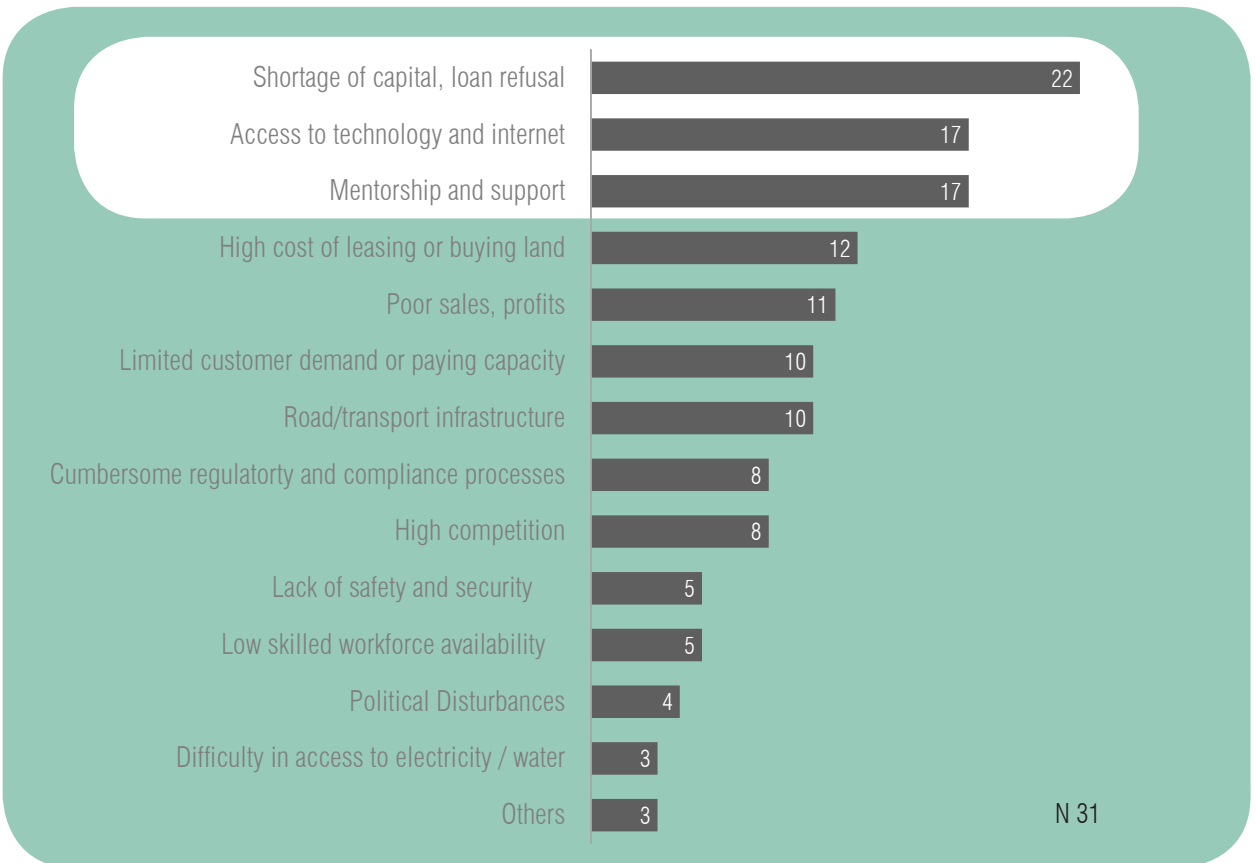


Source: Intellectap Analysis
*Multiple Response Question

Key Challenges

Access to timely and adequate finance was identified as the biggest challenge for most entrepreneurs, followed by infrastructure availability (access to technology and internet) and mentorship support. Marketing and sales were also identified as challenges, but ranked lower than finance and infrastructural challenges. Lack of collateral or assets was identified as one of the biggest bottlenecks for securing a bank loan (16 of 31 enterprises). In addition, 15 out of 31 entrepreneurs identified limited networks for gaining access to investors as a major challenge for securing funds.

Figure 17: Challenges faced by entrepreneurs*



Source: Intellectap Analysis
 *Multiple Response Question

GROWTH AND FUTURE STRATEGY

Drivers of Growth

Entrepreneurs identified a strong and growing local customer base as their biggest driver for growth, followed by enabling government policies and subsidies. Respondents identified increasing urbanization as the third key driver to growth, reflecting the potential of urban centres to reduce information asymmetry and catalyze a shift from subsistence-based to a cash-based economy. Access to capital and skilled human resources are also important growth drivers according to the respondents.

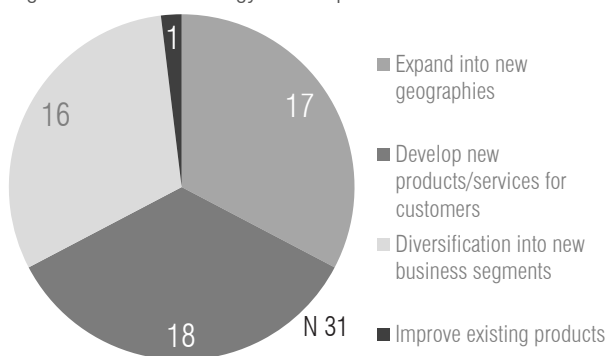
Figure 18: Drivers of growth*



Growth strategy

Expanding into new geographies and developing new products and services for customers were the key growth strategies identified by all entrepreneurs. Most entrepreneurs shared that they would expand to new markets and new products in the next three years, indicating the youth of these enterprises. Some entrepreneurs also wanted to diversify into new business segments.

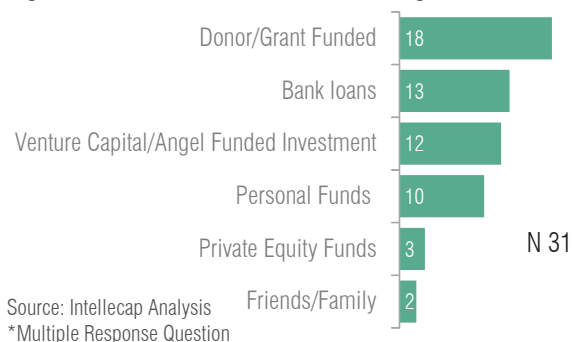
Figure 19: Growth strategy of enterprises*



Future Sources of Funding

18 out of 31 respondent enterprises planned to seek future funding from donors and grant-making agencies. A number of enterprises (10 out of 31) planned to use personal funds for their business operations, while 13 enterprises planned to approach bank for loans.

Figure 20: Planned source for future funding*



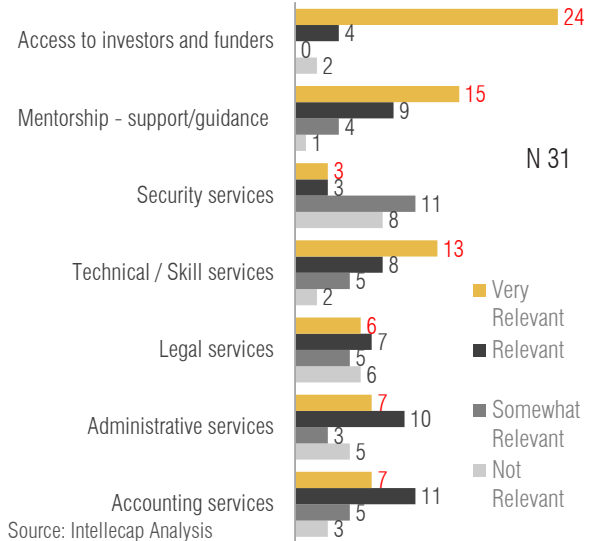
Support Services

We sought the opinion of the entrepreneurs about the relevance of various support services. Most enterprises (24 out of 31 respondents) suggested that access to investors and funders were very relevant. Even technical or specialized skill services and mentoring support was thought to be very relevant among responding enterprises. Security services and legal services were not considered to be as relevant as other support services, and the enterprises had mixed opinions about the relevance of administrative and accounting services.

While assessing the challenges that prevent the uptake of support services, most enterprises (13 out of 31) suggested that the high cost for obtaining the service was the biggest challenge. Many enterprises (9 out of 31) also suggested that limited knowledge on the relevance of the service was another big challenge. Only a few enterprises (2 out of 31) did not face any challenge in procuring these support services. This is again a reflection of the youth of these enterprises and suggests a need for incubation services.

In order to learn about different events that could benefit the social enterprise landscape in PNG, the survey enquired about the relevance of business plan competitions, start-up awards, conferences, business events and virtual entrepreneurship forums. Of the 31 respondents, 25 enterprises suggested that business plan competitions and start-up awards were relevant. Many enterprises also felt that conferences and business events were relevant, as were virtual entrepreneurship forums.

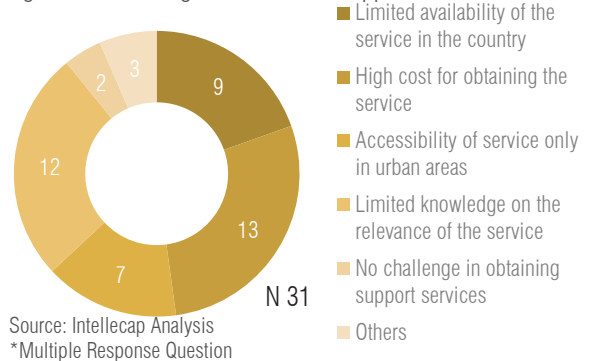
Figure 21: Demand for support services*



Source: Intellectap Analysis

*Multiple Response Question

Figure 22: Challenges in access to support services*



Source: Intellectap Analysis

*Multiple Response Question

Sector Deep Dive

In order to understand the sectors that these enterprises worked in, the team undertook extensive secondary research, corroborated by detailed interviews with sector and country experts. These sector studies examine prevailing conditions in the focus sectors, explored demand and supply, key challenges and opportunities in these sectors. The following sections of the report present excerpts from this research.

Agriculture drives socio-economic growth in PNG and is a significant contributor to the GDP. The sector is historically based on subsistence and semi-subsistence farming, with limited commercial farming activity focused on export oriented cash crops. With government support, increased demand from domestic and international markets, and the emergence of value added industries, agriculture is likely to witness strong growth in the coming years. However systemic challenges such as traditional farming approaches resulting in low productivity, lack of quality inputs and extension services, poor access to markets and credit, and lack of supporting infrastructure for transportation hamper the growth of agriculture sector in PNG.

Agriculture is the mainstay of PNG's economy; it drives economic growth and provides livelihoods for a majority of its population. PNG's agriculture sector contributes nearly 28% to the GDP³⁷ and 18% by value to total exports.³⁸ The sector provides employment to nearly 85% of PNG's population³⁹, with most of them relying on subsistence farming. Animal husbandry and fishing in coastal and inland water resources are other sources of sustenance for the population.

Figure 23: GDP Growth and Food Production per Capita Trends in PNG



Source: World Bank Data Series, 2003 to 2012 Data, FAO Agricultural Production indices 2003 to 2012 Data

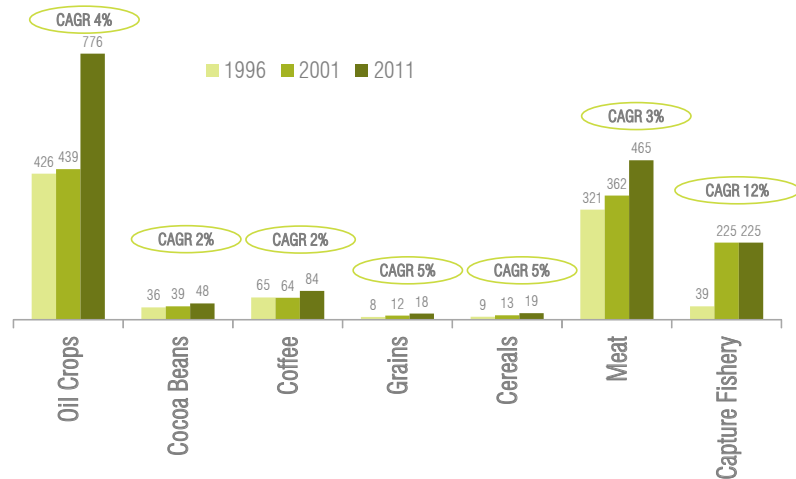
The contribution of the agriculture sector to GDP has been relatively stable in the last 4-5 years. However, growth in terms of food production per capita⁴⁰ in the last few years has not been in line with the economic growth and population growth in the country. From 2007 to 2012, when the GDP grew at around 7%⁴¹ and the population grew by 2.3%, food production per capita (measured in Gross Production Index⁴²) has declined by 1%.⁴³ This could potentially pose a risk to food security in PNG in the

long run⁴⁴ and lead to higher import volumes of food products for domestic consumption. Food price volatility in the international markets⁴⁵ could thus adversely impact smallholder farmers and make low-income consumers in PNG increasingly vulnerable to poverty.

The agriculture sector in PNG has seen limited advances in terms of efficiency in land use or production in the last decade. It has been able to gradually increase the arable land used for agriculture in the past few decades. Most of the landmass in PNG is under forest cover, although its share is decreasing due to deforestation resulting in nearly 1% being lost annually⁴⁶. Most of this deforested land is fallow, and used for agriculture. The rest of the landmass is largely unsuitable for agriculture as the varied geographic landscape in PNG includes land that is either too steep or too high in altitude for farming or too swampy due to regular flooding every year. A few studies indicate that around 7% of the land area in PNG may be classified as high quality for agriculture, and there is scope to increase the proportion of arable land without resorting to deforestation.⁴⁷

While the production of food crops and commodities saw a modest increase in the last few years, export oriented cash crops such as oil palm, meat and fishery products reported strong growth. This is supported by improved farming and irrigation methods such as higher use of composting, planting trees in fallow land and crop rotation to improve farm productivity, particularly for export oriented cash crops. However, farming and irrigation methods for a majority of other crops remain traditional.

Figure 24: Trends in Production of Key Commodities in PNG (000' Metric Tons)



Source: FAOSTAT, FAO of the UN, 1996 to 2011 Data

According to the Food and Agriculture Organization (FAO) index, food production per capita in PNG has declined by nearly 1% in the past five years.⁴⁸ The level of food production is, therefore, not in line with population growth, highlighting the threat to food security and growing dependency on imports of food items for domestic consumption. The decrease in agricultural productivity can be attributed to low adoption of agro-technology, lack of quality inputs such as high yield seeds and lack of extension services.

Local producers (apart from cash/export crops) use traditional methods of farming wherein farmers maintain, multiply and distribute their own planting materials. Farmers typically practice vegetative propagation and traditional storage methods such as seeds wrapped up in leaves stored above fire-places and ‘yam-houses’ for sprouted tubers.⁴⁹ The same acreage in PNG can be made productive through modern technologies for irrigation such as micro-irrigation systems (drip and sprinkler systems),

quality seeds, fertilizers and pesticides. However, the difficult topography of PNG and poor infrastructure development in rural areas makes it difficult for movement of quality inputs and provision of extension services.

The PNG government provides tax breaks for agri-processing and wage subsidies to promote the agriculture sector.

Since 2012, when the present government was sworn-in, PNG has had a relatively stable political environment and the government has focused on commercialization of agriculture through strategic initiatives such as National Agriculture Development Plan (NADP)⁵⁰ and Strategic and Corporate Plan 2013-2017. It has also introduced several incentives to promote agriculture through rebates in income and corporate tax, and wage subsidies.

Table 3: Policies and Projects to Support Agriculture Sector in PNG

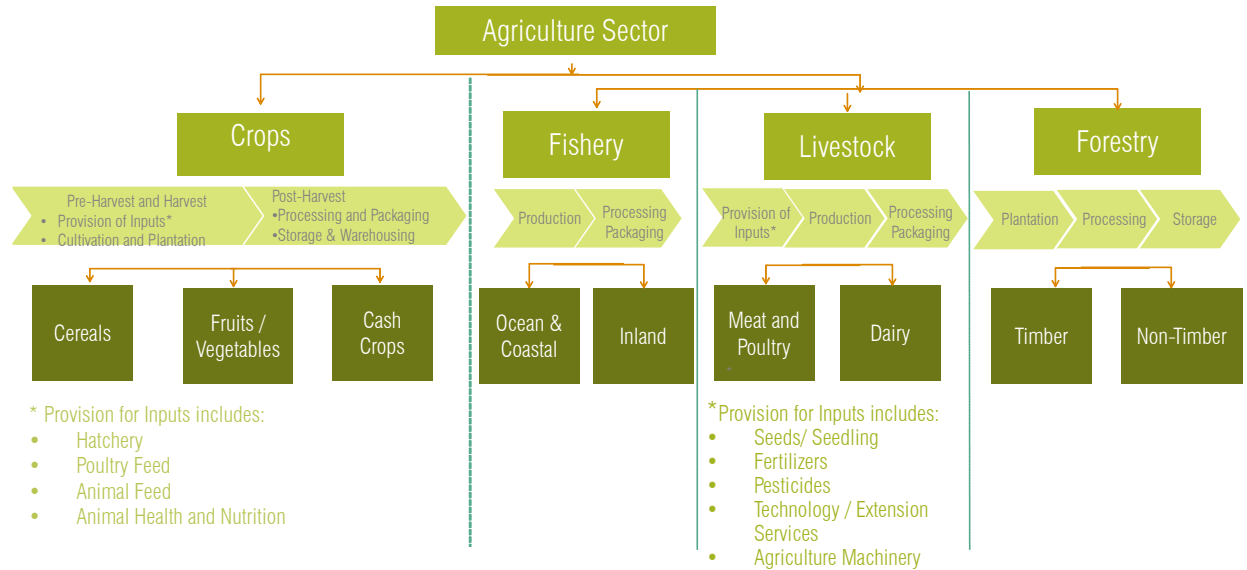
| Policy/Projects | Donors and Stakeholders | Objectives |
|--------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| National Agriculture Development Plan 2007-2016 (NADP) | Government of PNG, FAO | <ul style="list-style-type: none"> Formulate reforms in the agriculture sector in PNG for economic growth, social wellbeing, national food security and poverty alleviation Achieve minimum 5% annual growth in real terms for the sector |
| Strategic and Corporate Plan 2013-2017 | The Department of Agriculture and Livestock, Government of PNG | <ul style="list-style-type: none"> Increase agriculture based domestic and export revenue Promote private sector especially in rural areas Develop framework and guidelines to facilitate investments in the sector |
| Tax Rebates ⁵¹ | Government of PNG | <ul style="list-style-type: none"> 100% deduction (150% deduction in case of agriculture extension services) for expenditure in primary production of agricultural produce Agriculture businesses in under-developed areas are exempt from income tax for 10 years after commencement of business Accelerated and flexible depreciation (up to 100% deduction) is allowed for property used directly for agriculture |
| Wage Subsidy | Government of PNG | <ul style="list-style-type: none"> In the post-harvest segment, manufacturing facilities for processed agro-products can avail of wage subsidy of nearly 40% in the first year of operation |

The agriculture sector in PNG consists of crops and sub-sectors such as fishery, livestock and forestry. Commercial and private sector activity in agriculture varies across sub-sectors, with more private sector enterprises engaged in activities involving processing and value addition at the post-harvest stage. Many of these enterprises connect various stakeholders of the pre-harvest, harvest and post-harvest value chain by providing critical services in procurement and aggregation of agri-commodities from farmers and transporting these commodities to wholesale and retail markets.

Commercial farming is more prevalent in the provinces of the Islands region. A majority of the households across the 20 provinces are dependent on agriculture, however income-earning opportunities are low or moderate. Cash crops such as oil palm provide significant opportunities in provinces such as Milne Bay and West New Britain. Similarly, coffee has potential in the Western Highlands and Simbu provinces, but such cases are few as most farming is for subsistence.

Commercial farming of food crops is the highest in the Islands region especially in the East New Britain province. The well-developed tourism industry in East New Britain could be a key reason for higher uptake of commercial farming in the province. Households in densely populated provinces such as Southern highlands are largely engaged in subsistence farming. The Madang province has the

Figure 25: Agriculture Sector in PNG



Source: Papua New Guinea Country Report to the FAO, Intellecap Analysis

highest percentage of households involved in commercial rearing of livestock while provinces in the Highlands region have the lowest percentage. The Madang province has well-developed sea transport infrastructure and hence large part of the commercial livestock rearing is likely to be focused on the export markets. In the fishery segment, provinces with large coastlines and developed seaports such as Gulf, Manus and Milne Bay provinces have considerable number of households involved in commercial fishing.

Most commercial farming is geared towards export-oriented cash crops, with demand from international markets driving the growth for palm oil. Farming activity in the crops segment is dominated by smallholder, semi-subsistence farmers that are engaged in both, subsistence and commercial

activities. The cereals segment in PNG is still evolving, with the country largely dependent on wheat and rice imports to meet domestic demand for these commodities. Bananas, yam, cassava and sweet potatoes dominate the fruits and vegetables segment. Palm oil, cocoa and coffee are the leading export-oriented cash crops, accounting for more than 70% of all food exports (by value) in PNG.⁵²

In the last few decades, however, export volumes of traditional cash crops such as coffee and cocoa have seen very little growth. Demand for palm oil from international markets has made it an important cash crop in PNG,⁵³ and with a depreciating kina, export of palm oil is likely to increase in near future. Palm oil production has also given higher returns to farmers in recent years in terms of kina per person day compared to other cash crops.

Figure 26: Households involved in commercial agriculture activities across provinces in PNG

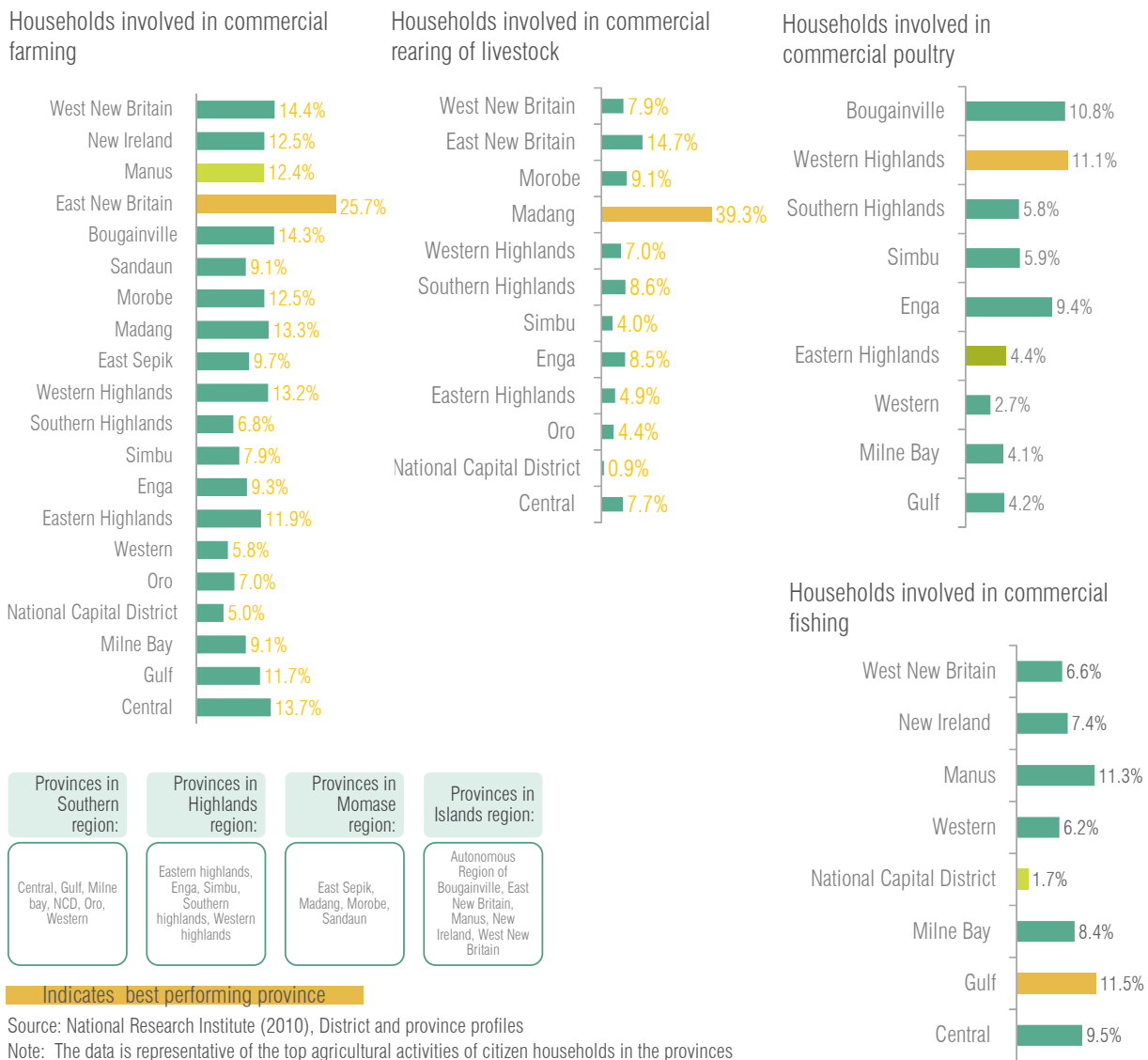
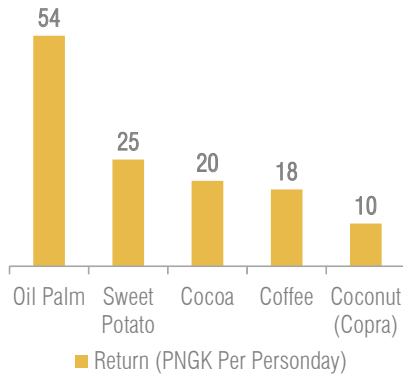


Figure 27: Gross Returns on Labor Inputs for Selected Crops in PNG, 2009



Source: Dr. Mike Bourke: The Australian National University, INA and RIC Seminar 2013

Farming for staple food such as sweet potato remains the most important economic activity for most of the rural population in PNG, and it largely involves traditional systems of shifting cultivation.⁵⁴ However, farmers in PNG are slowly moving towards commercial and intensive agriculture, and would be more willing to adopt improved farming and irrigation methods.

The livestock segment is gradually evolving, although most of the animal rearing activity is traditional and for subsistence purposes. Pigs, local fowl and chicken are reared for local consumption in PNG. According to the 2000 census, around 45% of total rural households in PNG were engaged in some form of livestock production. An estimated 25% of the households are engaged in poultry production, but systematic efforts to modernize commercial production of meat and eggs have only been made in the last 10–15 years. Total poultry production has increased in the last two decades from 4,000 tonnes in early 1980s to nearly 30,000 tonnes in recent years, growing at a CAGR of nearly 7%.⁵⁵ While much of livestock activity is for family consumption, the poultry and piggery segment have seen

considerable commercialization in the last five years.⁵⁶

Fishery is an important export segment in PNG, and has seen substantial growth in the last decade. Fish production increased from 39,000 tons in 1995 to 225,000 tons in 2010. Demand for fishery products is largely driven by Asian markets (Japan, Philippines, China, and Thailand), the European Union and Australia. Tuna fish, both processed and unprocessed, dominates the fishery segment accounting for over 85% of fishery exports, in value terms⁵⁷ Large international players are present in the fishery segment in PNG, both, in production and processing activities. Commercial fishery is largely ocean and coastal waters-based, while the local artisanal farmers currently have a limited role to play, and do not directly benefit from its growth.

Sub-sectors like dairy and forestry are yet to see traction, although demand for these products is increasing with the emergence of a sizable middle class population. Dairy products such as milk and cream have seen a spurt in demand in recent years, which is met largely through imports from neighboring countries. Cattle rearing activity for procuring milk is traditionally less practiced in PNG and at present there is only one dairy farm in PNG that involved in fresh milk production for sale. In the past, while there have a few been other dairy farms in PNG, their number has never exceeded six.⁵⁸ Local production of milk in a temperate climate such as PNG requires capital intensive chilling units and cold storage facilities to avoid spoilage. Higher capital expenditure coupled with low demand makes the milk production segment less attractive for the private sector.⁵⁹

With over 60% of the land area under forest cover and an environment suitable for harvesting high value timber products and non-timber forest products (NTFP), forestry is an important sub-sector in PNG. The demand of timber products is expected to increase

in near future largely driven by timber requirement for the rapidly developing Asian economies such as China and India.⁶⁰ However, depletion of timber resources in PNG could lead to serious and adverse impacts on bio-diversity in the country.

Demand

Two key drivers - steady increase in population and improving income levels - are likely to drive demand for food crops, meat and poultry products in PNG. The country has a young population that is steadily growing at around 2% in the last 4-5 years,⁶¹ This is likely to contribute not only to increased demand, but also changes in the composition of food products over the next 5-10 years. Further, buoyed by recent political stability and increase in per capita income, a new middle class has emerged in PNG. This new consumer class is likely to drive the demand for food crops and processed food products in PNG. For instance, demand for value added food products (such as Food prep nes⁶²) has doubled to around 21,000 MT in 2011 from 10,000 MT in 2009. Similarly, demand for key cereals such as wheat, rice, maize and fruits and vegetables such as bananas and yams has increased in the last few years.⁶³

There is limited demand for agri-inputs, technology and extension services as smallholder farmers are unaware of their benefits. Currently, the demand for agri-inputs such as high yield seeds, agrochemicals such as fertilizers, pesticides and herbicides, and mechanized equipment such as tractors is largely met through imports. Access to these inputs is restricted to major urban centres, while smallholder farmers have little information on the optimal use of agri-inputs and mechanization. Lack of extension services in PNG particularly constrains spread of such information. There is, however, growing realization of the importance of high quality agri-inputs and the latest technology to improve farm production among commercial farmers and small

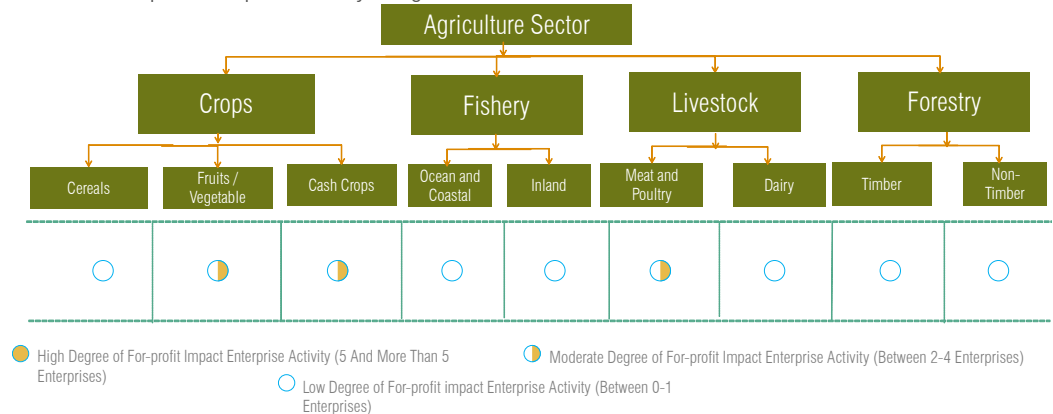
food processing enterprises in PNG.

There is significant demand for fresh food that is met largely through informal channels; demand for processed food items is mostly limited to the urban areas. Demand for fresh food products and semi-processed produce is largely met through informal supply channels such as small village markets, city markets and small retail stores in urban areas. Processed food products are mostly imported as PNG has negligible post-harvest processing facilities for food crops. The demand for such processed food items is currently limited to the urban areas in PNG.

There is growing demand for animal feed and poultry feed driven by local farmer groups. While a significant portion of poultry and piggery rearing is still driven by traditional approaches, this segment is likely to grow in the next few years, encouraging farmers to utilize quality feed to improve productivity and production. At present, demand for poultry feed and animal feed is largely met through informal and small enterprises. Most of these enterprises utilize crops such as maize and by-products such as leguminous grain products for feed production.

Demand for fresh meat and poultry products is increasingly driven by growing domestic household consumption. Domestic production of poultry products such as chicken has increased significantly from 4,000 tonnes in the 1980s to around 30,000 tonnes in recent years.⁶⁴ Demand for meat and poultry products increased significantly in the last 2-3 years⁶⁵ and this trend is expected to continue in the near future. Customers purchase meat and poultry at small village markets, informal city markets, small retail stores and organized retail outlets in urban areas. The demand for processed food products using meat and poultry is largely driven by the expat community in PNG and is met through imports.

Figure 28: Private Sector and Impact Enterprise Activity in Agriculture Sector in PNG



Source: Papua New Guinea Country Report to the FAO, Intelicap Analysis

Note: Large corporates in the above figure refer to large multinational corporations (MNC) or subsidiaries of MNC. Local Enterprise activity refers to formal private sector PNG own businesses. Informal sector refers to very small scale enterprises that usually not registered, not taxed, nor monitored by the government

Supply

The agriculture sector in PNG is dominated by informal private enterprise activity across various sub-sectors wherein small farmers or farmer groups grow, transport, trade and retail agri-inputs, fresh food, and other commodities for consumption. Export oriented segments such as cash crops and fishery have some large scale private sector companies in the post-harvest value chain.

Supply of food crops such as cereals, fruits and vegetables, and meat and poultry products for domestic consumption is largely dominated by small-holder farmers that sell their produce either in the local markets or to regional wholesalers. These regional wholesalers sell the produce to small unorganized retailers in urban markets to meet local demand. Poultry farming and pig rearing in PNG is largely dominated by smallholder farmers who rear chicken and pigs for household consumption as well as for limited commercial activities. Organized retail activity is a recent phenomenon in PNG, and there are

around 2-3 private sector players active in the organized retail sales of fruits, vegetables, meat and poultry products. Their presence is currently limited only to the Port Moresby and Lae region.

Organized private sector activity is concentrated in post-harvest stage of processing and packaging of cash crops and in the fisheries segment. Most of the private sector activity in PNG seems to be concentrated in the export oriented cash crops and fisheries sub-sectors. However, a majority of the private enterprises in these two sub-sectors are subsidiaries of large multinational corporations. There are 4-5 large players with predominantly foreign ownership active in high end processing of coffee and palm oil. Similarly, all the enterprises in the fishery segment are subsidiaries of major foreign companies. There are around 3-4 tuna processing enterprises in PNG currently, while 5-6 enterprises are in the process of being set up for fish processing.⁶⁶

There are few impact enterprises engaged in the cultiva-

Fresh Produce Innovation

Established in 2013, Fresh Produce Innovation is engaged in farming, sourcing, and delivering fresh fruits and vegetables to customers. It also provides training on agricultural practices to farmers.

Fresh Produce Innovation packages the harvest, delivers them to a central depot for storage and cooling, and finally transports them to the end-consumers. Most of its employees are from rural PNG, and its primary customers are supermarkets in Port Moresby, Alotau and Kiunga, and mining companies around the country

tion, packaging and processing of cereals, fruits and vegetables to meet domestic demand. Many of these players are the aggregators of agriculture produce and are involved in basic processing activities such as cleaning, sorting and grading and packaging of the produce for domestic markets

Impact enterprise activity in production and packaging of meat and poultry is emerging, with most of them having vertically integrated business models. Impact enterprise activity in the meat and poultry segment is limited to 2-3 private sector players that supply to retail stores and hotels and restaurants in major commercial centres of Port Moresby and Lae. Most of these players have vertically integrated business models ranging from feed production, hatchery, poultry and retail activity.⁶⁷

Challenges

Agricultural practices are traditional, and smallholder farmers lack access to quality inputs and extension services, resulting in lower land productivity. The informal market channels

in PNG also do not seem to drive productivity improvements, resulting in low uptake of modern agriculture practices. There are a few autonomous research agencies and one public funded research organization, National Agricultural Research Institute (NARI). However their role in promoting technological innovation for improving farm productivity for small holder farmers seems to be very limited. While consistent efforts to educate farmers will bring about improvement in productivity, it may take time to scale existing production.

Poor access to markets restricts private sector participation in the post-harvest value chain. Lack of infrastructure in PNG is not only limited to the road network for effective transportation of the produce, but also extends to the post-harvest infrastructure such as warehouses and cold storage facilities. In addition, poor information and communication technology (ICT) adoption results in delays or loss of information between key stakeholders such as farmers, middlemen, processors and retailers, who are unable to share information about production, prices of various commodities, and customer demand.

ASK Sanctuary Tilapia Farm

ASK Sanctuary Tilapia Farm started operations in 2013 to address the growing demand for fish protein in Papua New Guinea, and simultaneously create employment for poor households by integrating them in the aquaculture supply chain.

Primary customers of the caged Tilapia produce include fishmongers, supermarket retailers, and consumers from the hospitality and mining industries in the Highlands region. In addition to caged tilapia, It plans to produce low-cost fish feed locally to reduce the cost of aquaculture products.

Limited access to credit coupled with social and cultural attitudes towards loans makes it difficult for farmers to invest in agri-inputs such as high yield seeds and fertilizer, and agri-machinery such as tractors and harvesters.

Access to formal credit channels in PNG is largely restricted to major urban and semi-urban centres. Farmers' locational disadvantage is compounded by their social and cultural attitudes towards loans as they regard money as community property and loans as charity or aid.⁶⁸ Microfinance institutions (MFIs) and self-help groups currently have a limited presence in PNG, but could play a key role in linking farmers to the credit market as well as improving their financial literacy. Further, policies dealing with dedicated institutional credit (such as priority sector lending), crop production and crop insurance are still at a nascent stage in PNG.

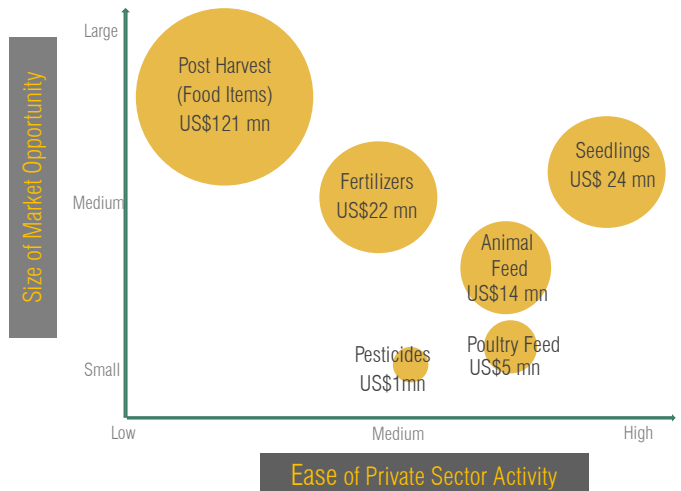
Small landholding pattern makes it difficult for enterprises to scale up production. Customary landholding among social clans or indigenous communities constrains consolidation and scale in the agriculture sector, and particularly deters private sector participation. Fragmented land holding limits private sector activity as it is difficult to achieve economies of scale and remain profitable. Private sector players who wish to access large areas of land for agricultural development may face difficulties in negotiating secure land leases from customary owners.⁶⁹

Opportunities and Whitespaces

There are growth opportunities for impact enterprises in pre-harvest agri-value chain activities such as provision of inputs, technology and extension services. Areas that could interest impact enterprises in the pre-harvest agri-value chain, especially for cash crops, include the production and marketing

of better-quality seeds, organic fertilizers, and bio-pesticides. Most of the farmers involved in cash crop production have the

Figure 29: Market potential for agriculture sector in PNG



Source: Intellect Analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)

ability to pay for these services, provided they are affordable and easily accessible. Production of fresh food items such as cereals, fruits and vegetables has considerable potential in PNG given the emergence of customer segments that have both, the capacity and the willingness to pay. In the livestock segment, animal and poultry feed seem to have good potential for impact enterprises as the farmers shift from subsistence based production to commercial scale cultivation in PNG.

Impact enterprises can also explore opportunities in provision of extension services and information to farmers. Improvements in

mobile and ICT penetration in rural areas of PNG can be leveraged to improve farmer awareness on latest methods of farming, proper use of inputs, irrigation based on the crop type and local / regional demand and supply.

There are opportunities for impact enterprises to develop the post-harvest value chain across multiple agri-commodities in PNG, particularly in production and processing of cereals, fruits and vegetables.

Middle income and low-income households representing more than 90% of the population in PNG are the key potential customer segments for processed food products. There is considerable domestic demand for several high volume products such as snack foods (banana chips, cassava chips), packaged fresh fruits and vegetables that could be met by local private sector enterprises.⁷⁰ Impact enterprises can also serve emerging business customer segments such as processing industries and retail chains / stores.

Impact enterprises could explore the provision of inputs in the livestock sub-sector by providing poultry feed and animal feed to improve farm productivity and feed conver-

sion ratio. Farmers involved in commercial farming or semi-subsistence farming of chicken / fowl and pigs are the key potential customers of animal and poultry feed in PNG. The demand for poultry feed could be high given that that one in four households in PNG is engaged in poultry production. In addition, some of the processing industries in the poultry and piggery segment that have a backward integrated model of harvesting and cultivation are also potential customers. Promotion of aquaculture could also provide some opportunities for impact enterprises in the fish feed segment.

The NTFP segment in PNG is largely unexplored, but PNG's forest reserves are rich storehouses of medicinal and herbal products, for which there is considerable global demand. Inadequate transportation infrastructure (such as roads and bridges) coupled with difficult geographic terrain may pose challenges for exploring opportunities in this segment. Thus, the NTFP segment may present a future opportunity for impact enterprise development in PNG, although very limited opportunities exist in the present scenario.

GLOBAL CASE STUDY – EA FRUITS FARM

EA Fruits Farm engages in commercial production and distribution of fruits and vegetables to customers in Tanzania, particularly in Dar es Salaam. The enterprise procures produce directly from farmers as far as 350-1000 kilometers away from the city, packages it and distributes it to retail markets in the city. Its model includes imparting modern agricultural best practices to farmers, increasing their incomes, and providing them with market linkages.

Approximately 80% of Tanzanians are employed in the agriculture sector, which accounts for half of the country's national income and three quarters of its merchandise exports. However, only about 33% of arable land in Tanzania is cultivated,⁷¹ and nearly 10% of the farmland remains unused largely because of technological constraints and lack of human and financial capacity. These challenges present opportunities for the private sector to educate farmers on agricultural best practices and create market linkages for farm products.

Elia Timotheo spotted this opportunity and set up EA Fruits Farm in 2011 to improve farm yields and the incomes of Tanzanian farmers. The company links farmers producing fruits and vegetables to markets in Tanzania. It also improves the economics of small-scale farming and reduces food wastage, which amounts to 48% of farm production and a loss of nearly US\$ 7 billion each year⁷²

Setting up

Elia Timotheo saw that Tanzanian smallholders are unable to secure good prices for their produce due to poor market linkages and inadequate infrastructure. He set up EA Fruits Farm to address these challenges through an agriculture extension and distribution solution. Farmers have seen their average annual income increase from about US\$ 500 to more than US\$ 2,900 due to support from EA Fruits.

Elia set up EA Fruits with his entrepreneur mother, Adeline, using personal funds. He explains, "My mother owns restaurants in Kilimanjaro. This had always inspired me to be an entrepreneur, and when I observed a gap in the system, I wanted to build a company that can connect the needs of the customer with increased income for the farmers." At present, the company has 16 full-time employees and investments of about US\$ 100,000. With growing demand from consumers for regular supply of fresh fruits and vegetables, EA Fruits has considerable expansion opportunities, not only within Tanzania, but also to other countries in East Africa, Europe and the Middle East. Elia is very optimistic about the opportunities, as he explains, "There is a growing demand of fresh fruits and vegetables in Tanzania and people are willing to pay a premium for this. Farmers want better quality and price for their produce. EA Fruits Farm can connect both and create a sustainable business model where all parties benefit."

Business and Operational Model

EA Fruits Farm works directly with farmers as well as through a franchisee model. Under the franchisee model, the company leases out 200 acres of its farmland to farmers and entrepreneurs who earn less than US\$ 1 a day, and provides training and support to increase yields of fruits and vegetables.

The company procures the produce from farmers and transports it in rented trucks and vans to the city. Here, the produce is

cleaned, processed and packaged before dispatch to customers. The primary customers of EA Fruits Farm include nearly 50 retail markets and door-to-door delivery services. Currently, it works with more than 300 farmers, including franchisees.

Figure 30: Operational model of EA Fruits Farm



Source: Primary Interviews, 2015

EA Fruits Farm pays farmers per kilo of produce, and payment is made in cycles of 7-10 days. EA Fruits Farm pays farmers for the entire produce and uses quick transportation and an advanced processing mechanism to reduce wastage.

Key Challenges and Strategies to mitigate them

Access to finance

Access to finance is a key challenge for EA Fruits Farm, particularly to build the distribution and market linkages. In order to reduce wastage, the company needs to invest capital in equipment, warehouses and technically skilled employees. Currently, all equipment and warehousing facilities are rented from third party vendors, which impact the profitability of the firm.

Competing with the existing channels

Traditionally, agents are responsible for buying produce from the farmers and selling it to traders. They are an essential part of the ecosystem and the biggest competition for EA Fruits Farm. To mitigate the competition, EA Fruits Farm works alongside agents instead of surpassing them to reach the farmers directly. As a result, now the company procures fruits and vegetables from

the farmers as well as from the agents. Agents also help the enterprise understand strategies of reaching out to new farmers.

Traditional agricultural practices resulting in low productivity

Smallholder farmers cannot afford to invest in fertilizers and high quality seeds due to the low prices they receive for their produce. This results in a cycle of low agricultural yield leading to low investment in the farm. In order to address the lack of knowledge among farmers, EA Fruit Farm trains them on techniques to improve yields. In its franchisee model, low income farmers are not only provided land on lease, but also supported with irrigation systems, fertilizers, seeds, equipment and training. The model also generates employment for farmers who do not own land.

Road Ahead

Over the next few months, Elia Timotheo plans to increase EA's product range to include new varieties of processed and packaged fruits and vegetables. It is seeking additional investment to set up collection centers close to the farmers and invest in refrigerated trucks to minimize wastage. The enterprise is looking for international partners and cross border platforms to enter new markets to expand into newer markets.

Over the next two years, the enterprise intends to reach out to 2 million customers. In order to do this, it wants to increase its procurement from 300 to 1000 farmers and add about 100 franchisees.⁷³ The CEO of the company Elia insists, "We believe in a fact that happy farmer makes health and quality produce. If we can put back to their pockets some untapped income, we are sure to make one of these happy and so for the rest, to achieve world class standard of produce right from Tanzania."

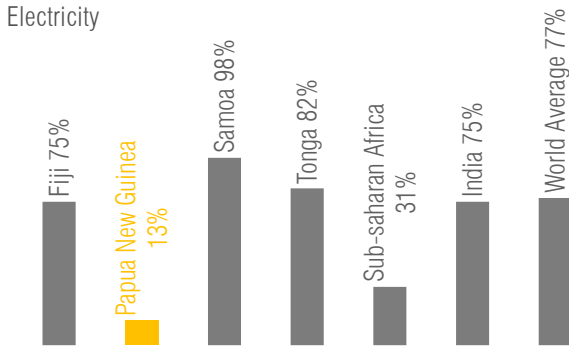


CLEAN ENERGY

PNG is endowed with several renewable energy resources such as hydro, solar and geothermal with proven theoretical and commercial energy potential that could be utilized to meet the energy demand in the country. However, the clean energy potential remains largely untapped, and petroleum products and traditional biomass products are utilized to meet energy needs. The government is the only supplier of grid power in the urban areas with an installed capacity of 330 MW.⁷⁴ Rural areas are largely underserved by the grid network.

Availability of renewable energy resources, high prices of petroleum products such as kerosene and diesel, and increased customer awareness are likely to drive the market for clean energy products and services in PNG. However, difficulty in reaching out to a larger customer base due to challenging geographic conditions, limited transportation and logistics infrastructure to transport products and lack of institutional and credit support are some of the key factors impeding the growth of the clean energy sector in PNG.

Figure 31: Percentage of Population with Access to Electricity



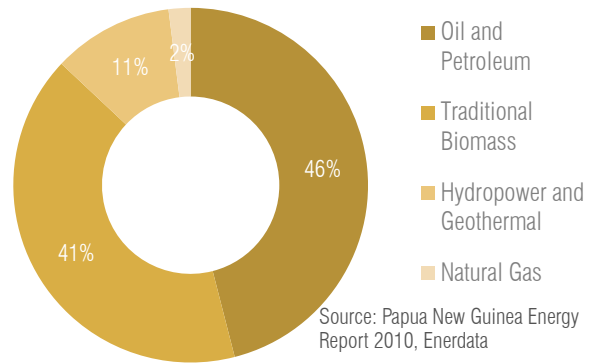
Source: World Bank data series 2010 data

Access to electricity in PNG is among the lowest in the world. Around 13% to 17%⁷⁴ of the population has access to electricity as per various reports.⁷⁵ The rate of electrification in PNG has been very low at around 1.3% from 2000 to 2010.⁷⁶ The situation is worse in rural areas where electricity penetration dips to around 6%.⁷⁷

Access to grid electricity also varies across different regions with around 15.3% households in the Papua region having access to grid electricity compared to only 5.9% in the Momase region.⁷⁸ Lower population density coupled with the scattered nature of key load centres is the most likely reason behind this uneven distribution of electricity.

Traditional sources of energy make up the energy mix to meet demand in PNG. Given the low access to electricity, a majority of the population relies on oil and petroleum products

Figure 32: Energy Supply in PNG (by source)



Source: Papua New Guinea Energy Report 2010, Enerdata

(petrol, diesel and kerosene) and traditional biomass (fuel wood) to meet their energy needs for lighting and cooking.

Household demand for energy in PNG (for lighting purposes and fuel source for cooking) requires per capita energy consumption of 500 kg of oil equivalent (koe) as of 2010.⁷⁹ Many of the unserved households⁸⁰ in PNG are dependent on kerosene, candles, and battery torches for meeting their lighting requirements. Most of these sources are available in rural areas of PNG, although they are often expensive due to high cost of distribution and transportation to ensure last mile reach. Kerosene is the most commonly used source of lighting for approximately 45% of the households, while fuel wood or fire wood is most commonly used for cooking in more than 80% of the households in PNG.⁸¹ Excessive dependence on petroleum products such as kerosene and fuel wood for energy is not only detrimental to the environment, but also poses health hazards for the people.⁸²

PNG’s significant potential for hydropower, solar energy and geothermal energy remains largely untapped. PNG has significant hydropower potential across four large river basin systems: Sepik and Fly River in the Papua region, Purari River in the Highlands / Papua region and Markham River in the Momase region. The economic benefit of developing large hydropower projects is limited in PNG due to lack of demand centres near the generation sites. However, there is a greater economic potential for developing mini/micro grids using hydro power for rural areas.⁸³

While solar energy has potential, it has been the least tapped for meeting energy requirements. Port Moresby, with more than 2000 sunshine hours per year and other urban and rural areas in the Papua region are considered excellent for harnessing solar power. Given the high solar irradiance across major regions in PNG (apart from the highlands region), solar PV systems, solar home systems and solar products can be increasingly utilized to meet the shortfall in grid energy supply.

While geo-thermal sources could be of importance to extractive industries due to presence of geothermal sites near mining locations in PNG, they may not be as relevant for small or medium enterprises. Other sources of renewable energy such as wind

energy and ocean thermal energy remain largely unexplored and are at very initial stages of development.

The regulatory and policy framework for promotion of clean and renewable energy in PNG is still at the development stages. Independent Consumer and Competition Commission (ICCC) established in 2002 under the Electricity Industry Act 2000 is the regulatory body for the energy sector in PNG. Its key responsibilities include issuing licenses for independent power producers (IPP), and establishing electricity tariffs and price controls for some petroleum fuels such as kerosene. However, the ICCC is highly dependent on the state-owned PNG Power Limited (PPL) to perform its role as the energy regulator. There is no dedicated law or regulation for the promotion of clean or renewable energy in PNG. However, this scenario is expected to change under the National Electrification Roll-Out Plan (NEROP) that was initiated in 2013 to improve access to electricity through on-grid and off-grid clean energy technologies. The government has initiated multiple policies to promote clean energy products in PNG. For instance solar products are given exemption from import duties (0% duty tariff), and have lower value of Goods and Services Tax (GST) at around 10% when compared to 20% on general items.⁸⁴

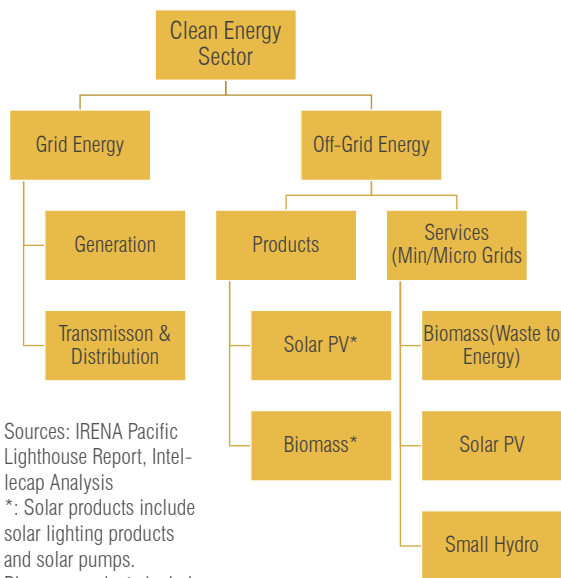
Table 4: Policies and Projects to Promote Access to Electricity in PNG

| Policy/Projects | Key stakeholders | Objectives |
|------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| National Development Strategic Plan 2010-2030 | Government of PNG | <ul style="list-style-type: none"> Achieve at least 70% electrification of households by 2030 |
| National Electrification Roll-Out Plan (NEROP) | Government of PNG, World Bank, ESMAP, ADB Australian Aid | <ul style="list-style-type: none"> Implement Government plan for improvement in access to electricity Make institutional investments and provide credit support to on-grid and off-grid clean energy technologies and enterprises that would expand access to electricity at an economical price |

Sources: Implementing PNG’s Electricity Industry Policy 2013, National Stakeholders Consultation Workshop, 2013

The clean energy sector can be segregated into two major segments: grid energy and off-grid energy. The off-grid energy segment can be further segregated into two sub-sectors based on the type of activity: services (mini/micro grids) consisting of solar PV, small hydro and biomass waste to energy conversion, and products such as solar products for lighting and biomass cook stoves.

Figure 33: Clean Energy Sector in PNG



Sources: IRENA Pacific Lighthouse Report, Intel- lecap Analysis
 *: Solar products include solar lighting products and solar pumps. Biomass products include clean cook stoves for the purpose of this report

Grid energy in PNG offers little scope for impact enterprises due to high capital requirement, lack of supporting power infrastructure and regulatory constraints. Grid energy is controlled by the state-owned PNG Power Ltd (PPL) that is largely responsible for generation, transmission and distribution of grid electricity. Three smaller Independent Power Producers (IPPs) are also active in grid electricity generation.

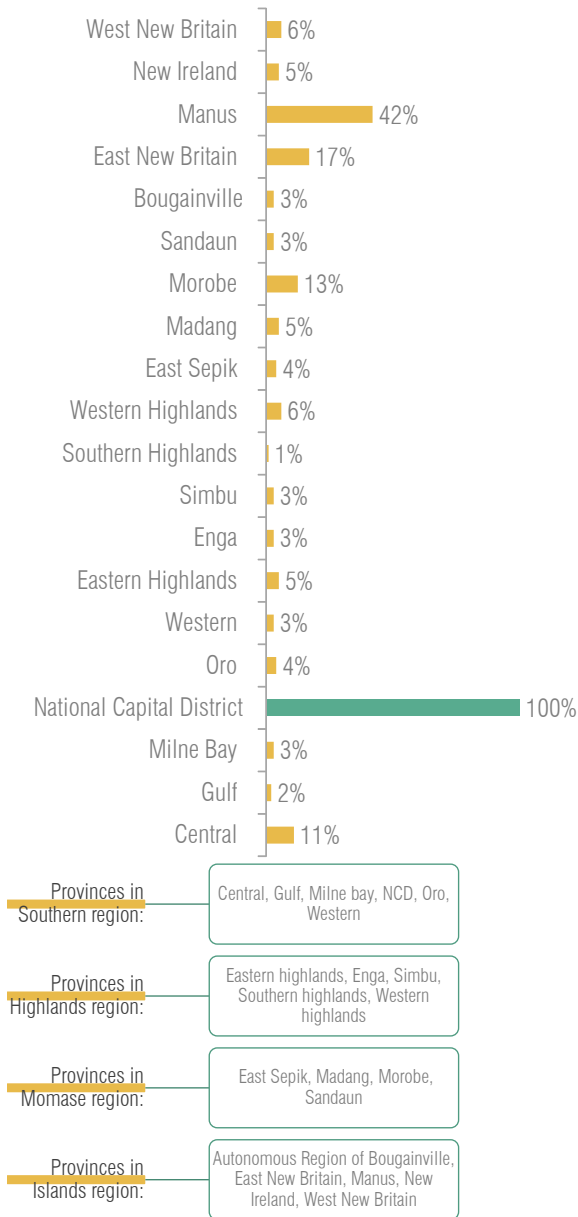
Market potential for private sector impact enterprises in the grid energy segment in PNG is limited due to high capital requirement, and geographic and commercial constraints in setting up power plants. Further, there are several regulatory constraints for private sector players. For instance, PPL has exclusive rights to supply electricity to consumers of less than 10 MW within 10 km of its existing network. The blanket sale price for electricity makes it difficult for private impact enterprises to consider grid electricity generation for household and retail consumers.

Access to electricity is the lowest in the provinces of the Highlands region as geographic conditions constrain grid expansion. Population with access to grid electricity is very low in PNG barring the National Capital District province that has 100% grid electricity access. Provinces in the Highlands region: Southern highlands, Enga, and Simbu have the worst electricity access indicators compared to the national average. Difficulty in the construction of power generation, transmission and distribution infrastructure makes it economically unviable to expand the grid services in the Highlands region. Mini/ Micro Grids and solar products could be utilized to meet the energy requirements of the population in this region.

Demand

There is significant demand for solar products in PNG, driven by need as well as increased customer awareness. In recent years, there is greater awareness of the health and cost benefits of using reliable and clean energy sources. The lack of grid electricity further fuels the search for consistent and cost-effective lighting and heating solutions. As a result, there is growing demand of solar products from low-income households who currently use an expensive mix of kerosene lanterns and battery powered torches. Findings from a recent survey highlighted a large increase in sales of solar energy products year-on-year

Figure 34: Access to grid electricity: Provincial Data



Indicates best performing province

Source: Papua New Guinea District and Provincial Profiles, The National Research Institute 2010

Number of electricity consumers of PPL have been considered for estimation (excluding customers of Mini/ Micro or provincial grids)

in 2013 (more than 100% increase in sales in some cases⁸⁵), suggesting that there is a growing market and greater consumer awareness of clean energy products in PNG. In addition, hybrid products with charging points for mobile phones are in demand in the last few years from communities that have mobile phone connections, but no electricity connection.

There is negligible demand for solar pumps as farmers are unaware of its usage and benefits. Although most of the farmers in PNG largely practice subsistence farming, they are slowly transitioning to commercial agriculture. However, they are less aware of modern agri-machinery and tools such as solar irrigation pumps to efficiently utilize limited surface water and stored rain water and improve farm productivity. Yet, with increasing commercialization, this scenario could change.

Demand for biomass products is low despite lack of clean cooking solutions and high dependence on fuel wood for cooking.⁸⁶ Less than 10% of the households in PNG are estimated to use clean energy sources, with over 85% being dependent on fuel wood for cooking.⁸⁷ Even in urban areas, nearly 50% of the households utilize biomass products such as fire wood for cooking. The current need for fuel wood is met through local markets or through collection from nearby forests. However, fuel wood is increasingly becoming expensive, and over-harvesting of trees has created a supply crisis for fuelwood.⁸⁸ Despite these conditions, demand for efficient products such as clean cook stoves is very low due to poor customer awareness.

Solar Solutions PNG Limited:

In order to reduce the dependency on kerosene for lighting requirements, Solar Solutions PNG Limited installs affordable micro-grids in PNG's off-grid communities. Along with installing micro-grids, the enterprise provides households with a solar panel, four pendant lamps, batteries, regulators, and also ports to charge small electrical devices.

The enterprise sees an opportunity in partnering with provincial governments who require cost-effective solutions to rural electrification. It targets to have an average installation cost of PGK 500,000 or less for each micro-grid, to enable local distributors to earn a significant income.

Demand for mini / micro grid services is low despite availability of clean and reliable sources of power generation such as solar PV, small hydro and biomass for waste to energy conversion. This can be attributed to the low level of customer awareness and difficulty in the construction, operations and maintenance of these grid systems in remote locations. The demand for mini / micro grid services using small hydro and solar PV is largely driven by government, donor and development organization initiatives. Demand for biomass waste to energy

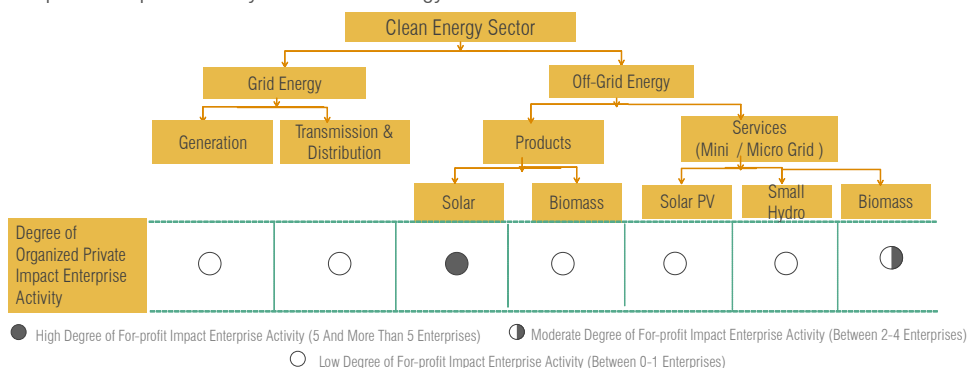
conversion is largely driven by Corporate Social Responsibility (CSR) activities of large enterprises in the country.

Supply

Impact enterprises are active in the solar lighting products segment in PNG. There are estimated 8-10 impact enterprises supplying solar lighting products. However, these impact enterprises are mostly concentrated in Port Moresby, Lae and other commercial centres. The solar products market in semi-urban and rural areas is largely served through donor programs of various agencies, NGOs and church-based initiatives as well as Corporate Social Responsibility (CSR) activities of major extractive companies in the country.⁸⁹ There is no enterprise activity observed in the solar pumps for irrigation in PNG.

There is a limited impact enterprise activity in the services segment with a few enterprises active in the biomass waste-to-energy conversion to produce bio-fuels. These enterprises generate bio-fuel from agricultural waste that can be utilized for energy conversion. Agriculture waste-to-energy conversion is largely dominated by CSR activities of companies such as New Britain Palm Oil Limited and Hargy Oil Palms Limited. Solar PV based mini/micro grids are slowly emerging in

Figure 35: Private sector and impact enterprise activity in the clean energy sector in PNG



Source: Intelicap Analysis

PNG, with PPL having established a small scale solar PV plant in the Western Province in 2013-14.

There is negligible impact enterprise activity in the supply of biomass products such as clean cook stoves in PNG. A few international suppliers of clean cook stoves have their sales offices in Lae and Port Moresby⁹⁰, and largely act as importers of these products.

Challenges

Small enterprises find it difficult to pay for the up-front cost of installation of mini/micro grids. Similarly, households too find it difficult to pay up-front for clean energy products, and this limits enterprise expansion. There is a substantial upfront capital cost associated with installation of mini / micro grids such as small hydro power plants or solar PV plants, particularly if they are to be operated in isolated locations. Small impact businesses find it difficult to access capital. Similarly there is an upfront cost involved in the purchase of clean energy products such as solar lanterns or improved cook-stoves. Many potential customers for clean energy products from rural and underserved areas may find it difficult to pay for the relatively high initial costs for utilizing these products or services. There is limited institutional and credit support for low-income households, and this makes it challenging for enterprises to build viable businesses in these segments.

Clean energy products are relatively new to customers in PNG, and there is limited customer awareness about the existence of renewable energy technologies suited for their requirements. Although solar lighting products have seen significant traction in this nascent market due to various donor and aid programs, there is limited awareness about biomass products for clean cooking. A private sector enterprise

interested in exploring the segment may have to invest significantly in customer education as well as provide support through financing options.

Enterprises providing clean energy products or services in PNG may find difficult to reach out to customers in remote, rural areas in the absence of civil infrastructure. The geographic landscape in the country, especially in the Highlands, is challenging with highly dispersed and diverse off-grid population, making it difficult to connect them with a reliable and clean source of energy. Transportation and logistics infrastructure in PNG is not well developed – over 50% of rural households in PNG live more than 5km from a national or a paved road⁹¹ making last mile distribution of solar or biomass products very difficult.

Mobile Hydro Power Plant

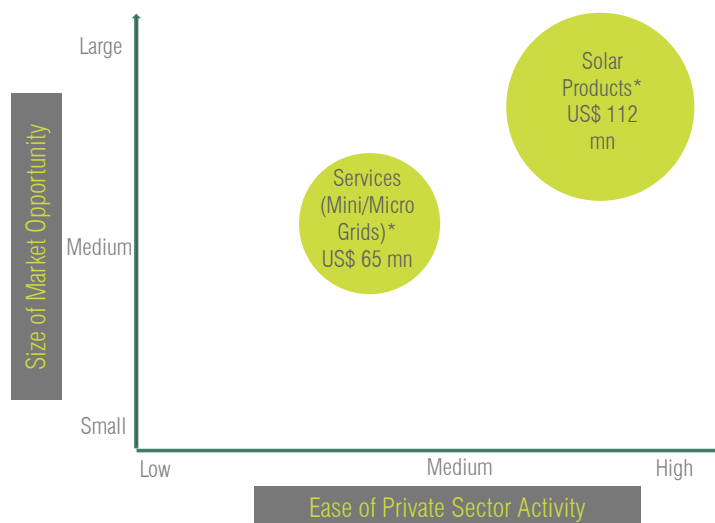
Still in the idea stage, Mobile Hydro Power Plant plans to use locally used materials to construct power plants that have the capacity to generate electricity by using the river current. These power plants will provide affordable electricity and also help create local jobs for the rural population in PNG.

Mobile Hydro Power Plants sees local communities, the national government, provincial and local governments, NGOs, and donor agencies as its primary customers.

These customers will be provided with a stable power output of approximately 100W.

Opportunities and Whitespaces

Figure 36: Market Potential for Clean Energy in PNG



Source: Intelicap analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)

*Market potential for solar products has been estimated for solar lighting products. Market potential for services includes mini/micro grids services through small hydro and solar PV. It must be noted that there is a high degree of overlap between the two segments that could lead to potential customers choosing one option over the other to meet their energy needs.

Impact enterprises can tap opportunities in the solar products segment for lighting and mobile charging solutions. A majority of the energy needs for lighting in currently unserved and under-served households, primarily in the rural areas, could be met through solar products such as solar lanterns and solar lighting systems. In addition, increasing uptake of mobile phones in PNG, where an estimated 1.3 million households have a mobile phone⁹², but no charging capability provides an excellent opportunity for solar mobile charging products and solar home systems.

There is potential for mini / micro grid services if they receive adequate institutional and government support. Grid extension in PNG could be highly costly and not feasible

in remote rural areas especially in the highlands region. Mini/micro grids such as small hydropower and solar projects would be feasible for these locations.

Biomass waste-to-energy conversion services have high potential for impact enterprises in PNG given the agrarian nature of economy and high production of oil crops such as palm oil and coconut that generate waste which could be utilized for energy conversion. Oil palm companies in PNG can play active role in promoting private sector participation in the segment. Enabling government policies and institutional support such as provision of capital at low interest rates, and technical assistance are required for encouraging private sector participation in this sector.

GLOBAL CASE STUDY – COBITECH SOLAR

Cobitech Solar provides affordable lighting solutions to off-grid households in Kenya. It propagates the use of solar power as an alternative to conventional sources of energy such as kerosene.

Around 82% of Kenya’s population does not have access to electricity and a majority of the households in rural Kenya are dependent on kerosene for their day-to-day energy needs. Rural areas in Kenya are characterized by low per capita income and the price of kerosene in these areas is around 46% higher than that in urban areas. Given this scenario, a large number of Kenyans are compelled to spend a high-proportion of their income on fulfilling basic energy needs. This limits their savings and prevents them from undertaking productive investments that can improve their income. Cobitech Solar, a renewable energy enterprise based in Kenya, was set up to address these challenges. It seeks to promote off-grid solar solutions to rural poor households that use kerosene for lighting. Their primary products are solar kits that can be used for lighting three bulbs and charging small devices. Cobitech also partners with microfinance organizations to provide financing for these kits.

Setting Up

Samson Gichia incorporated Cobitech Limited in 2010 in Ruiru, Kenya with the mission of generating clean renewable energy from biogas. The enterprise planned to sell energy to the national government of Kenya for rural electrification. Given that more than two-third of the population in Kenya did not have access to electricity, Samson saw a huge business opportunity in the sector. However, the enterprise was finding it difficult to scale and set up an adequate number of biogas projects every year. Over time, Cobitech realized the massive potential of solar power as a clean, cheap and efficient source of electricity and around mid-2013, Cobitech started focusing only on solar power products. It was rebranded from Cobitech Limited to Cobitech Solar.

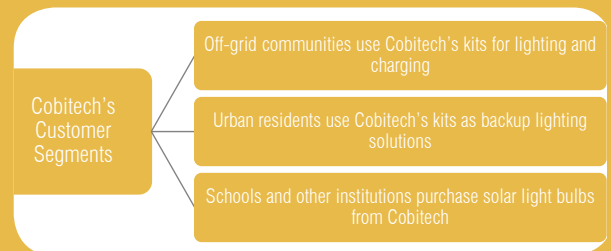
The demand for lighting in off-grid communities is enormous in

Kenya. People in off-grid communities know the importance of lighting and how it affects their productivity, but are unable to afford it. Cobitech identified this as a business opportunity and started selling solar kits. These kits can be used for lighting three LED bulbs and charging small electronic devices such as mobile phones. Till date, it has sold around 400 solar energy kits. In addition to these kits, Cobitech also produces solar power light bulbs which are purchased by schools and educational institutions. Daniel Kelli Nzioka, Sales and Marketing Manager at Cobitech Solar, states that, “Our main aim is to see that many off-grid households have a complete, cheap and affordable lighting solution. We are championing for the eradication of the expensive use of kerosene for lighting.”

Business and Operational Model

Cobitech imports the easy-to-use solar kits from China and sells them to off-grid households and communities. The business model considers the income constraints of people in off-grid communities in Kenya. Hence, Cobitech partnered with a number of Kenyan MFIs to provide loans to community members who are interested in purchasing the solar kits. The borrowers are allowed

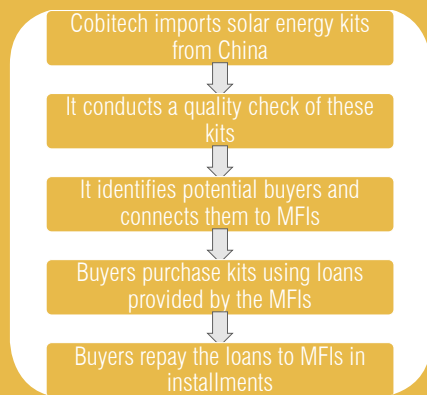
Figure 37: Key Customer Segments



Source: Primary Interviews, 2015

to repay the MFIs in installments over a period of 12 months. Cobitech introduces potential customers who seek finance to purchase the energy kits to the MFIs. Cobitech also partners with MFIs for marketing their products.

Figure 38: Operational Model



Source: Primary Interviews, 2015

The solar kits are priced at KES 5,800 (US\$ 64.5). Buyers who avail credit from MFIs repay the loans in monthly installments of KES 500 (US\$ 5.5) over a period of 12 months. MFIs charge an interest on the loans payable by the customers, and a commission for marketing that is paid by Cobitech. Some MFIs also purchase the solar kits from Cobitech directly, and resell them to their clients on an installment basis. Cobitech has also partnered with a few plantation owners, who purchase the solar kits for their workers. The payment for these kits is debited from the worker's salaries on a monthly basis. Cobitech's partnerships with the MFIs and plantation owners have increased its outreach and customer base.

Key Challenges & Strategies

Capital

Banks in Kenya prefer lending to companies which have established operations and are in the expansion stage. Cobitech did

not fit their criteria as it is at a nascent stage in the industry, and therefore struggled to raise capital initially. In order to address this challenge, Cobitech focused efforts to make its product successful and increase uptake, so that its income is able to support expansion. With time, the enterprise hopes to demonstrate its sustainability, and then raise capital.

Supply chain efficiency

Cobitech imports the solar kits from China, and this presents some challenges. Due to import restrictions, Cobitech cannot import a very high number of solar energy kits at one go. Moreover, the import process is time consuming – the sea route takes 40 days, while air transport is very expensive. Additionally, quality checks of the imported kits require considerable time. To mitigate this challenge, Cobitech plans to partner with a U.S based organization to produce similar solar kits in Kenya. Domestic production of solar kits is likely to reduce turnaround time as well as overall costs, thereby increasing the sustainability of the business.

High transportation and last-mile delivery cost

Since Cobitech sells its solar kits primarily in off-grid communities in rural areas, it has to bear high transportation and last-mile delivery costs. Its partnerships with MFIs mitigate this challenge to some extent, and hence, the enterprise is keen to increase its network of MFI partners in the future.

Road Ahead

Going forward, Cobitech plans to widen its Africa footprint, by expanding in Kenya and potentially explore similar business opportunities in neighboring countries. The enterprise aims to sell 200 kits every month in the near future. It is also likely to partner with a U.S. based organization to set up its own manufacturing plant in Kenya by 2016.

GLOBAL CASE STUDY – POWERGEN RENEWABLE ENERGY

PowerGen Renewable Energy seeks to increase access to high-quality and affordable renewable energy in East Africa, particularly in off-grid communities. In a period of four years, the enterprise has installed more than 20 solar micro-grids in Kenya and Tanzania, making it one of the most successful players in the energy space in East Africa.

In Kenya, only 18% of the population has access to electricity and in East Africa, 90% of the population is dependent on biomass and kerosene for their energy requirements.⁹³ These conventional sources of energy are expensive creating a huge demand for affordable energy in East Africa. Inspired by this opportunity and their experience in the renewable energy industry, Alastair Smith, Mark Wopicho and Sam Slaughter collaborated to establish PowerGen Renewable Energy. Besides offering a wide-range of solar powered products, PowerGen provides electricity to off-grid communities in Kenya and Tanzania through solar powered micro-grids.

Setting Up

Established in Nairobi in 2011 as WindGen Power East Africa, the enterprise initially restricted its business to manufacturing small wind turbines. Over time, as the cost of solar power dropped, the enterprise saw enormous business potential in providing solar-based energy systems. In 2013, it was rebranded as PowerGen Renewable Energy, and it offered a diverse range of products including on-grid battery back-up, solar water pumping, solar heaters and solar lanterns. Soon, the PowerGen team realized that off-grid communities in Kenya were spending a large amount of money on traditional sources of power. This encouraged PowerGen to provide energy solutions to off-grid communities through solar micro-grids. To date, PowerGen has installed more than 100 renewable energy systems across East Africa including 20 solar micro-grids in Kenya through which it provides affordable and reliable electricity to over 500 homes and businesses.⁹⁴

Business and Operational Model

PowerGen charges a nominal connection fee of US\$ 10, which encourages potential customers to take-up connections. The micro-grid supplies AC current which can be directly used to power any electronic device and customers have the flexibility to prepay for energy via mobile money and uses an innovative metering system that automatically cuts off power supply when customers run out of credit. Electricity is restored automatically when customers make a subsequent payment for a recharge. Of the 20 micro-grids installed by PowerGen, four have been financed by Kiva, an online platform that connects lenders to borrowers. Kiva's support in raising capital ensures that electricity can be made available to customers and households who may not have the capacity to make full up-front payments. The Kiva loans are offered for tenures of 2 years up to 7.5 years at interest rates ranging from 5% to 10%⁹⁵.

Besides solar micro-grids, PowerGen also specializes in installation of solar products for various on-grid customers. The products, which are imported, include solar heaters, lanterns, water pumping systems, battery backups and generators. PowerGen has built good relationships with suppliers, clients and partners in the sector.

Figure 39: PowerGen's KIVA Financed Micro-grid Model Process Flow



Source: Primary Interviews, 2015, Intellectap Analysis

Key Challenges & Strategies

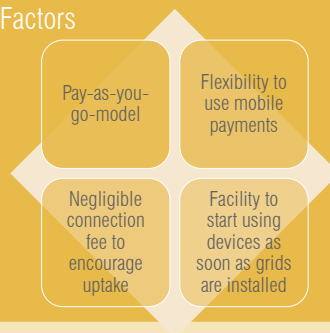
Awareness among potential customers

It is challenging for any renewable energy enterprise to get potential customers to try their product. In order to address this challenge, PowerGen charges a very nominal connection fee to encourage potential clients to explore renewable energy. It provides new customers a ready-to-use lighting kit at a very low price, which they can try and then decide if they want to continue using the service.

Capital

PowerGen mostly targets off-grid communities in rural Kenya whose members find it difficult to make upfront payments for the micro-grids. In order to mitigate this challenge, PowerGen has partnered with Kiva and provides micro-grids to underserved communities on credit. PowerGen is also taking numerous steps to educate investors regarding the potential of solar projects.

Success Factors



Partners

- MorningStar, Trojan, Deka, Victronenergy, access:energy, Firefly, Lorentz, Grundfos, and Ezinc provide inputs;
- KIVA, SunFunder, and NVI Energy provide funding
- GVEP, NVI Energy, and CIC Kenya provide advisory and other support services
- USAID, Community Solutions Initiative, and Rural Energy Agency are other important partners

Identification of micro-grid sites

Identification of suitable micro-grid locations becomes challenging when the National Energy Grid of Kenya does not disclose where it will be set up its power grids and transmission lines. If PowerGen targets the same location, the micro-grids become redundant. Hence, PowerGen makes assessments that involve site-surveys, field trips, and communication with community members prior to installing grids.

Road Ahead

PowerGen plans to install over 2MW of solar, wind, and hybrid projects by 2018.⁹⁶ It believes that the market potential in Kenya and Tanzania is huge and will remain its focus for the next couple of years. Elizabeth O'Grady, Business Development Associate at PowerGen, emphasizes on the opportunities in these countries and says, "Appetite for energy in Africa, especially Kenya is really high. . . People in Kenya are entrepreneurial and are driven to improve their quality of life. We see this as a business opportunity."

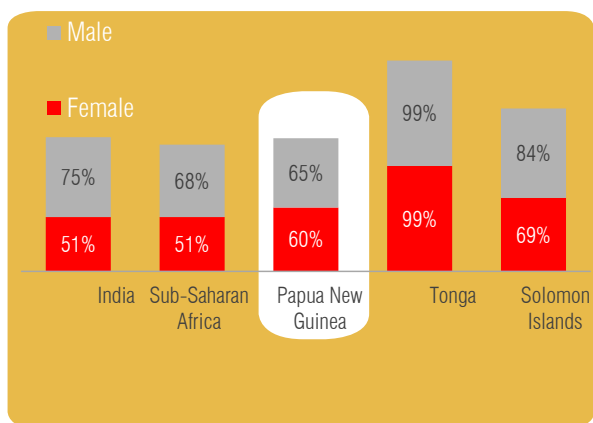


EDUCATION

PNG's education sector is broadly organized into elementary, primary, secondary, tertiary and vocational schools, most of which are owned and managed by the government. The government's aim to provide free education for all up to secondary school has helped in building awareness of the need and importance of education. Further, demand for learned skills and therefore, for schools and academic courses, increases as more people move to urban centres and work in non-farm sectors

Government efforts to improve the access and quality of education include providing universal access to education, teacher training and short vocational courses. Despite the strong push provided by the government, education in PNG faces challenges such as low enrollment rates, high drop-out rates, delayed entry into schools and low gender parity in secondary and tertiary sub-sectors.

Figure 40: Adult (15 years and above) literacy rates as a percentage of population



Source: World Bank Database 2012

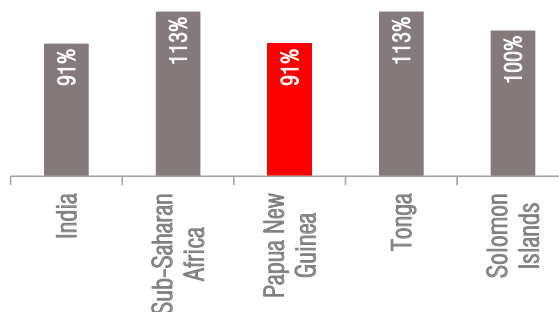
The literacy rate⁹⁷ and net enrollment ratio (NER)⁹⁸ in PNG is low compared to other East Asia and Pacific countries.

Given the low net enrollment ratio of children in primary schools, about 64,000 boys and 100,000 girls of primary school-going age are out of schools.⁹⁹ The MDG for education intends to ensure that by 2015, all children will be able to complete primary school. To measure this goal, there are three relevant parameters - net enrollment ratio, number of students completing primary

school and youth literacy. As per available information, PNG is lagging behind on these metrics.

The overall gross enrollment ratio of PNG was 114 in 2012.¹⁰⁰ The Gender Parity Index (GPI) for primary education is lower when compared to countries such as Fiji and Tonga. The female to male gross enrollment ratio¹⁰¹ in PNG decreases further at the higher grades.

Figure 41: Gender Parity Index for Gross Enrollment Ratio (Primary Education)



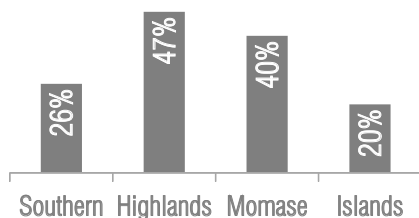
Source: Primary Interviews, 2015, Intellect Analysis

Table 5: Education Indicators in PNG

| Goal Evaluation Parameter | MDG Target | | Status |
|---------------------------------------|------------|-----|-------------------------------------------------|
| Net enrollment ratio (primary school) | 95% | 75% | • Expected to meet the target only after 2030 |
| Number of students completing primary | 95% | 57% | • High drop-off ratio and no progress on target |
| Youth literacy rate (15-24 years) | 95% | 71% | • Among the lowest in developing economies |

Source: UNESCO Statistics 2011

Figure 42: Region wise percentage of people who cannot read or write (8 years+)



Source: Household Income and Expenditure Survey, 2010

PNG’s education indicators highlight low literacy rates in the Highlands region, high drop-out rate for secondary education and inadequate provision of tertiary education.

The Household Income and Expenditure Survey (HIES) of 2010 indicates that the Highlands region has the highest illiteracy with about 47% of the people being unable to read or write. The high rate of illiteracy in the Highlands can be attributed to poor access to schools given the difficult terrain and limited means of connectivity.

Population aged between 14-25 years has a higher literacy rate of 78% in contrast to the population aged 50 years and above (44%).¹⁰² Persistent efforts by donors and the government to develop the sector in the past few years have resulted in higher literacy rates amongst the youth. The school NER is higher in the urban centers (46%) than in the rural areas (27%) in PNG.

The NER is one and half times higher for primary schools than for secondary schools, indicating high drop-out rates.

High school fees, disinterest in education, family responsibilities, long distances to access schools and non-functionality of schools are some of the key reasons cited by 92% of the population for non-attendance in schools. In addition to challenges in

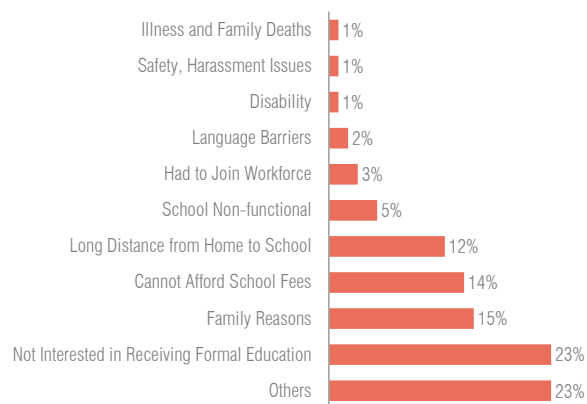
school infrastructure and transportation facilities, there is limited awareness among people about the benefits of formal education.

The medium of education is English, but students lack skilled usage of the language. PNG’s government adopted English as a medium of instruction in 1970-80s. However, Pidgin is still the choice of instruction for teachers in primary and secondary schools. The school leaving examinations are all held in English and poor comprehension of the language results in low graduation rates.¹⁰³

Inadequate skill sets of teachers seem to result in poor quality of education in PNG.

Teacher absenteeism in primary schools in PNG is 15%,¹⁰⁴ which is low as compared to the situation in India (25%) and countries in Sub Saharan Africa (16-27%). As of 2003, student teacher ratio for primary education stood at 35 for primary education and 27 for secondary education, which is similar to India and other neighboring countries.¹⁰⁵ However, inadequate skill sets of teachers seem to be the key reason behind poor quality of education especially at the primary level in

Figure 43: Reasons For High Drop-off Rates



Source: Household Income and Expenditure Survey, 2010

PNG - teachers particularly lack adequate skills in the English language and numeracy.¹⁰⁶ This has exacerbated the situation leading to poor student quality and high drop-out rates for subsequent levels of education.

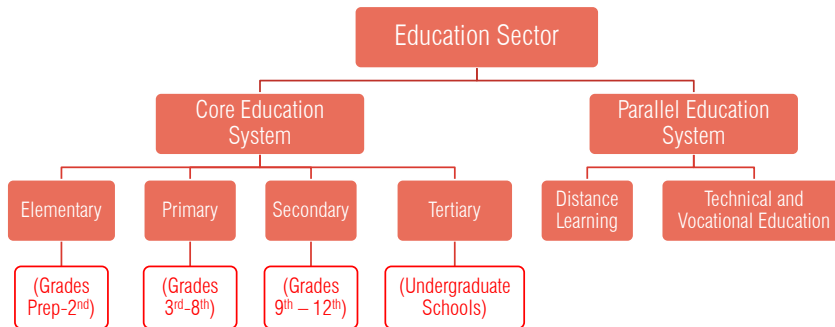
The government has increased spending on education in the past five years. The government, through two of its major policies, The National Education Plan (2005-2014) and the Universal Basic Education Plan (2010-2019), aims to integrate education service providers and implement education reforms.¹⁰⁷ It also initiated a Tuition-Fee Free (TFF) education policy in 2011; and as a result, government spending on education has grown from PGK1.1 bn (US\$0.43 bn) in 2011 to PGK1.5 bn (US\$0.58 bn) in 2014. Department of Foreign Affairs and Trade (DFAT), New Zealand Aid Programme (NZ Aid), and Asian Development Bank (ADB) are some of the key donors providing financial support to the government to implement these policies.

Table 6: Policies and Projects to Support Education Sector in PNG

| Policy/ Projects | Donors and Stakeholders | Objectives | Status |
|---------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tuition Fee Free Education Policy | Government of PNG | <ul style="list-style-type: none"> • Improve access to schools (especially for girls) • Improve retention • Improve the quality of education • Strengthen education management • Improve equity to schooling | <ul style="list-style-type: none"> • Initiated in 2011 • Currently under implementation • Subsidized school education for all students from elementary to secondary and vocational institutions, inclusive of privately run schools |
| National Education Plan 2005-2014 | Government of PNG | <ul style="list-style-type: none"> • All children (six years of age) must enter the elementary preparatory grade by 2012 and complete three years of basic education • All children must have the opportunity to complete primary education of six years up to grade 8 • Relevant, affordable and quality secondary education should be provided to selected grade 8 and grade 10 graduates • Provision of a flexible, open and distance education as alternative opportunities to students to pursue formal education • Provision of a variety of institutions offering courses of varying lengths to students completing primary education • Cost-effective technical education system, should be available and be accredited by industry | <ul style="list-style-type: none"> • Review of current plan is underway |
| Universal Basic Education Plan ¹⁰⁸ 2010-2019 | Government of PNG | <ul style="list-style-type: none"> • All children of school-going age must enroll in school • They must complete nine years of basic education. • They should have learnt skills, knowledge and values covered in the basic education curriculum | <ul style="list-style-type: none"> • School infrastructure, quality of teaching improved at elementary and primary level |
| Medium Term Development Plan 2011-2015 | Government of PNG | <ul style="list-style-type: none"> • Implementing reforms to ensure better service delivery in primary and secondary education • Build capacity of education institutions • Achieve youth literacy of 70%, gender parity of 0.97, pupil teacher ratio of 44, 50% graduation rate of primary education and 95% job provision for graduates of tertiary education by 2015 | <ul style="list-style-type: none"> • Plan under implementation |

Source: Department of Education, Government of PNG

Figure 44: Education Sector in PNG



The education sector in PNG can be divided into core and parallel sub-sectors.

Core education system, which includes:

1. Elementary - Preparatory schools, elementary 1 and elementary 2
2. Primary - Grades 3rd to 8th catering to children of ages 9-14 years
3. Secondary - Grades 9th to 12th catering to children of ages 14 to 17
4. Tertiary - Universities for graduate and post-graduate studies, teachers' training, nursing colleges

Parallel education system comprising:

Distance learning schools - Mostly offer secondary and tertiary education for students unable to travel to brick-and-mortar schools

TVET - Offer technical degrees for employment purposes.

State of education varies across provinces in PNG indicating a disparity in access to basic education infrastructure and services. Challenges range from lack of infrastructure and qualified teachers and the inability of parents to pay school fees to high incidence of repetition, and enrollment of over-aged children. Total number of educational institutes as a fraction

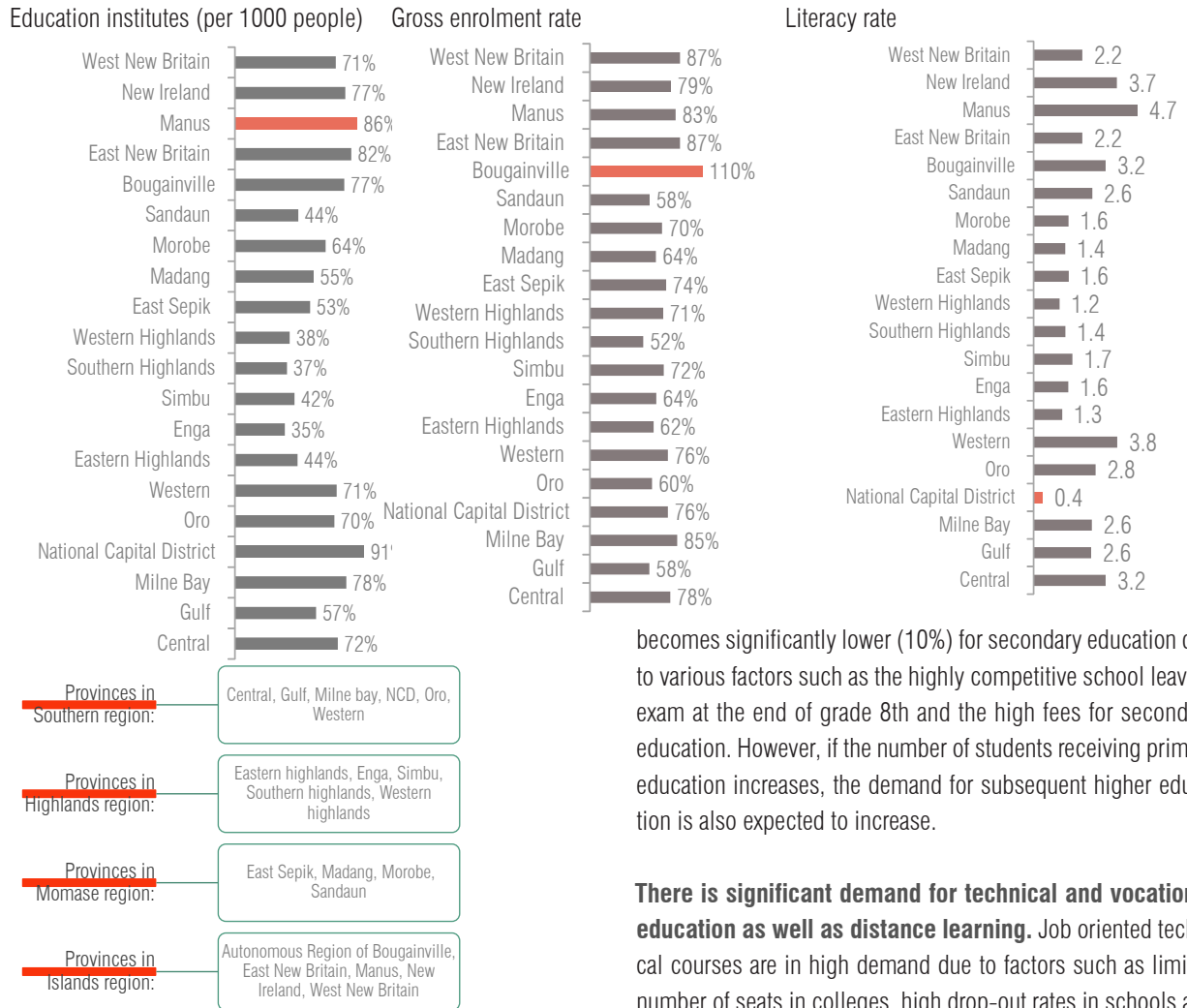
of the population in a province could indicate the adequacy of infrastructure to meet the demand for education. Infrastructure and enrollment together contribute to improving the literacy rate across provinces. National Capital District (NCD) has the highest literacy rate (91%), while Enga has the lowest literacy rate (35%) as there are few educational institutes in the province. NCD has a high literacy rate despite having few government run schools, as there are private educational institutes bridging the need gap. Manus performs the best on education infrastructure with 4.7 schools per 1000 people and has a high literacy rate of 86%.

Demand

With 60% of total population below 25 years of age, there is high potential demand for education. Increased government and donor focus has provided a boost to sector. Further, there is greater demand for skilled workers in heavy engineering and extractive industries such as mining. Technical and vocational education can help build the pool of skilled workforce to meet this demand.

Number of students seeking elementary, primary and secondary education is high due to the sizable young population in PNG. Around 27% of the total education seeking population requires elementary and primary education. This number

Figure 45: State of Education across Provinces



Source: National Research Institute (2010), District and province profiles
 Note: Educational institutes include elementary, community, primary, provincial high, secondary schools and vocational institutes

becomes significantly lower (10%) for secondary education due to various factors such as the highly competitive school leaving exam at the end of grade 8th and the high fees for secondary education. However, if the number of students receiving primary education increases, the demand for subsequent higher education is also expected to increase.

There is significant demand for technical and vocational education as well as distance learning. Job oriented technical courses are in high demand due to factors such as limited number of seats in colleges, high drop-out rates in schools and growing job opportunities in industries such as mining and food processing. Students who drop out of secondary schools (70% drop-out rate), and students who either fail grade 12th graduation examination or pass but are unable to secure college admissions seek parallel education.

The potential demand for tertiary education is low compared to primary and secondary education. The number of grade 12th graduates in PNG increased from 18,000 in 2013 to 22,000 in 2014, indicating increasing demand for college education. Over the past few years, the number of school graduates has increased by 13%¹⁰⁹ annually. However, this number is fairly low as compared to primary and secondary education since many students drop out at subsequent education levels. The Task Force on Outcome Based Education 2013 estimates that many grade 12 leavers are poorly prepared for university level studies, and hence, actual demand may be much lower compared to current estimates. Enrollments for tertiary education are also low due to the comparatively higher tuition fees for degree courses, which are about 3-5 times the cost of vocational education.

Supply

The government is the largest provider of education services in PNG. The church is the largest not-for-profit private provider, followed by very few for-profit schools.

Most elementary, primary, secondary and tertiary schools are owned and managed by the government or by the church. Elementary education in PNG is primarily delivered in

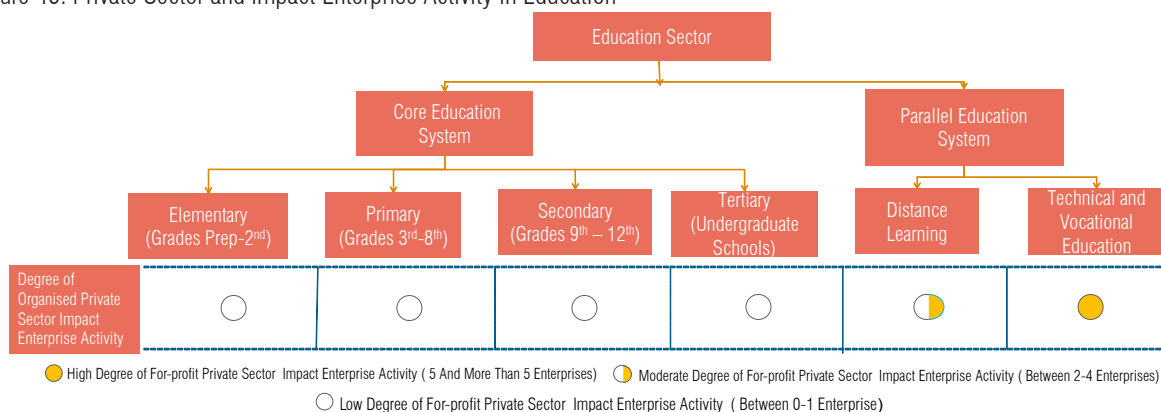
800 or more vernacular languages and has been designed to suit the local environment and culture. Elementary schools have very basic infrastructure and are usually run by the local community. Primary schools fall under four main categories-

1. Government owned, government run schools
2. Church owned, government aided schools
3. Church owned, unaided private schools
4. Private owned, private run schools

About 1,700 schools are owned by the government and 1,800 are church owned.¹¹⁰ Students successful in obtaining the Certificate of Basic Education (COBE) at the end of grade 8th are eligible to move to the secondary segment. Secondary schools are fewer in number, but are again owned and managed largely by the government and the church. The student to school ratio is around 440. There are only two private sector schools owned by the International Education Agency (IEA) that cater to about 1,000 students in total.

The tertiary education segment has very limited seats, particularly when compared to the number of students exiting grade 12th. Only 22-25% of these students are able to secure seats for tertiary education. In 2013, about 4,000 students out of 18,000 school graduates secured admission in colleges.¹¹¹

Figure 46: Private Sector and Impact Enterprise Activity in Education

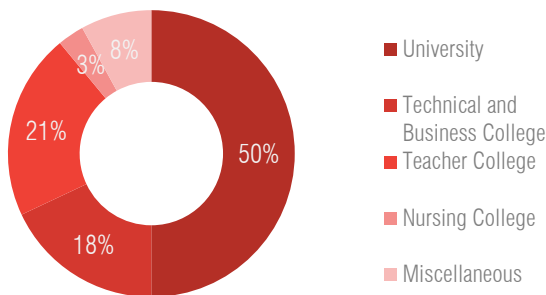


Source: Intellecap Analysis

Universities offer courses such as arts and humanities, business, health sciences, education and teacher’s training, science, and theology.¹¹² Currently, there are only a handful of higher education institutions such as universities, technical colleges, teacher colleges, and nursing colleges. Four universities are owned by the government and two are owned by the church.

For-profit, private sector schools predominantly serve the high income population. Most of the private schools are owned

Figure 47: Tertiary Education in PNG



Source: Update Paper by Office of Higher Education, PNG, 2014

Vocational Education in PNG

Promotion of vocational education in PNG is a key priority for the government. The government provides coordinating services and logistics support for all the seven technical and business colleges and 140 vocational centres in PNG. More than half of the Technical Training Certificate (TTC) courses are sponsored by the Office of Higher Education. Vocational courses in PNG have been customized to suit local requirements with several community based short term courses on offer at various institutes.

by the IEA and follow an international curriculum that is different from the national system of education. There are 16 IEA schools offering primary education to around 4,700 students. However, these students belong to the expat and high income communities and are mostly located in urban centers.

Most private sector impact enterprises in education offer Technical and Vocational Education. The government established vocational education centers in 2000, and subsequently, private players also set up operations in PNG. These

Table 7: Universities in PNG

| Name of Institute | Year of Establishment | Courses Offered |
|------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Divine Word University | 1996 | Undergraduate and post graduate full time and flexi learning programs in education, humanities, management, science. |
| Pacific Adventist University | 1984 | Undergraduate and postgraduate courses in arts, business, education, nursing, science, theology. |
| PNG University of Technology | 2009 | Diploma and undergraduate courses in technology, commerce, communication, architecture |
| University of Goroka | 1997 | Undergraduate and postgraduate courses in education, humanities and science. |
| University of PNG | 1965 | Undergraduate and postgraduate courses in agriculture, engineering, commerce, education, humanities, medicine, nursing, law, science, management. |

Source: Websites of Universities

International Training Institute (ITI)

ITI, established in 1999, specializes in business and IT diploma programs. ITI has a flexible distance education model. Learners can take exams or submit assignments at their convenience during or after the 17-week training period. There are no formal deadlines. The enrollment at ITI had crossed 2,500 in 2012. It has opened branches in Lae, Kimbe and Buka town in response to growing demand for vocational training.

centers offer short term courses such as business studies and hospitality training for students with secondary education, and trade technician courses for those that have dropped out of the system prematurely. These courses range from apprenticeship and diploma to degree courses.

Technical and vocational education and training (TVET) segment has significant impact enterprise activity.

The total number of vocational centers stood at about 140 as of 2009.¹¹³ The national TVET division was established in 1999 and formulates regulations for the sub-sector. Large corporate enterprises

have also established vocational training schools such as Newcrest Professional Development Centre, Exxon Mobil POM, Bank South Pacific TVET institute.¹¹⁴ Apart from these industry based institutes, independent institutes are run by IEA as Technical and Further Education (TAFE) colleges. TAFE courses range from diploma to advanced certification in disciplines such as information technology, finance, hospitality, tourism, and business.

Private enterprises offering distance education are mainly active in tertiary segment.

There are about 2-3 private distance education providers in PNG. These private sector institutions are generally structured as stand-alone institutions or are extensions of overseas institutions.¹¹⁵ Currently, distance education is provided through various methods such as sharing academic material and conducting tutorials at study centres via internet¹¹⁶. Technology is expected to be an important element in delivery of distance learning programs in the future.

The Government also provides degree courses through Flexible Open and Distance Education (FODE) and Papua New Guinea University of Technology (PNGUOT) which offers a correspondence-based High School Certificate Program. Currently, 46,000 stu-

Table 8: Technical and Vocational Education Institutes in PNG

| Name of Institute | Year of Establishment | Courses Offered |
|-----------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------|
| Allied Career Training Institute | --- | • Skill training (computing, secretary courses) for grade 10 graduates |
| Anitua Security Training | 2008 | • Training in security services |
| Fisher Training and Recruitment Academy | --- | • Training for heavy equipment technical support |
| IEA College of TAFE | 2001 | • Diploma in cookery, human resources, library management, general management health and safety |
| MTO Training Center | 2010 | • Agriculture, security, construction, forestry, health, safety training courses for professionals and beginners |
| Star HR Limited | --- | • HR solutions for mining and construction companies |
| Work Skills Training Academy | 2010 | • Training in sectors such as oil and gas, construction |

Source: National Training Council Secretariat Website

Table 9: Institutes Offering Distance Education

| Name of Institute | Year of Establishment | Courses Offered |
|---------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| International Training Institute | 1999 | <ul style="list-style-type: none"> Distance education for certificate and diploma programs in accounting, management, sales |
| Professional Staff Training Centre ¹¹⁷ | 2005 | <ul style="list-style-type: none"> Diploma program in business, tourism etc. |

Source: Open and Distance Learning Practice at Papua New Guinea

dents are enrolled under FODE.¹¹⁸ University of PNG's distance learning program offers degree and diploma courses in science, commerce, mathematics, and human resource management.¹¹⁹

Challenges

Limited availability of qualified teachers prevents expansion of schools to remote, rural areas. As per the national education plan, the student teacher ratio should range from 32 to 37 across primary and secondary education. While statistics¹²⁰ indicate that this number has been achieved, high teacher absenteeism impacts delivery of education. Further, low competencies of school teachers affect the quality of education.¹²¹

Lack of internet and communication technology also constrains expansion of existing delivery platforms. Mobile internet penetration in PNG is around 7%,¹²² indicating that internet usage through mobile phones is fairly basic and limited, although more than 50% of the population owns mobile phones. The cost of setting up and utilizing internet is as high as PGK 3,000 - 5,000 (US\$1,170 –US\$ 1,950) per month excluding download charges.¹²³ Internet enabled education solutions such as e-learning through Massive Open Online Content Systems (MOOC) are not prevalent in PNG. Students living in remote areas are unable to make it to physical classrooms, and thus, are not able to progress to subsequent levels of education.

Social norms and expectations also play a key role in reducing enrollment of female students in schools. The

education of the girl child is considered unnecessary beyond basic elementary and early primary levels as she is expected to help at home. Educating a girl child is therefore seen as carrying a higher opportunity cost as compared to the cost of educating boys. Sociological issues coupled with safety reasons primarily bring down the female enrollment in schools.

Challenges such as law and order situation and poor transportation infrastructure present a difficult environment for impact enterprises. High crime rates coupled with poor transportation infrastructure restrict impact enterprises from expanding their services to rural and remote areas. Crimes such as robbery and vandalism also affect the development of school infrastructure and deter female students from undertaking subsequent levels of education.

Opportunities and Whitespaces

TVET and distance education presents significant opportunities for impact enterprises. TVET presents significant market opportunity for the private sector players. Demand for vocational training is driven by requirements from large industries such as the mining sector, which provides opportunities to young people with minimum technical training. Large number of employment-seeking youth and school drop-outs from the formal education system also add to the demand for TVET. Distance education presents a sizable opportunity for private players as full time degree courses are expensive and the availability of seats in universities and colleges is limited.

Given the government’s focus on inclusive education, impact enterprises can set up innovative business models such as affordable schools in elementary, primary and secondary education sub-sectors. Government subsidies are available to all schools under public sector management. This has enabled most schools to reduce the parents’ fees contribution to PGK12 (US\$5) in 2012 from PGK70 (US\$27) in 2001. However, accountability and the quality of education require significant improvement.¹²⁴ Private sector impact enterprises

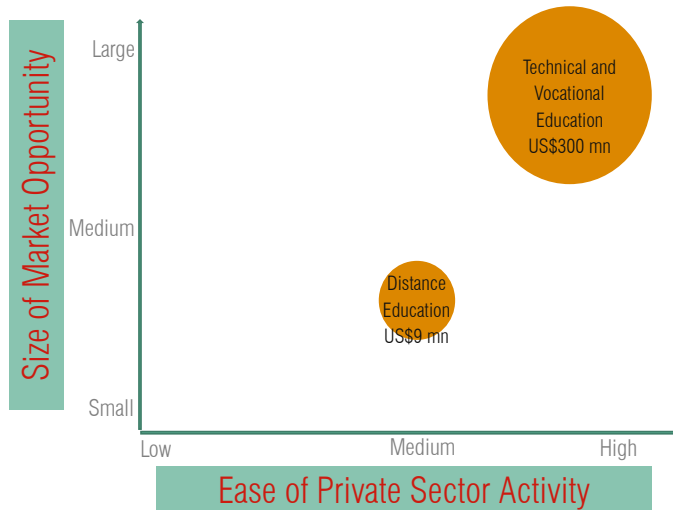
can provide disruptive solutions in the sub-sector by motivating and training teachers. For instance, affordable schools in India and Africa, usually recruit captive talent to reduce chances of geographical attrition. The quality of teachers is maintained by constant training, feedback and close monitoring of curriculum dissemination methods. In PNG too, the private sector can set up affordable schools to provide quality education in remote areas and ensure improved skill sets for next generation.

Winnona Publishing:

Winnona Publishing focuses on writing text books in history and other subjects for students in PNG to address the gap in the need for relevant and informative resource books. The objective of the project is to allow writers from PNG to write their own history so as to avoid inconsistencies and errors in reporting events and milestones. The project not only intends to record the history of PNG but also to educate citizens about it.

Besides providing resource books for history and social science students, Winnona Publishing will also focus on demand for books from students of creative arts, and students at the University of Papua New Guinea as well as those pursuing tertiary education.

Figure 48: Market Potential for Education in PNG



Source: Intelcap Analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)

IN4DEV: Still in its research and development stage, IN4DEV seeks to provide an opportunity for schools to access teaching and learning resources through a solar-powered ICT hub. These ICT hubs will be specifically designed for use in rural and poor communities that have low levels of electrification and access to internet and information. To link the ICT hubs with learning materials, the enterprise plans to establish strategic alliances with mobile network operators in PNG. IN4DEV also plans to create an enabling environment to transition from the current basic use of ICT in schools to the proposed use of ICT as a facilitator in learning and teaching.

GLOBAL CASE STUDY - BRIDGE INTERNATIONAL ACADEMIES

Bridge International Academies is the world's largest chain of primary and pre-primary schools bringing quality education to the poor across Africa and Asia. Currently, Bridge International Academies educates more than 120,000 pupils and employs more than 5,500 people.

In most developing countries, there is an enormous gap between education needs and the education facilities that are available. Private schools across developing countries have tried to address this gap, but their contribution is limited due to challenges such as high variance in quality, cost inefficiency in operating individual schools and inability to undertake large-scale capital investments.

The founders of Bridge International Academies, Jay Kimmelman, Shanon May, and Phil Frei, saw this as an opportunity to establish a chain of academies that would provide quality education at fees that are lower than most low-cost private schools. Bridge International Academies provides primary and pre-primary education at an average cost of US\$ 6 per month, a price that 85% of the households in targeted communities can afford. In addition, the enterprise also arranges for sponsorship programs to provide additional support to high achievers.

Setting Up

In 2007, Kimmelman, May and Frei spotted the need for affordable high quality education among poor families in the developing world, and saw it as a means for them to climb out of poverty. Their idea was that by operating a network of schools supported by a strong central headquarters, Bridge would have the scale, experience and capacity to invest in management systems and support training and innovation allowing individual schools to dramatically increase their effectiveness.

At present, Bridge International Academies is the world's larg-

est chain of over 300 low-cost primary and pre-primary private schools, all operating in Kenya and providing education to around 100,000 students. Research shows that on an average, Bridge pupils have an additional 0.32 standard deviation on core reading skills and an additional 0.51 standard deviation on mathematics in comparison to pupils of other neighboring schools. An additional 250 days of learning will be required by non-Bridge pupils to reach the levels achieved by Bridge pupils on core reading and mathematics. Currently, Bridge is opening new academies at the rate of one every 2.5 days.

Business and Operational Model

At the heart of Bridge's model is the "Academy in a box" concept. The concept allows for quick replicability and has enabled Bridge to scale rapidly in Sub-Saharan Africa. Bridge manages every step in delivering quality education starting from how to build an academy to how to teach in classrooms. It also recruits staff and teachers for its academies from the communities it serves, helping drive job creation. Teachers are supported with pre-developed lesson plans, which are used across all Bridge academies. Lesson standardization enables less qualified teachers to deliver lessons of a higher quality than their level of experience would otherwise allow. The lesson plans are delivered through data-enabled tablets, synced to the Bridge Headquarters. This enables Bridge to monitor lesson pacing, record attendance, track assessment scores, and update or add lesson scripts in real time. Kimmelman said in an interview, "We've developed this academy in a box that allows us to provide this high-quality education, leveraging a lot of technology. All that put together

allows us to plan lessons better, deliver content into the classroom, and monitor teacher performance. But most importantly, look at pupil outcomes.”

Many aspects of Bridge’s academies are technology and data driven, and this allows the enterprise to cut down on operating costs related to tracking performance of students, curriculum management, and teacher dedication. The model is completely cashless and Bridge uses mobile payments to collect fees and make payments including wages and salaries. Each Bridge academy is funded completely by school fees. Each academy is expected to reach profitability when it enrolls around 200 to 300 students.

Bridge conducts extensive research and scouting to identify high-need communities before buying property and opening academies in new locations. It has a dedicated real-estate division which executes all decisions concerning land acquisition and construction. For each academy, only one employee is involved in school management, known as the Academy Manager. Most of the managerial and non-instructional activities usually undertaken by an Academy Manager are automated and centralized through her smartphone and tablet applications, which are all connected to Bridge’s headquarters. This systematization allows Academy Managers to focus on overseeing instruction and building relationships with parents and the local community. Bridge also provides every Academy Manager with a detailed plan to make her academy grow.

Figure 49: Key Divisions at Bridge International Academies



Source: Primary Interviews 2015; Intellectap Analysis

Key Challenges & Strategies

Standardizing all academies

The biggest challenge that Bridge faced was standardizing the different elements of the enterprise across the large number of academies that it operates. In order to achieve this, the enterprise has designed a framework that all academies follow. The team at the Bridge headquarters monitors and evaluates different academies on a real-time basis in order to ensure consistency in different processes.

High teacher absenteeism

Initially when the first few Bridge academies were set up, the absenteeism rates among teachers was very high and this affected the efficiency of the academies. In order to mitigate this challenge, Bridge started awarding monitoring-based rewards to teachers. Such a system motivates and drives teachers to perform better.

High operational costs

Bridge is the largest private chain of educational institutions in Africa. Typically, managing a network of this size would result in high operating costs. To reduce costs, Bridge increased its reliance on technology for a diverse range of functions such as scouting suitable sites for new academies, assessing the performance of students, assessing the efficiency and profitability of new academies and training staff and teachers.

Road Ahead

Bridge International Academies aspires to be the global leader in providing education to families who live on less than or equal to US\$ 2 per day per person. It also plans to launch in Uganda, Nigeria and India by 2015-2016, and has set a target of operating 3,337 schools by 2018, which would serve close to 2.5 million students. With a mission of "Knowledge for all", Bridge plans to educate 10,000,000 children across many countries by 2025.



FINANCIAL INCLUSION

About 85% of the total population resides in rural areas,¹²⁵ of which 42% lives below the poverty line¹²⁶. Only 15-19% of the adult population has access to formal banking services.^{127, 128} Financial inclusion is thus imperative to help the underserved and un-served population to avail of opportunities to climb out of poverty.¹²⁹ The financial inclusion sector is organized into financial service providers that offer savings, micro-credit, micro-insurance, remittances and payments services.

The government of PNG seeks to provide access to financial services for the unbanked, promote technology enabled financial inclusion initiatives and encourage financial literacy. Several donors actively support a diverse range of service providers, financial products and delivery channels. The sector is, however, constrained due to lack of financial literacy, lack of distribution system to acquire and service poor customers, and high transaction costs to serve them

PNG has a well-developed, urban-focused financial ecosystem with diversified financial service providers and equity markets. There are 21 listed companies¹³⁰ with a market capitalization of PGK59 bn (US\$23 bn).¹³¹ For enabling financial transactions, there are 10,000 Electronic Funds Transfer Point of Sale (EFTPOS) terminals¹³², 66 bank and microbank branches, 300 Automated Teller Machines (ATMs), 89 district and treasury offices and 105 post office branches.¹³³

PNG also has five mobile money service providers including Mobile Networks Operators (MNO), commercial banks and PNG Post. There are about 770 agents for commercial banks, microbanks and PNG Post that act as access points for financial services. An agent management company recruits and trains agents on behalf of financial institutions.¹³⁴

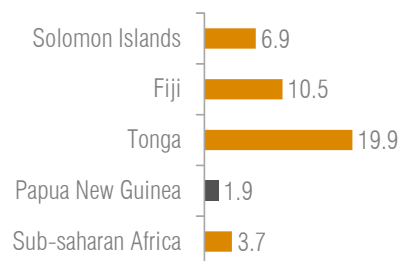
Table 10: Financial service providers in PNG”

| Type of Service Provider | Number |
|-----------------------------|--------|
| Commercial Banks | 4 |
| Development Banks | 1 |
| General Insurance Companies | 18 |
| Life Insurance Companies | 4 |
| Microbanks | 5 |
| Savings and Loan Societies | 21 |
| Superannuation Funds | 4 |

Source: Bank of PNG, 2015

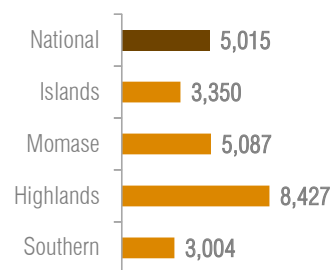
Financial inclusion in PNG is extremely low despite the

Figure 50: Access to Financial Services in PNG



Number of Bank Branches Per 100,000 People

Source: World Bank Database

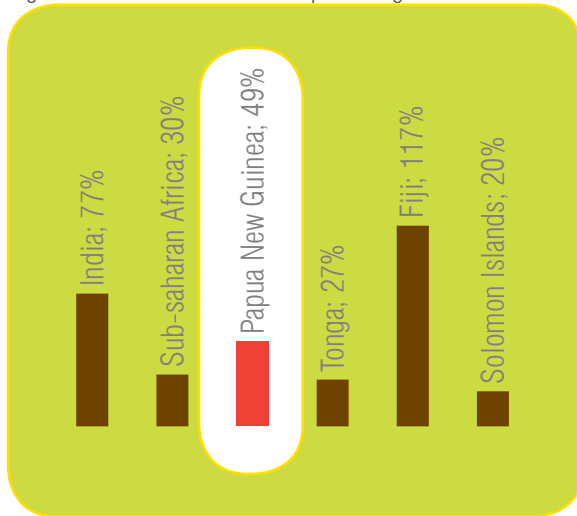


Adult Population Served per Branch/Agent across Various Regions

Source: PNG Financial Sector Services Analysis, 2013; Intellectap Analysis

presence of financial services infrastructure. The existing financial services infrastructure is largely geared towards catering to the accessible urban markets. Given the difficult terrain, poor infrastructure, weak security environment and low levels of financial literacy, its reach in rural areas is extremely low.¹³⁵ Banks and agents in remote regions such as the Highlands serve almost 2.5 times the number of people than in well-connected Southern or Islands regions. There are very few financial access

Figure 51: Domestic credit as a percentage of GDP



Source: World Bank Database

points such as bank branches or agents – in 2012, there were 1.9 bank branches per 100,000 adults in PNG¹³⁶ and the density of bank branches per 1000 km square area was 0.2.¹³⁷

Percentage of population availing banking loans in urban PNG is about 19% whereas in rural areas, it is 16%.¹³⁸ Apart from savings and credit services, insurance penetration is also extremely low and under developed in PNG. Most people rely on the traditional form of community-based, risk mitigation called the “wantok” system. This system ensures that resources are shared by the community in times of personal emergencies.¹³⁹

While PNG has four life insurance companies, and as many life insurance brokers and superannuation funds, less than 5% of population is covered by any form of insurance, while life insurance reaches a meager 0.05% of the people.¹⁴⁰

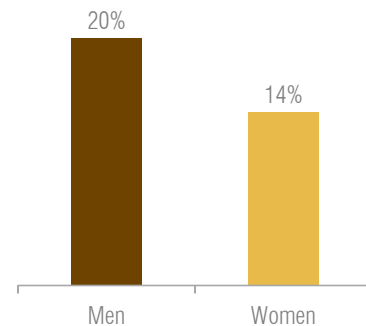
PNG has a predominantly cash-based economy; a majority of the population lacks financial literacy. Although 85% of the population lives in rural areas, most goods and services are bought and sold in cities. People from rural areas typically

transact using cash. Additionally, they tend to be secretive about their money since those who have cash face greater societal pressures to pay for social obligations.¹⁴¹ Findings of the Financial Diaries Project undertaken by Bank of Papua New Guinea (BPNG) and Pacific Financial Inclusion Program (PFIP) in 2012 indicate that providing access to appropriate financial products and imparting the ability to make informed financial decisions are two key intervention areas to mainstream and include the underserved population.

Credit penetration in PNG is better than Sub-Saharan Africa, but lower than the Pacific average. The ratio of domestic private credit to GDP has also increased from 35% to about 49% from 2010 to 2014.¹⁴² It is, however, much lower than that in Fiji in the Oceania region. Total deposits of financial institutions such as commercial banks, microbanks, SLS was PGK20 bn (US\$7.8 bn) in 2012 and loans outstanding were PGK10 bn (US\$3.9 bn)¹⁴³.

Women find it more difficult to access credit than men in PNG. Only 30% of all customers of financial inclusion services in PNG are women.¹⁴⁴ Majority of small ticket borrowing is conducted by women in areas closer to their dwellings. Lower economic opportunities, lack of education and financial literacy

Figure 52: Percentage of population availing loans by gender



Source: Bank of Papua New Guinea Estimates

are some of the reasons for the lower penetration of financial services to women.

The government of PNG has launched multiple policies to enable financial inclusion of underserved communities and women. It has initiated several projects to enable inclusion with support from donors such as ADB, DFAT, NZAid, and United Nations Development Programme (UNDP). The government is also keen to improve financial literacy and reduce risks for providing banking services to women, who form 46% of the informally employed population. The Maya Declaration and the National Informal Economy Policy aims to provide bank accounts to 50,000 women by end-2015.

Women and Financial Inclusion in PNG

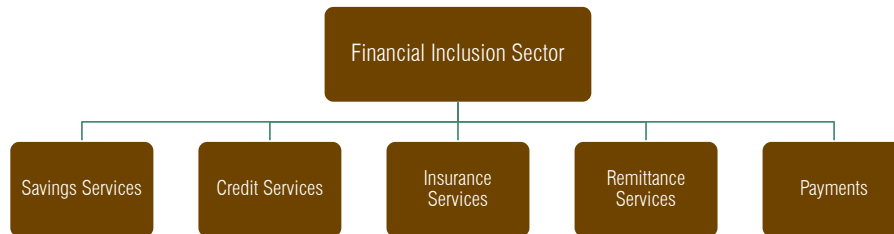
As per the data from Women's World Banking, there are about 2.5 million unbanked women in PNG and only 30% of all customers of financial inclusion services in PNG are women. The Bank of PNG estimates that only 14% of women are able to secure loans as compared to 20% of the men. Lower economic opportunities, lack of education and financial literacy are some of the reasons for lower access of financial services by women.

Table 11: Policies and Projects to Support Financial Inclusion in PNG

| Policy/ Projects | Donors and Stakeholders | Objectives | Status |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maya Declaration and National Informal Economy Policy for 2011-2012 | BPNG and PFIP | <ul style="list-style-type: none"> Reach 1 million more unbanked people, 50% of which are women Improve agent banking, mobile phone banking, public bank reforms, consumer protection and diversification of financial inclusion providers through policy reforms | <ul style="list-style-type: none"> National Financial Inclusion and Financial Literacy Strategy 2014-2015 supports the implementation and monitoring of this policy |
| 2020 Money Pacific Goals – Policy | BPNG | <ul style="list-style-type: none"> Provide financial education to children through core curricula Provide financial education to adults Improve access of basic financial services to twice as many people Formulate better consumer protection laws | <ul style="list-style-type: none"> Policy under implementation |
| Vision 2050- Policy for Wealth Creation and Poverty Reduction | Government of PNG | <ul style="list-style-type: none"> Provide access to grants/credit/funding Roll out financial literacy programs | <ul style="list-style-type: none"> Policy launched with evaluation parameters such as credit volume to high growth sectors like agriculture, tourism and manufacturing |
| Microfinance Expansion Project for 2012-2017 ¹⁴⁵ | Government of PNG, Asian Development Bank, Department of Foreign Affairs & Trade, Australia and BPNG (implementing partner) | <ul style="list-style-type: none"> Provide technical assistance to enablers of financial inclusion (institutions, partners, community organizations) Support BPNG in drafting regulations and benchmarks Set up risk share facility to share some of the risk associated with lending | <ul style="list-style-type: none"> Designed 33 financial products Trained 30,000 people for financial literacy Established the Centre for Excellence in Financial Inclusion (CEFI) |

Sources: Asian Development Bank, Pacific Financial Inclusion Programme and Development Policy blog, Intellectap Analysis

Figure 53: Financial inclusion services in PNG

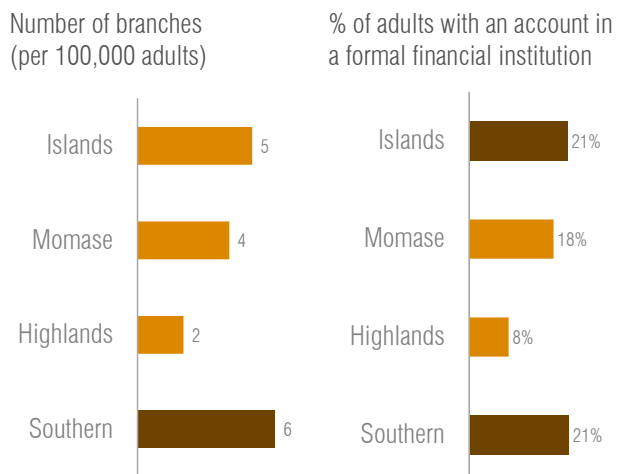


Financial inclusion providers¹⁴⁶ in PNG can be classified according to the services they provide to the underserved population. The financial inclusion sector in PNG has achieved some breadth in terms of number and type of financial services.

1. Savings services - Commercial banks and Licensed Financial Institutions (LFI) such as microbanks and Savings and Loan Societies (SLS) are the key deposit taking institutions
2. Credit services - Commercial banks, microbanks, SLS offer credit services
3. Insurance services - Micro-insurance is very nascent and offered by two insurance companies
4. Remittance services - International remittance providers help in transferring overseas remittances, while domestic providers such as PNG post and other providers of technology-enabled solutions (ATMs, smart card etc.) such as mobile money support domestic transfers
5. Payments - This segment comprises service providers such as agent networks and agent management companies, payment technology companies for branchless and mobile banking, and product and technology companies (smart cards, biometric and EFTPOS ¹⁴⁷ services).

Inaccessibility of formal financial institutions and poor financial literacy has led to low financial services penetration across regions. The number of bank branches indicates infrastructure availability to drive usage of financial services. The

Figure 54: Penetration of financial services in PNG



Indicates best performing region

Source: PNG National financial inclusion and financial literacy strategy

Southern region performs the best on financial inclusion indicators with 6 bank branches per 100,000 adults and the highest percentage of adults with an account in a formal financial institution. Manus province in the Islands region is known to receive high remittances from natives, which also contribute to a higher demand for formal financial services in the province.¹⁴⁸

Demand

About 6 million people are financially excluded¹⁴⁹ in PNG. As the subsistence-based economy shifts to a cash-based one, poor financial literacy and access to finance are key constraints to demand growth. Demand is expected to increase as efforts by donors and the government to educate people about formal financial services and increase outreach of banking services start showing results.

Uptake of savings services is currently very limited, but will increase as there is strong government focus on improving financial literacy. Currently, only about 13% of adults in PNG have regulated deposit accounts.¹⁵⁰ Most of the unbanked population consists of women and low-income, rural and remotely located people. It is common practice in rural areas to save money by burying and hiding it in and around homes.¹⁵¹ However, upcoming mobile banking services like MiCash are expected to increase the demand for formal financial services. Literacy and banking show a strong correlation in PNG. As most of the communication related to banking services is in English, educated and urban population, particularly urban men find it easier to use banking services.¹⁵²

Informal credit is common among low-income communities; formal micro-credit currently caters to only 0.4% of the total population. As per the Financial Competency Survey of 2012,¹⁵³ use of informal credit is common among the low-income population.¹⁵⁴ Currently only 0.4% of the total population has access to formal credit. Local money lenders charge exorbitant interest rates, which could be as high as 50-100% fortnightly¹⁵⁵ in some cases; and this keeps people in poverty and has a negative social impact. They are, however, governed by the social contract system of the community.¹⁵⁶ Although formal financial service enterprises offer micro-loans at interest rates as low as 18%¹⁵⁷ (consumer loan of PGK500 (US\$190) offered by

People's Microbank), poor outreach and lack of financial knowledge and skills actively contribute to limited access of these formal services. Further, there is no private sector MFI in PNG as the sector is currently dominated by government-run MFIs.

Micro-insurance demand is low due to presence of strong community support systems. The formal sector in PNG offers its employees access to insurance cover, often on account of mandatory legal requirements. As per the HIES Survey 2009-10, about 61.6% of the total population is employed. Of this, only 59% are engaged in the formal sector. The population employed in the informal sector is estimated to be 25%¹⁵⁸ of the total adult population.¹⁵⁹ Access to insurance products is extremely low among those that do not get covered by mandatory insurance, particularly among the low-income population. Currently, the penetration of any type of insurance services is lesser than 5%.¹⁶⁰

Despite the presence of the informal support system or “wantok”, low-income families require micro-insurance for protection from unexpected financial burdens such as that arising due to death of the family's breadwinner. Traditionally, during the mourning period (“hauskrai”), extended relatives visit the family – sometimes by the hundreds – and expect to be fed and housed. Funeral costs often oblige the family of the deceased to borrow money or even sell assets, having devastating, long-term negative effects on the household, particularly if the deceased was the only earning member of the family.¹⁶¹ Currently, the uptake for micro-insurance is low – as the cost of insurance is a fraction (about 3%¹⁶²) of the yearly income of low-income households estimated at PGK2000¹⁶³ (US\$780), it does not seem to be a major deterrent. It is likely; therefore, that low uptake can be attributed to the limited awareness about insurance and other financial products among low-income communities.

Domestic remittance services are largely informal, and are utilized by migrant workers who send money to their

families in rural areas. Most of the domestic remittances are through informal channels and are conducted in person. Key consumers for domestic remittances include urban migrant workers, who send money home to their families in rural areas on a regular basis, through formal or informal channels. These people mostly consist of waged employees who have found employment in urban centers with either mining or infrastructure companies or are employed by the government. As per the HIES, about 48% of the population receive cash or kind transfers in urban and rural areas of PNG

As per the World Factbook, 2013, the inward flow of international remittances to PNG was PGK24 mn (US\$9 mn) and the outward flow was close to PGK190 mn (US\$72 mn) due to the sizable expat population in the country.¹⁶⁴ Thus, key customers for international outward remittances are immigrants, foreign working population in the country and students who have moved to other countries (mostly Australia) to pursue higher education. Key consumers of inward remittances are families of people involved in wage activities in other countries. The amount of inflow and

Nationwide Microbank (NMB)

Established in 2000, Nationwide Microbank or MiBank is the prominent microfinance services provider in the country. Women's banking is a key focus area for NMB, featuring financial literacy programs, empowerment of women, and affordability of services. It has more than 100,000 account holders. In 2011, NMB launched the first bank-led deployment of a mobile wallet in the South Pacific, called MiCash. In 2013, it launched a mobile-linked micro-insurance product, called MiLife.

outflow of remittances has been stagnant for the last couple of years.¹⁶⁵ This indicates that there has been no major shift in the composition of immigrant and emigrant population in PNG. However, with large scale mining projects being implemented, outward foreign remittances are expected to increase in the future.

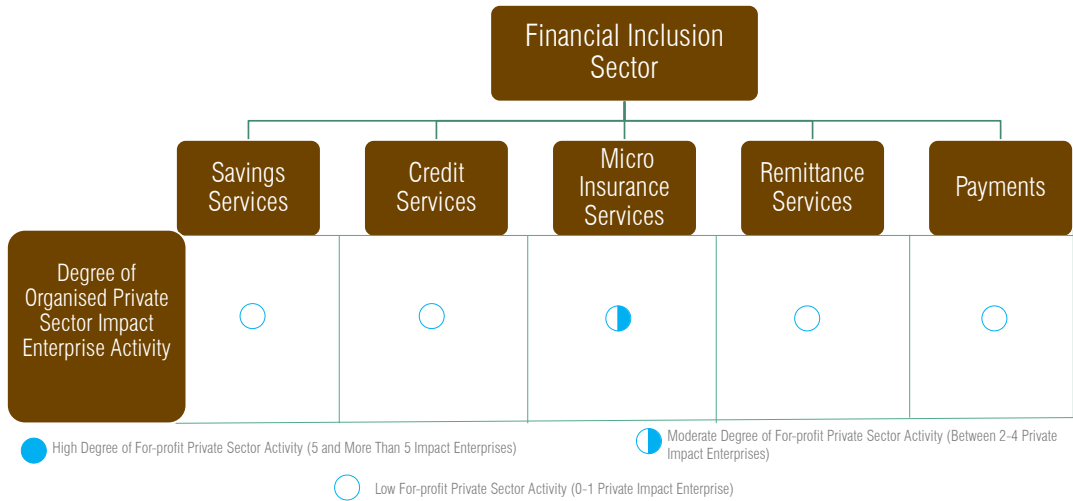
Payment services are mostly offered by banking agents, and require basic technology to achieve scale. Currently people in rural areas need to travel distances to reach a post office for transferring money or to reach vending sites that are available only during business hours to get an electricity voucher top-up. Payment products such as mobile money solutions for electricity purchase, airtime recharge and transferring money from urban to rural areas can increase the convenience for customers and drive demand for mobile payments. Key customers of mobile money include the government (for payment of salaries to teachers and nurses), export companies (for payment of products purchased from local commodity growers), people working in urban areas (for domestic remittance) and urban population (for electricity and airtime purchase). There are about five mobile money service providers serving over one million clients in PNG.

Supply

There is considerable private sector activity in the financial inclusion sector in PNG. However, most of the activity is dominated by large corporate enterprises, and there are very few small and medium enterprises in the sector.

Saving services are mostly provided by government owned microbanks,¹⁶⁶ large commercial banks and SLSs. Microbanks provide banking facilities to the low-income unbanked population.

Figure 55: Private sector and impact enterprise activity in the financial inclusion sector in PNG



According to BPNG, between 2008 and 2013, the number of microbanks increased from one to four, the number of branches increased from 17 to 27 and the number of agents increased from 68 to 771.¹⁶⁷

As commercial, brick-and-mortar banks involve high costs and infrastructure, small scale microbanks and technology led initiatives are driving financial inclusion in the country. The minimum capital required for microbanks (PGK1.5 mn / US\$0.6 mn)¹⁶⁸ is 10 times lower than that required for commercial banks. Microbanks offer basic financial services such as savings and deposits. For example, Nationwide Microbank offers passbook savings account and term deposit accounts with interest rates up to 2.25%.¹⁶⁹

Financial Inclusion Services of Commercial Banks in PNG

Bank of South Pacific's (BSP) rural initiative, BSP Rural has 41 branches operating from local treasury offices that offer facilities such as withdrawals and deposits using an EFTPOS machine. It also offers Rural KunduCards, smart cards to enable purchase of goods, withdrawals and buy airtime for mobile phones.

Westpac Bank's Everywhere Banking Program and ANZ Bank's goMoney program use mobile technology and agent networks equipped with EFTPOS to provide mobile banking and in-store banking for a variety of transactions such as remittances, bill payments, airtime purchases, withdrawals and balance enquiries.

Table 12: Savings Services of Microbanks

| Name of Bank | No of Depositors | Total Deposit | Minimum Balance | Savings Products |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nationwide Microbank (MiBank) (owned by GoPNG, ADB, DFAT ¹⁶⁹) | 14,000 (as of 2012) | PGK70 mn (US\$27 mn) ¹⁷⁰ (as of 2013) | GK5,000 (US\$1950) | <ul style="list-style-type: none"> Fixed deposit savings up to 1 year Savings account for children with saving value starting from PGK2 (US\$ 0.8) |
| PNG Microfinance Ltd (owned by government's PNG Sustainable Development Program and IFC) | 6,500 (as of 2010) | PGK30 mn(US\$12mn) ¹⁷¹ (as of 2010) | PGK20 (US\$8) for Financial Inclusion Savings Account (FISA) ¹⁷² | <ul style="list-style-type: none"> School fee savings account Christmas savings Account Student savings account¹⁷³ |
| Kada Poroman Microfinance Ltd (Kokopo Microfinance) (owned by local governments of Kokopo, Bitapaka, Raluana, Duke of Yorks) | | PGK17 mn (US\$7 mn) ¹⁷⁴ (as of 2013) | PGK20 (US\$8) for Bungim and KPML savings | <ul style="list-style-type: none"> Savings accounts that can be used to avail loans against savings Children's savings account |

Note: Data about People's Microbank from National Development Bank (NDB) was not available in published sources

Sources: Websites of the Microbanks, 2015

Credit services in PNG are mainly provided by microbanks and SLSs. Microbanks also provide micro-credit to the low-income rural population in PNG. For example, to improve access to credit, People's Microbank offers small loans to SMEs owned by locals. There are around 5,000 borrowers who have availed microcredit from microbanks as of 2013,¹⁷⁵ which have a total loan outstanding of PGK69 mn (US\$26 mn) in 2013. A new women's microbank started operations in August 2014.

SLS, which are not-for-profit organizations owned by local people, offer small credit and savings services. Currently there are 21 SLS in PNG and their services are restricted to members only¹⁷⁶. NASFund Contributors, Teachers SLS, National Farmers SLS, East New Britain SLS are some of the largest organizations in this category.¹⁷⁷

Table 13: Credit Services of Microbanks

| Name of Bank | No of Borrowers | Portfolio Outstanding (PGK mn) | Average Size of Loans | Key Offerings |
|---------------------------------------------------------|-----------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nationwide Micro-bank (MiBank) | 2,172 (as of 2012) ¹⁷⁷ | 12.7 (as of 2012) ¹⁷⁸ | PGK200 (US\$78) | <ul style="list-style-type: none"> • Business loans • Fisheries loans • Payroll loan • Microfinance loan • School Fee loan • Speed loan • Vehicle Loan |
| PNG Microfinance Ltd | 3,500 (as of 2010) | 12 (as of 2010) | PGK500 (US\$195) (personal loans) PGK300-900 (US\$117-351) (Microloans to Women groups) ¹⁷⁹ | <ul style="list-style-type: none"> • SME loan • Fast track loan • Oil palm loan¹⁸⁰ |
| Kada Poroman Microfinance Ltd (Kokopo Microfinance) | | 12 (as of 2013) | PGK500 (US\$195) (personal loans) ¹⁸¹ | <ul style="list-style-type: none"> • General purpose loan • Business loans • School fee loan • Agriculture loan • Salary loan¹⁸² |
| People's Microbank from National Development Bank (NDB) | | | PGK 300-5,000 (US\$117-1,950) | <ul style="list-style-type: none"> • All-purpose loans • Business loans¹⁸³ |

Source: Websites of the Microbanks

Micro-insurance is currently being offered by microbanks in partnership with private insurance providers. In April 2013, NationWide Microbank with support from Pacific MMI launched PNG's first micro insurance product, MiLife. MiLife provides life insurance for one year duration with an annual premium of PGK55 (US\$21). It offers a one-time payout of PGK5,000 (US\$1,950) and aims to reach out to low-income households that face risks such as loss of livelihoods and life.¹⁸⁴ Similarly, People's Microbank launched a new micro insurance product called Credit Plus in May 2014 in partnership with Capital Life.¹⁸⁵

Credit-Plus

Credit-Plus is a micro insurance product launched by People's Microbank and Capital Life. Under the scheme, the borrower must pay a small premium at the commencement of a loan to avail of the insurance services. The benefit is that on death of the microfinance client, there is no financial obligation to the bank, thereby ensuring that the family is debt free.

The government-owned PNG Post is the largest provider of formal domestic remittance services. PNG Post has 44 offices, of which 12 are money transfer and banking service agents for BSP Rural, the rural banking arm of Bank of South Pacific. PNG Post also provides non-bank money transfer service called Salim Moni Kwik (SMK) in about 22 offices. SMK provides same day domestic money transfer services. Customers can transfer and receive money using post office branches as remittance centers.

International remittance services are mostly provided by large, private, for-profit international players. Majority of the international transfers come from Australia, New Zealand and Philippines, and are controlled by foreign players such as Western Union, Coinstar, and MoneyGram. Additionally, there are two authorized foreign exchange dealers and nine money changers and currency bureaus in the country.¹⁸⁶

Impact enterprises that provide remittance services mainly consist of agent networks. Among the smaller for-profit impact organizations, Send Money Pacific is a DFAT and NZAid funded initiative, which acts as an information portal for people intend-

ing to transfer money from New Zealand and Australia to Pacific countries.

Domestic remittance services are provided mainly by formal physical remittance providers and mobile money service providers. While the formal market is dominated by PNG Post, the informal market for remittances is estimated to be much larger, although formal statistics are not available.¹⁸⁷ The increased penetration of mobile phones in the country has boosted financial inclusion with commercial and microbanks relying heavily on mobile money for providing basic banking and money transfer services.

Agent networks are also active in last mile payments delivery, particularly in remote areas of PNG. Banking agents not only provide access, but also help in reducing the costs of traditional banking systems. Currently, there is only one private service provider, Oceanic Communications, which sources and trains bank agents who are recruited by Post PNG, Nationwide Microbank and Digicel. It also provides third party agent management services to them.

MiLife

MiLife is the first mobile microinsurance scheme in the South Pacific. It is a term-life policy that provides funeral cover in the event of accidental or natural death (excluding HIV/AIDS) and is bundled with Nationwide Micro Bank's mobile banking service, MiCash. Covering policyholders aged 18 to 60 and their spouses, the policy costs PGK55 (US\$22) a year and provides pay-outs of PGK5,000 (US\$2,033).

Table 14: Mobile Money Services in PNG

| Provider | Service | Description |
|----------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANZ | ANZ goMoney | <ul style="list-style-type: none"> • Launch year: 2013 • Network: Digicel • Services: Checking account balances, making bill payments, making purchases at ANZ goMoney agents, top-up of mobile credit and transfer funds to ANZ and non-ANZ account holders |
| BSP | BSP Mobile Banking | <ul style="list-style-type: none"> • Launch year: 2011 • Network: All mobile networks • Services: View account balances, transfer funds between BSP accounts only, also pay bills, and top-up airtime credit |
| | Wantok Moni | <ul style="list-style-type: none"> • Launch year: 2013 • Network: Digicel • Services: Money transfer |
| Digicel | Easipay | <ul style="list-style-type: none"> • Launch year: 2009 • Network: Digicel • Services: Pay for pre-paid electricity using airtime credit |
| | CellMoni | <ul style="list-style-type: none"> • Launch year: 2011 • Network: Digicel • Services: Pay bills, top-up airtime credit, and transfer funds to anyone on Digicel network |
| Nationwide Microbank | MiCash and MiLife | <ul style="list-style-type: none"> • Launch year: 2012 • Network: Digicel • Services: Mobile bank account with term life or funeral cover (MiLife) |
| Post PNG | Mobile SMK | <ul style="list-style-type: none"> • Launch year: 2011 • Network: Digicel • Services: Money transfer |
| Westpac | Everywhere Banking (SMS Banking) | <ul style="list-style-type: none"> • Launch year: 2011 • Network: All mobile networks • Services: Check account balances, transfer funds between Westpac accounts only, order statements or cheque books |

Source: Intelicap Analysis

Challenges

Lack of delivery channels for financial services, particularly those leveraging technology, limits the outreach of existing products. Lack of robust delivery channels, particularly beyond the traditional brick and mortar banking facilities, is a challenge in PNG. The limited number of banking agents and lack of innovative business models limit distribution and reach,

while the lack of innovative and customized financial products constrain uptake. Even though mobile penetration is increasing, the existing infrastructure is inadequate to overcome the issues of physical infrastructure.

High transaction costs and concern over sustainability of products for low-income customers present significant barriers for impact enterprise development. As of 2011,

of PGK 900 mn (US\$351 mn) in circulation in rural areas of the country, only PGK 200 mn (US\$78 mn) was part of formal sources such as banks.¹⁸⁸ As of 2009, there were a total of 1.6 million bank accounts among a rapidly expanding population of 7.2 million people. The high cost of transactions is a key deterrent for banks to expand their services to the low-income population. Mining financial behavior data and validating the sustainability of models that cater to this population will help prove the business case for such products and services.

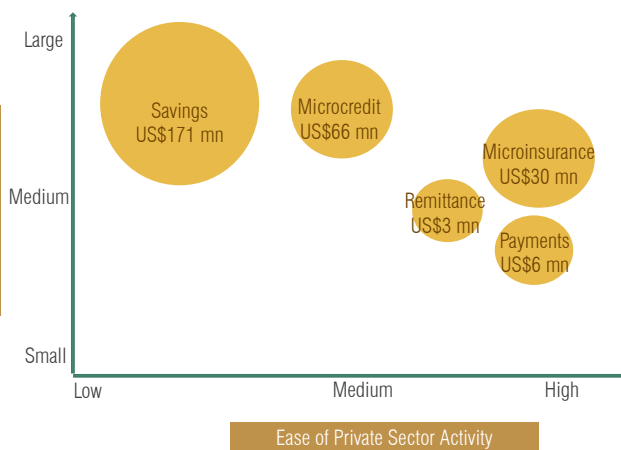
Impact enterprises are unable to design targeted products for different consumer groups due to limited availability of financial behavior and transaction history data.

Data generated from financial transactions is crucial in designing financial products. The Financial Diaries Project has helped bridge the information gap and provided an initial understanding of the space. However, a structured mechanism is required to mine data related to various financial transactions of rural and unbanked population in order to understand their behavior and design products accordingly.

Challenges such as law and order situation, poor transportation infrastructure and limited financial literacy of the population present a tough environment for growth of impact enterprises in this sector. High crime rates coupled with poor transportation infrastructure constrain impact enterprises in providing their services in rural and remote parts. Low levels of financial literacy and limited English language literacy present barriers¹⁸⁹ in reaching out to unbanked segments of the society since most of the banking transactions are conducted in English. Financially illiterate population also faces risks of exploitation by financial predators as well.

Opportunities and Whitespaces

Figure 56: Market potential for financial inclusion in PNG



Source: Intellectap Analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)

Savings services segment has the largest potential for development; however, ease of private sector activity is highest for micro-insurance segment. Market opportunities exist in savings and credit since the number of prospective customers for these basic services is high. However, there is a banking system and microbanks that provide these services, albeit to a small proportion of the population. In contrast, barriers to entry seem much lower in the case of micro-insurance, payments and remittance sub-sectors, which has very few private sector players providing niche services. However, enterprises in these segments also face the task of educating customers and encouraging them to avail of services such as insurance and payments processing, which are convenient, but

TLF Limited

TLF Limited provides an incubation program for micro-entrepreneurs, especially women that fall within the lower income group with an annual income ranging from PGK 5,200 and PGK11,000. The enterprise seeks to address issues in access to rolling capital among women entrepreneurs by providing business and financial services.

TLF's services include savings and learning groups, counseling services, incubation facilities, and monitoring and mentoring programs. TLF currently works with women entrepreneurs in Port Moresby, and seeks to expand its incubation program to other cities and eventually to rural districts in PNG.

intangible. As the concept is new to these customers, they may not be willing to pay for them.

Technology enabled solutions is another opportunity segment for impact enterprises. The ICT policy (2005) enabled low cost electronic transaction channels and opened up the mobile services market in 2007. Since then, there has been an improvement in the outreach of money transfer and payment services through electronic channels in PNG.¹⁹⁰ There are opportunities for private sector enterprises that focus on providing technology support for financial transactions and launch safe mobile wallets for small transactions. As per the Financial Diaries project, 74% of informal financial transactions are undertaken within the family network.¹⁹¹ There is a huge potential to migrate these transactions on to an electronic network. With the mobile penetration increasing to 41% in 2013, the electronic money transfer market is also expected to grow.

Impact enterprises could provide last-mile solutions to ex-

pand the financial services of commercial and microbanks.

Currently commercial and microbanks train and deploy their own agents. With an increase in demand for micro-savings, credit and insurance services they will need many more trained agents. For instance, Bima,¹⁹² a leading micro insurance provider present across seven countries, plans to enter PNG in partnership with Digicel to provide micro-insurance products. Nationwide Micro-bank and Pacific MMI Insurance have launched a low-cost term life product, MiLife, which is being coupled with mobile phone accessed bank accounts.¹⁹³ Impact enterprises could provide last mile distribution with trained banking agents and become key providers of branchless banking solutions.

Impact enterprises can provide valuable support in driving financial literacy and financial data collection. The Government is working towards improving the state of small enterprises in the informal sector in PNG. It is involved in various policies and programs such as National Informal Economy Policy and the Pacific Financial Inclusion Programme to promote entrepreneurship, improve financial literacy and financial inclusion. Private impact enterprises can play a key role in providing awareness building and training services to help the government attain its objectives.

PNG Mortgage Brokers

Established in 2013, PNG Mortgage Brokers provides financial services to the emerging small and medium enterprises sector in Papua region of PNG. It specializes in providing debt-finance services to small scale enterprises, and also has a team of real estate specialists who assist clients in identifying new properties, writing loan proposals, and getting approvals to purchase properties. The enterprise seeks to diversify to new geographies, develop new products and services, and explore new business segments.

GLOBAL CASE STUDY - ZOONA

Zoona is a leading mobile money provider in Zambia. It provides small businesses and entrepreneurs with a mobile money platform that can be used for processing money transfers, making payments to suppliers, and accessing working capital. Zoona currently has a network of more than 500 entrepreneurs who act as its agents and more than 700,000 end-users.

Access to finance is a limiting factor to growth in most African countries. In Zambia, more than 60% of the population does not have access to basic financial services. However, mobile phone penetration in Zambia is more than 73%. The combination of limited access to finance and high mobile penetration levels, presented a business opportunity to increase access to finance through the use of mobile phones. Brothers Brad and Brett Macgrath identified this opportunity in Zambia and built Zoona with a primary focus to offer emerging entrepreneurs an opportunity to provide money transfers and other payment services to low-income consumers. In doing so, they earn attractive commissions and create employment within the community by employing tellers, many of whom are young women.

Setting Up

By the end of 2008, Safaricom's M-Pesa, with its rapidly increasing customer base, had become the most popular mobile money platform in Kenya. Inspired by the growth of M-Pesa, Brad and Brett Macgrath set up Zoona in Zambia in 2009. The founders' first experience with mobile money was in 2004 when they were involved in a project to implement an SMS (text message) based electronic airtime distribution system in Bangladesh. The project was successful and in a few months, the mobile money system that was developed was processing 500,000 airtime sales on a daily basis. In 2007, the founders were approached by PROFIT, a USAID funded organization to conduct a pilot for a mobile money platform in Zambia. The objective of the pilot was to implement an electronic payment system that could be used to pay rural cotton farmers. During this successful pilot, the Macgrath brothers

developed a money transfer service which was later used by Zoona. In late 2009, Mike Quinn joined them as CEO.

Although, the idea of using mobile money to boost financial inclusion was promising, Zoona found it difficult to raise capital from financial institutions in Africa because of the lack of collateral. As a result, they sought investors in the United States and succeeded. Since its inception in 2009, Zoona has incorporated many innovations into its business model and also raised capital from a number of sources. ACCION and Omidyar Network invested US\$ 3.2 million in early 2012. Zoona used the funds to develop its leadership team, agent network, and technology platform. 2013 was a landmark year of Zoona - it processed its 1 millionth money transfer, its agents processed transactions amounting to US\$ 142 million and the enterprise closed its first debt facility, signed a partnership with Airtel Money in Zambia, and also launched a new website lovezoona.com. It also injected US\$ 500,000 in working capital to micro and small enterprises. Co-founder Brett Magrath believes that the Zoona model has the capacity to catalyze socio-economic change. He says, "Our model can truly deliver impact and we need to take on the responsibility of understanding our customers and consumers and ensure that our products and services meet their expectations. By doing these simple things and ensuring that each day we are turning ideas into actions as rapidly as possible, we will achieve this."

Over the last six years, Zoona has grown from an idea in a text message between two brothers to a multi-million dollar profitable company with nearly 100 employees. Currently, it has operations in two African markets and has acquired support from interna-

tional investors. Zoono has helped African economies lower their dependence on cash transactions. It has established a network of over 800 Zoono entrepreneurs, who on an average earn US\$ 500 every month as commission per outlet that they operate. These entrepreneurs have created a loyal base of around 700,000 end-users, who frequently transact at its outlets. It also supports over 1,000 jobs, and is one of the few Zambian enterprises in which the gender distribution of employees is in favor of women. Around two-third of Zoono's employees are female. In October 2014, Zoono was nominated to take part in The Girl Effect, a global movement that works to help girls realize their potential as agents of change, and was also identified as one of the top ten companies making a positive impact on young women in Africa. Zoono's operational teams work across Zambia and Malawi and their Head Office is based in Cape Town.

Business and Operational Model

Figure 57: Key Partnerships

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Governments: Zoono provides mobile money infrastructure to various government projects. These projects help Zoono increase its outreach</p> | <p>Impact Investors: Impact investors provide Zoono with working capital and greater credibility</p> |
| <p>Distribution Channels: Distribution channels help increase Zoono's outreach and provide for extra sources of income</p> | <p>Mobile Network Operators: Zoono provides money transfer services to MNOs as an independent interoperable agent, while the MNOs provide Zoono with access to potential customers and better market visibility</p> |

Zoono's core product is a mobile-based Zoono account that provides end users with a safe and quick money transfer service and third party cash-in/cash-out services. Its primary customers are the Zoono entrepreneurs who act as the company's agents on ground. These entrepreneurs include franchisees, which provide

money transfer services through Zoono outlets. These outlets are distributed across Zambia near post-offices, urban markets, border posts, and even in rural areas. Many small enterprises and retailers also use Zoono's services to pay for their stocks in a secure and quick way.

A unique aspect of Zoono's business model is that the end-users do not have to sign up for their own mobile-money wallets to make transfers. Instead, they can use the Zoono entrepreneur's mobile wallets to make transfers making the whole process hassle-free and convenient for the end users. When an end user makes a transfer at one of Zoono's outlets, the intended recipient receives a verification SMS. He can then redeem his cash at any Zoono outlet when presenting the verification SMS and a secret PIN provided to him by the sender. For each transaction, Zoono charges a variable fee. This fee depends on the size and type of the transaction. As a part of its model, Zoono also connects potential entrepreneurs who lack the capital to set up Zoono outlets to Kiva, an online lending platform. Kiva provides these entrepreneurs with the capital required to establish Zoono outlets and become Zoono agents.

Zoono mandates that each of its agents must maintain a minimum cash balance in order to prevent withdrawing customers from facing any difficulty due to lack of cash in Zoono outlets. Each new agent also has to undertake a training program that particularly focuses on developing entrepreneurial skills. According to CEO Mike Quinn, "Zoono's core purpose is to help small businesses grow. We want to become the best in the world at providing business solutions to micro, small, and medium enterprises in Africa that unlock their latent potential. We also provide affordable working capital finance and business management tools to our agents so that they can grow their businesses sustainably. Many of our agents are people under 30 years old who are first time entrepreneurs themselves and are creating jobs, servicing their

communities, and helping their economy grow.”

A large number of transactions are made through Zoono outlets on a daily basis and each of these transactions generates data including information on service users' names, phone numbers, origin of transfer, transfer values, and where cash collections take place. Zoono has worked to incorporate and increase the effectiveness of data analysis within the company. It uses Qlikview, a business intelligence tool, which enables analysis of user' activity including identification of key Zoono outlets, top users, most used service, most profitable Zoono entrepreneurs, and suitable areas for expansion. Such insights help Zoono streamline its offerings and increase the efficiency of its money transfer service. Recently, based on user data, Zoono has developed a credit scoring system for its end users that also supports risk management and design of customer centric products.

Since its launch, Zoono has partnered with a number of organizations and has greatly benefited through these partnerships. Its early connections with NGOs such as USAID helped it access seed capital. The Omidyar Network has also supported Zoono in executive coaching, brand development training, and management training. Zoono has also partnered with Governments to increase the efficiency of many electronic-payment programs for assisting people at the base-of-the-pyramid.

The Zoono team constantly measures its success. This helps the enterprise keep track of how well it is performing and the areas in which it is lagging. Some of the indicators that Zoono uses to measure its success include the number of Zoono entrepreneurs currently active, the number of end-users that transact at least once every 90 days, and the revenue that it is generating.

Key Challenges and Strategies

Capital

One of the key challenges that Zoono faced in its initial days was capital constraints and cash flow. As it was particularly difficult to raise start-up capital from financial institutions in Africa, it approached investors in the United States and succeeded in raising the initial working capital. Its subsequent success and scale enabled it to demonstrate the viability of its model to future investors.

Skilled Human Resources

Zoono has found it difficult to find suitable human resources, and has had to compete with banks and large organizations in order to tap Zambia's limited talent pool. In order to mitigate this challenge, Zoono has laid down systems, processes and legal procedures that have helped the organization streamline its hiring process and attract suitable human resource. Zoono invests heavily in its people to ensure that it attracts and retains the right caliber of candidate.

Road Ahead

Zoono seeks to enable transactions and financial services to 1 million end-users per month by the end of 2015. In Zambia, Zoono wants to increase the value of payments to US\$100 million per month. The organization also seeks to expand its activities to other countries, starting with Malawi and Tanzania. It also wants to develop its role as an interoperable agent network that adds value to the various mobile network operators in Africa. Finally, Zoono also aims to become the top employer in Africa, which will help attract more entrepreneurs and allow Zoono to scale sustainably in the future.



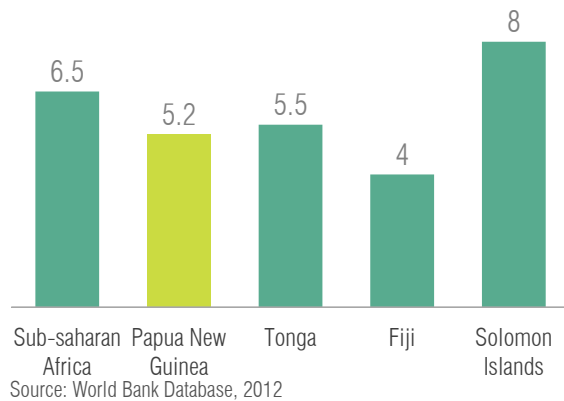
HEALTHCARE

PNG's Human Development Index of 0.491 is below the average of 0.493 for countries in the low human development group.¹⁹⁴ While life expectancy at birth has increased from 52.8 in 1980 to 62.4 in 2013, PNG has very high rates for neo-natal mortality (24 per 1000 live births) and infant mortality (47 per 1000 live births).¹⁹⁵

The healthcare sector in PNG is constrained by the lack of primary health infrastructure, very few skilled health workers, erratic drug supply and systemic challenges such as lack of transportation and civil infrastructure. The healthcare spend in PNG is low compared to other countries with similar human development indices. The per capita healthcare expenditure in PNG in 2012 was PGK300 (US\$114)¹⁹⁶ while the global average is PGK2740 (US\$1027).¹⁹⁷ As per the National Department of Health of PNG, despite high demand, less than 50% of the total population has access to primary healthcare.

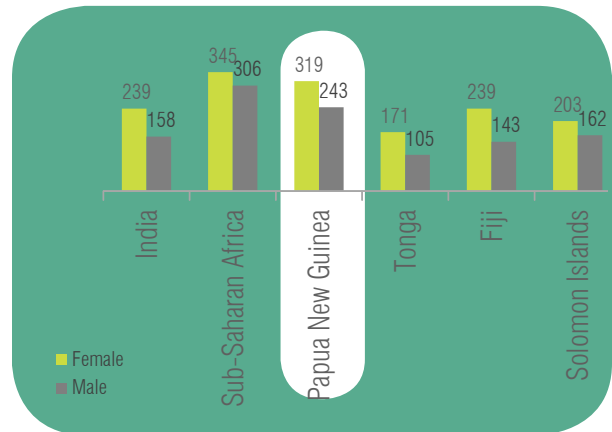
Health indicators in PNG compare unfavorably with respect to other lower middle income and developing countries.¹⁹⁸ The country ranks 168th in life expectancy¹⁹⁹ with higher adult mortality rates compared to Pacific countries including Fiji, Solomon Islands and Tonga. Maternal Mortality Rate (MMR) is very high in PNG and there has been no significant reduction in the number of maternal deaths - from 250 maternal deaths per 100,000 live births in 2008, it has only reduced to 220 in 2013²⁰⁰ while the MDG target was 85 by 2015.²⁰¹

Figure 58: Total healthcare expenditure as a percentage of GDP



Current disease burden for the country is vastly on account of communicable diseases. Nutritional, maternal and communicable diseases account for most of the disease burden in the country (48%), followed by non-communicable diseases (42%), and accidents and injuries (10%).²⁰²

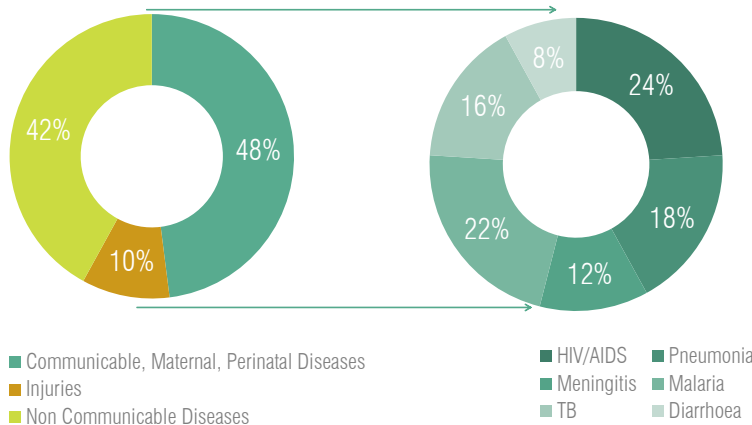
Figure 59: Adult Mortality Rate per 1,000 people(2007-2012)



Source: World Bank Database, 2012

Key communicable diseases include lower respiratory infections, tuberculosis, diarrheal diseases, malaria, HIV/AIDS, meningitis, maternal and neo-natal diseases. Malaria remains an important contributor to morbidity and mortality (especially in coastal areas), accounting for the highest share of disability adjusted life years.^{203,204} PNG is facing an HIV epidemic with a prevalence rate of 1.5% among the general population. The incidence of tuberculosis is among the highest in the world with 541 cases diagnosed per 100,000 population per year.²⁰⁵ Awareness about agents of communicable diseases is poor and people use contaminated water, resulting in a high number of diarrhoea deaths. In rural areas, only 20% of the population uses improved water sources and consumption of contaminated water is a serious problem. The situation is no better in sanitation. In urban areas, 70% of the population uses improved sanitation, while 13% of rural households have no toilets. Open defecation is common, especially

Figure 60: Disease Burden in PNG and Communicable Diseases Causing Mortality



Source: WHO Report on PNG, World Vision Report 2012

in rural areas.²⁰⁶ Lack of awareness about causes of multi-drug resistant tuberculosis, pneumonia and malaria are other major reasons of these diseases contributing to high mortality in PNG.

Key non-communicable diseases include diabetes, asthma, kidney and heart diseases, cirrhosis, congenital anomalies and cancer.

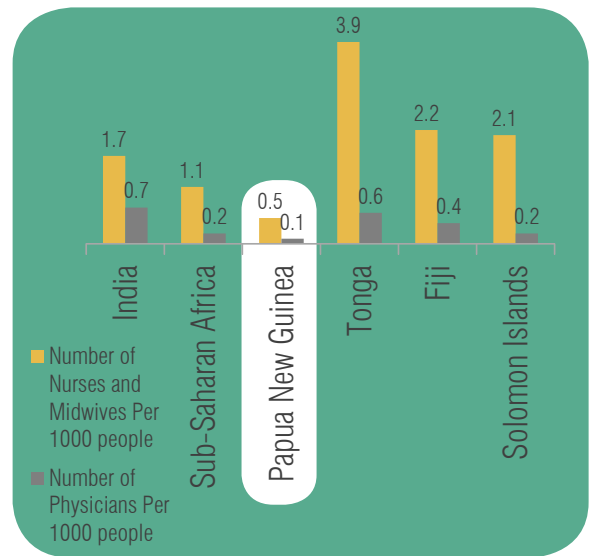
Health infrastructure such as hospitals, skilled health workers, drugs and devices to address the disease burden is weak. In PNG, there are around 3,000 government and church based primary healthcare institutions (also referred to as aid posts), 50 hospitals for secondary care and a very small number of private providers including clinics and private hospitals, which are situated in urban centers. Of the existing aid posts, only 66% are functional. Many of them are non-functional due to lack of qualified staff.²⁰⁷ Each aid post caters to a catchment of about 1,000-5,000 people, and secondary care national and provincial hospitals provide services to around 5,000-300,000 people.

There are only 0.6 health workers per 1000 people ²⁰⁸ while World Health Organization (WHO) recommends a minimum 2.3

health workers per 1,000 people.²⁰⁹ PNG has two groups of nurses -community health workers and professional registered nurses. The educational preparation for qualifying as a community health worker is lesser compared with that required for qualifying as a registered nurse.²¹⁰ There are around 10 nurse training colleges which have a capacity of around 60 seats each.²¹¹ In 2012, there were 570 doctors, 3,429 nurses and 4,400 community health workers in the country.²¹² The current demand for qualified health staff is currently being served by health workers and nurses from Philippines, Australia, and India.

Traditional medicine is widely accepted as being effective for treating a variety of health issues in PNG. As per estimates, 15% of the total population reports illness in a month, of which only 54% avails of treatment at aid posts and hospitals.²¹³ A considerable proportion of the population, especially in rural areas, visit traditional healers for

Figure 61: Number of health workers



Source: World Bank Data

their healthcare needs.²¹⁴ For people living in the remote areas of PNG such as Lihir Islands, where the public health service delivery system is absent, these traditional healers are the only available option. They are easily accessible, charge low fees and treat people for routine health ailments such as fever, pain, gastrointestinal maladies, anemia or malnutrition.²¹⁵

The total number of traditional healers in PNG is not known, although the national traditional medicines database lists around 400 such practitioners across the country.²¹⁶ As per the National Policy on Traditional Medicine 2007 (NPTM), traditional healers can practice at the village level, and bridge the gap in healthcare supply.²¹⁷ These practitioners do not need formal registration; and there are no research institutes, traditional medicine training or education programs at the college or university level. PNG aims to promote the NPTM nationwide by selecting 'safe and effective' traditional medicines, developing a training manual for traditional practitioners in primary care, and formalizing traditional healer guilds in all provinces.²¹⁸

Table 15: Policies to Support Healthcare in PNG

| Policy | Donors and Stakeholders | Objectives |
|-----------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Free Primary Health Care and Subsidized Specialist Services Policy ²²¹ (2013-2014) | Government of PNG | <ul style="list-style-type: none"> Promote access to primary health services Promote equitable provision of such services Help realize PNG's Constitutional commitment to a better standard of public health Achieve Millennium Development Goals related to health |
| PNG Community Health Post Policy | Government of PNG | <ul style="list-style-type: none"> Increase the number of supervised births Ensure maintenance of primary healthcare facilities Retain skilled health workers in rural areas Increase access to primary healthcare |
| National Drugs Policy | Government of PNG | <ul style="list-style-type: none"> Maintain a continuous and adequate supply and inventory of drugs and basic equipment to sustain service demand at all levels of health care facilities Improve administration and management of drugs at all levels Accord particular attention to rural health services |

Source: Department of Health, Papua New Guinea

The PNG government has enacted supportive policies to improve healthcare services and increase outreach. As part of its Medium Term Development Plan (MTDP 2011-2015), the government of PNG intends to improve its primary healthcare system by rehabilitating aid posts, health centers and community health posts, especially in rural areas.²¹⁹ The Free Primary Health Care and Subsidized Specialist Services Policy (2013-2014) is a key initiative to achieve Universal Health Coverage.²²⁰ The government also plans to upgrade existing health infrastructure and improve outreach of medical facilities through this initiative. WHO, DFAT, NZAid, ADB, UNDP, United Nations Educational, Scientific and Cultural Organization (UNESCO) are some major donors actively involved in supporting the government's healthcare programs.

The healthcare industry in PNG can be classified into prevention, treatment, monitoring and insurance segments. **Prevention services** mainly include awareness building for communicable diseases and immunization of children. These

Table 16: Projects to Support Healthcare in PNG

| Policy | Donors and Stakeholders | Objectives | Status |
|---------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Medium Term Development Plan (2011-2015) ²²² | Government of PNG | <ul style="list-style-type: none"> Achieve an efficient health system that can deliver internationally acceptable standards of health services | <ul style="list-style-type: none"> Current phase is near conclusion The government will continue to rehabilitate and open aid posts, health centres, community health posts over the next 15 years |
| Rural Primary Health Services Delivery Project (2011-2015) ²²³ | Asian Development Bank | <ul style="list-style-type: none"> Strengthen rural health systems in selected areas by expanding coverage and improving the quality of primary health care in partnership with state and other service providers | <ul style="list-style-type: none"> The project covers two districts in each of the following provinces: Eastern Highlands, East Sepik, Enga, Milne Bay, Western Highlands, West New Britain, Morobe, and the Autonomous Region of Bougainville Partnerships with local providers are being established to promote basic health awareness |
| PNG Health and HIV Capacity Development Project (2012-2015) | DFAT | <ul style="list-style-type: none"> Increase the percentage of births supervised by skilled health staff Immunize more children; reduce the spread of HIV/AIDS, tuberculosis and malaria Help more men, women and children access treatment | <ul style="list-style-type: none"> Currently under implementation |
| PNG Health Services Improvement Program (HSIP) | DFAT | <ul style="list-style-type: none"> Direct financing of health services to provide PNG's funding for health services delivery | <ul style="list-style-type: none"> PGK130 mn (US\$48.73 mn) to be deployed in 2013-2014 and 2016-2017 |

Source: Department of Health, Papua New Guinea

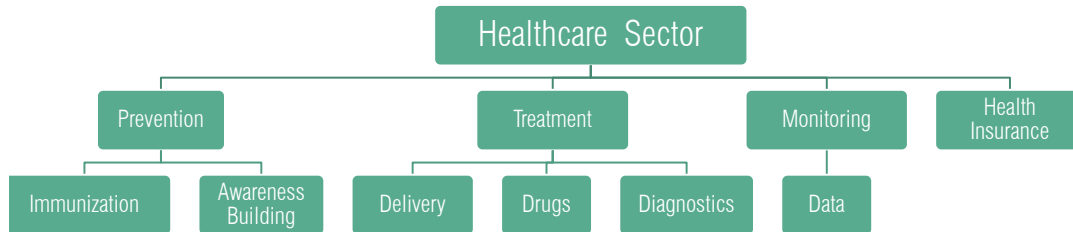
services are generally provided by government agencies, not-for-profit organizations, corporates (for employees) and other donor-driven programs. There is negligible for-profit impact enterprise activity in this space.

Treatment services include health care delivery through hospitals and health centers, diagnostics and drugs. These services are related to delivery, drugs and diagnostics provided by the government as well as by private enterprises. Private sector activity is, however, concentrated in cities. The government has organized the delivery of treatment services in a tiered system of aid posts, health centers, provincial and central hospitals. ²²⁴

The government is also largely responsible for managing the drug supply system in the country through its drug distribution supply chain mechanisms. The provincial drug distribution centres supply to regional centres. Last mile delivery of drugs takes place through two major channels - medical supply kits and area medical stores.²²⁵ Faith-based organizations and other civil society organizations also work with the government in last mile delivery of primary healthcare services.

Monitoring includes collection of patient and disease data, analysis of trends and application of insights for improving services. Disease related data collection is mainly done by the National

Figure 62: Healthcare Sector in PNG

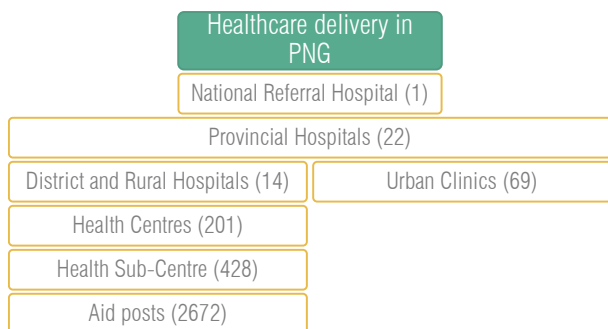


Source: Intellectap Analysis

Department of Health through its National Health Information System (NHIS). Not-for-profit and donor institutions also monitor specific disease-related data and design their health programs accordingly.

Health insurance is a nascent sub-sector, with few health insurance providers in the country.²²⁶ These providers mostly cater to high income groups, and most of the health insurance products are not tailored to suit the requirements of the low-income population.

Figure 63: Healthcare delivery in PNG

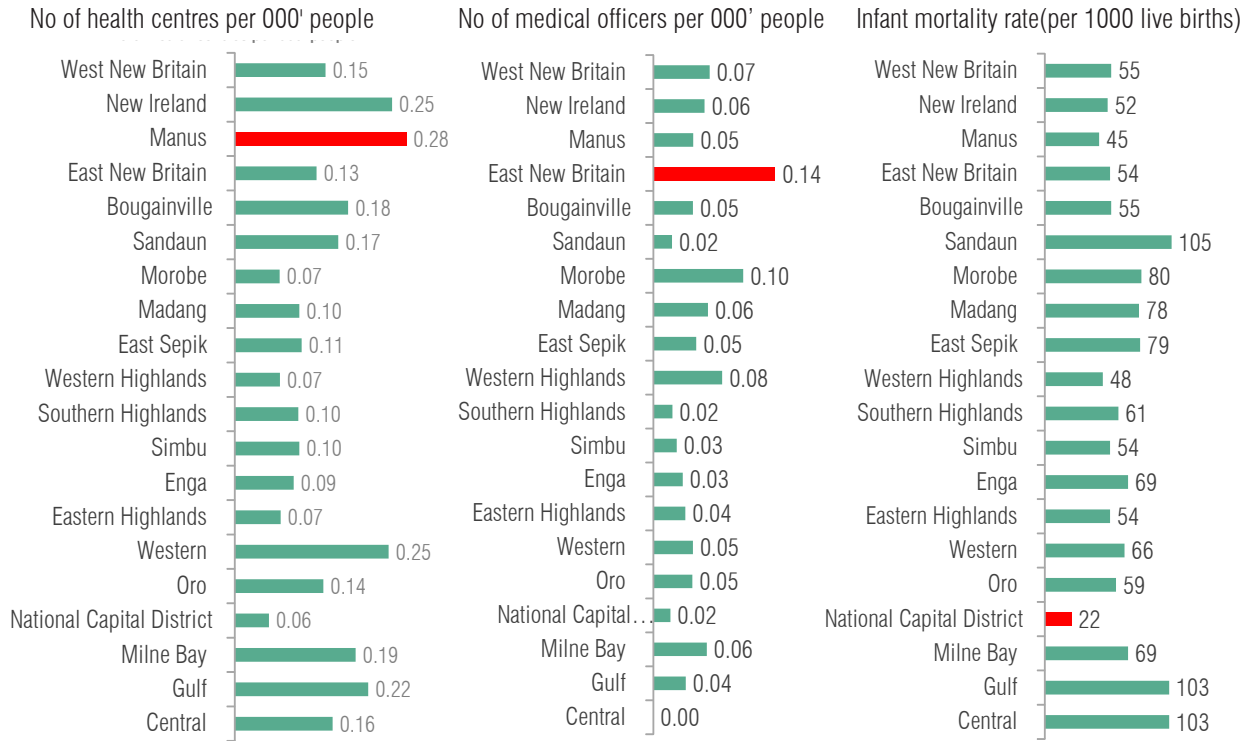


Source: WHO and National Department of Health (2012), Health Service Delivery Profile

Healthcare facilities vary across PNG with provinces in the island performing better on major health related metrics.

Provinces in the Islands region, Manus, New Ireland, and East New Britain have the best healthcare infrastructure in terms of government-run healthcare centres and medical officers. The densely populated provinces in the Highlands region - Eastern Highlands, Western Highlands and Southern Highlands have the least healthcare facilities. Low government expenditure per person, difficult geographic terrain, and inadequate transportation services are some reasons for the supply gap in these provinces. Availability of adequate infrastructure can be measured through healthcare indicators such as infant mortality rate and life expectancy. Provinces such as Manus and New Ireland in the Islands region are performing better on infant mortality compared to other regions. National Capital District (NCD) has low population served per health center and medical officer due to the presence of a large number of private healthcare service providers in the province.

Figure 64: Provincial level information on key healthcare indices in PNG



Indicates best performing province

| | | | |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <p>Provinces in Southern region:</p> <p>Central, Gulf, Milne bay, NCD, Oro, Western</p> | <p>Provinces in Highlands region:</p> <p>Eastern highlands, Enga, Simbu, Southern highlands, Western highlands</p> | <p>Provinces in Momase region:</p> <p>East Sepik, Madang, Morobe, Sandaun</p> | <p>Provinces in Islands region:</p> <p>Autonomous Region of Bougainville, East New Britain, Manus, New Ireland, West New Britain</p> |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|

Source: National Research Institute (2010), District and province profiles
 Note: Central Province has no medical officers as per the PNG provincial profiles by National Research Institute in 2010

Demand

PNG's population is expected to increase to 10 million by 2030.²²⁷ While 40% of the population is below 15 years of age, the older population (above 50 years of age) accounts for 10% of the total population. Increased economic activity and rapid urbanization have resulted in higher disposable incomes among a growing middle-income socio-economic group in PNG. As per 2010 estimates, the percentage of population earning more than PGK5 (US\$2) is expected to increase by 18% and the population earning more than PGK10

Centers for Disease Control and Prevention (CDC)

and the World Health Organization (WHO) partnered with the Government of PNG to expand and enhance the national HIV/AIDS program and to provide HIV surveillance and treatment. They aim to:

- Improve national systems for HIV surveillance and data use in PNG
- Increase the capacity for testing and counseling for HIV patients
- Assure quality of HIV diagnosis
- Improve quality of HIV care
- Prevent mother to child transmission

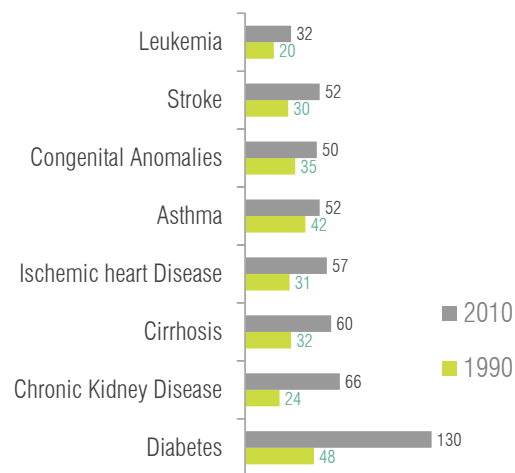
(US\$4) is expected to increase 12% by 2030. The increasing ability to pay for health services, and efforts by donors and the government to improve awareness and develop the health sector will act as strong drivers for growth.

Poor healthcare indicators and increase in non-communicable diseases drives the demand for treatment services.

An estimated 34% of the pregnant women in PNG cannot access a hospital or an aid post for receiving ante-natal care.²²⁸ The 2007 STEPwise approach to Surveillance of NCD Risk Factors Report (STEPS)²²⁹ indicates that adults are at increased risk of developing chronic diseases. Approximately 80% of the respondents were at moderate risk and around 20% faced high risk for NCDs.²³⁰ Lifestyle diseases also contribute to high mortality; currently about 8% of total deaths is due to oral cancer (from chewing betel nut) and cervical cancer.²³¹

Demand for health insurance is low primarily due to

Figure 65: Years of Life Lost* (in'000s)



Source: Global Burden of Disease Profile, PNG

*Years of Life Lost is a measure of premature mortality

limited awareness of its benefits among the low-income population.

As of 2013, health insurance accounts for a small proportion of PNG's total insurance market worth around PGK800 to PGK900 mn (US\$382- US\$430 mn).²³² Demand for health and life insurance is low reflecting poor consumer awareness and limited reach of financial services in remote rural locations. People employed in the formal sector, mainly in the urban areas of PNG, have access to insurance through their employers. However, a majority of the population in PNG is employed in non-wage activities and in the agriculture sector, which do not mandatorily provide them with life or health insurance cover.²³³

Supply

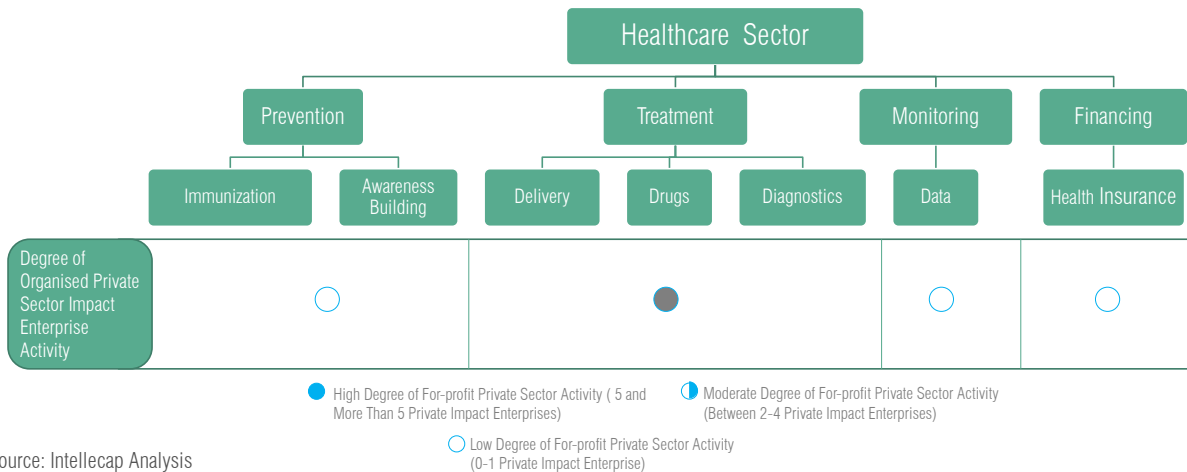
The government is the leading provider of health services in

PNG. In 2015, government healthcare expenditure of PGK1.8 bn (US\$700 mn) will account for approximately 80% of total healthcare expenditure.²³⁴ The remaining 20% ²³⁵ of total healthcare expenditure will be borne by households in the form of out-of-pocket expenses, which includes consulting fees of doctors and cost of medical supplies such as drugs and devices.

PNG's 20 provincial hospitals are managed by the central government, while local governments are responsible for the health centers and rural aid posts (collectively called as rural health services). In addition, there are two provincial Faith-based organizations that provide healthcare services. A few for-profit impact enterprises provide primary healthcare in major towns and cities. Corporate foundations, aid agencies and donor institutions also support healthcare provision in PNG.

Wallace and McLeod Limited provides mobile hospitals and clinics in 10 ton to 20 ton trucks, vans, and expandable trailers across PNG. These mobile hospitals are fully computerized and come with back generators, water treatment/purification equipment, and sewerage system. The enterprise prices its services to be affordable and accessible to rural, low-income, under served, and disadvantaged consumers. It aims to partner with the National Government, the National Health Department, and Provincial Health Authorities to deliver tertiary health services across the country.

Figure 66: Private Sector and Impact Enterprise Activity in Healthcare Sector in PNG



Source: Intellectap Analysis

Prevention services in PNG are primarily provided through support programs by donors and the government. In 2012, child immunization coverage was between 60–80% for various vaccines.²³⁶ The US Centre for Disease Control (CDC) provided financial grants to WHO PNG to initiate the Reaching Every District (RED) program in 2010 to provide routine immunization at the district level. With support from donors and not-for-profit enterprises such as Child Fund Australia and Save the Children Fund, the child mortality rate has dropped from 101 per 1,000 live births in 1990 to 63 per 1,000 live births in 2015.²³⁷ While the situation is improving, PNG

Table 17: Private Sector Activity in Immunization

| Program | Enterprise | Activity |
|---------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| GAVI Alliance | Pfizer, Merck, GlaxoSmith Kline | Not-for-profit medicine contribution for child immunization |
| Collaboration for Change in PNG | Pfizer, Merck, GlaxoSmith Kline, Boehringer Ingelheim, Gilead, Tibotec | Free anti-fungal medicine for AIDS treatment |
| Oil Search Health Foundation | Oil Search ²³⁸ | HIV treatment, maternal health, ART distribution, malaria and TB prevention and treatment |

Source: Oil Search Website, GAVI Website, Devpolicy Blog

is not likely to meet its MDG goal for child mortality of 33 per 1,000 live births by 2015. Large corporate enterprises such as Pfizer, Merck, GlaxoSmith Kline, Boehringer Ingelheim, Gilead and Tibotec also engage in various for-profit and not-for-profit activities to improve the state of healthcare in PNG by providing medical supplies.

Healthcare awareness building services in PNG are led by donors and not-for-profits. Large corporate foundations and donors have several initiatives to increase awareness about health and hygiene, water borne diseases and other communicable diseases such as tuberculosis, HIV, and malaria.

The national and provincial governments own and manage drug distribution in PNG. The government distribution system in PNG consists of area medical stores (AMS), provincial transit stores, provincial hospitals and rural health services. The medical supply branch of the Ministry of Health is responsible for procuring and distributing medical supplies to AMS and provincial transit stores. About 6 AMSs receive stock from international ports or from the major AMS in Port Moresby and Lae. The supplies are distributed to provincial warehouses or transit stores, and subsequently transported to aid posts and hospitals. The government distributes supplies through centrally funded con-

Table 18: Private Sector Initiatives to Build Awareness

| Enterprise | Activity |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil Search Foundation ²³⁹ | <ul style="list-style-type: none"> • Collaborates with public agencies for building awareness • Focus areas include malaria, HIV, maternal and child health • Activities are primarily conducted around existing Oil Search facilities |
| Seeds Theatre | <ul style="list-style-type: none"> • Builds awareness about health, social, economic, political issues through theatre • Targets various groups such as illiterate population, unemployed youth in urban and rural areas • Estimated to have reached over 100,000 people between 1997-2010 |
| Bauer Popular Education Troupe Wewak | <ul style="list-style-type: none"> • Builds awareness about health and sociological issues through interactive dialogue and presentations |

Source: Oil Search Website

tractors who ensure distribution of medical supply kits to health facilities across PNG. It also responds to requests (at the AMS) for drugs on demand from the health facilities. Provinces are funded through the central government's health grant to ensure smooth functioning of the distribution system.

Supply of Medical Essentials

A set of 8 key medical supply kits have been standardized for distribution through the country. They are - Depo-Provera injection (Family planning), Ergometrine (Maternal Health), Measles vaccines (Vaccination), Oral Rehydration Solution (Diarrheal Disease), oxygen, Amoxicillin tablets Artemisia combination, and baby books.

Securing essential medical supplies has historically been a challenge, and often, health facilities would go without drugs for about half the year. However, the government continues to implement reforms to improve procurement and distribution networks. Third party engagement for procurement and distribution channels for drug kits, supported by development partners, resulted in 83% availability of essential medicines for 2011. While distribution has improved, storage facilities for drugs and vaccines at rural health centres and aid posts continue to be neglected.

A few large private sector pharmacy stores such as Chemcare and City Pharmacy import and sell medical supplies and medicines to individual customers. The City Pharmacy Group is the largest pharmaceutical retail chain in the country, and is present in rural and remote parts of the country as well.

Treatment services are primarily provided by the government, while there are some private hospitals in urban areas. There are about 20-25 private and for-profit hospitals providing primary, secondary and tertiary care in PNG. Most of them are located in the business areas of cities such as Port Moresby and Lae. They provide basic hospitalization and out-patient facilities including diagnostic services. Pacific International Hospital is the largest private sector hospital in the country.

The health insurance industry is evolving in PNG, but currently has limited private enterprise activity. There are four to five life insurance providers in the country. The supervision and regulation for these companies is carried out by the Bank of PNG (BPNG). Apart from the life insurance companies, there are few health and non-life insurance companies which are regulated by Office of the Insurance Commissioner.²⁴⁰

Table 19: Private Sector Activity in Life and Health Insurance Industry

| Enterprise | Activity |
|-----------------------------|---------------------------------------------------------------------------------|
| Capital Insurance | Offers group term life, credit linked life, life and medical insurance products |
| Century Insurance | Provides travel accident insurance |
| INSPAC | Offers personal accidental insurance |
| Kwila Insurance Corporation | Provides insurance coverage and security for ordinary wage earners |

Source: Company websites, Bloomberg

Challenges

Lack of skilled manpower limits healthcare delivery in PNG.

The number of skilled healthcare professionals is inadequate, and the gap is currently being bridged by overseas recruitment. Private sector participation will be constrained until this imbalance is corrected locally, and a talent pool is built by increasing intake in local nursing and medical schools. Local talent specializing in different streams of the healthcare and pharmaceutical sectors needs to be developed as lack of skilled manpower also affects the development of pharmaceutical manufacturing industry.

Inadequate communication infrastructure hinders the development of innovative healthcare delivery channels.

Current manpower inadequacy and infrastructure challenges can be overcome by using technology enabled solutions such as telemedicine. However low internet penetration (less than 1% broadband penetration) and mobile internet penetration (7%) capped with inadequate communication infrastructure hinders the development of such alternative channels.

Challenges to mobility and information constrain participation by impact enterprises. High crime rates coupled with poor transportation infrastructure keep impact enterprises away from providing their services in rural and remote parts. Many rural patients have to travel long distances to get to the nearest medical facility. Low levels of awareness and health seeking behavior of the society limits the demand and deters impact enterprise participation.

Existing free primary healthcare treatment from government facilities makes the space less viable for private players.

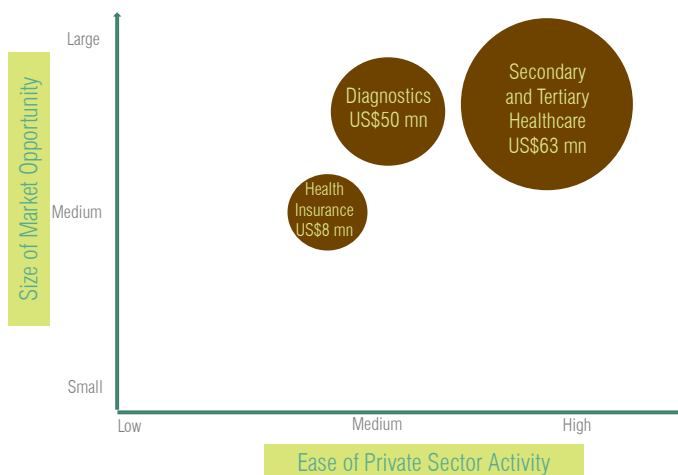
There is limited perception of the high indirect costs associated with poor access or poor quality of healthcare. As the government provides subsidized and free health services, the direct cost for accessing health services is reduced for patients and their families. However, despite the National Health Plan mandate on free healthcare services, a majority of the primary health centers charge fees for consultation and drugs.²⁴¹ Most patients from low-income households are unable to pay for expensive treatment. Impact enterprises interested in providing primary health services, therefore need scale (perhaps through public-private partnership models) to sustain at low per-patient revenues.

Opportunities and Whitespaces

There is considerable potential for impact enterprise activity in the healthcare sector. Apart from existing demand for secondary and tertiary healthcare, opportunities are emerging in sub-segments such as pharmaceutical retail and health micro-insurance.

Low-cost hospitals that adopt a hub and spoke model can be effective in reaching out to underserved communities in remote locations. Currently, people living in remote areas can only access existing public healthcare facilities, that too with great difficulty. Private sector enterprises are yet to make inroads in areas beyond urban centres. Impact enterprises that leverage models such as hub and spoke delivery, no-frills services with high operational volume, mobile healthcare facilities and usage of technology such as telemedicine could be efficient in improving outreach.

Figure 67: Market potential for healthcare sector in PNG



Source: Intellectap Analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)

Pharmaceutical retail presents opportunities for impact enterprises. While there are a couple of large pharmaceutical retail chains in PNG, they can reach only a small fraction of the population. Given that supply chain and logistics is evolving for all sectors in the country, impact enterprises can help address the current gap in the drug distribution segment. Further, with the increasing awareness levels and accessible facilities, the low-income population in rural areas which currently uses traditional forms of medicines may also seek improved quality of healthcare services. In order to build a sustainable model, impact enter-

Allegiance Health

Incorporated in 2013 and currently in the pre-revenue stage, Allegiance Health seeks to provide primary healthcare and affordable quality-assured diagnostic services to PNG's rural population. Its model will include a chain of diagnostic units, eHealth and 3G mobile technology.

Primary beneficiaries will include women, children, rubber plantation workers, snakebite patients, and diabetic patients. The enterprise also plans to provide medical and paramedic training to local health workers and administration training for medical staff.

prises can offer bundled services such as drug retail and basic medical consultation for primary healthcare and maternal health.

Pharmaceutical manufacturing also has significant potential for development. As per the National Drug Policy of PNG,²⁴² the government promotes and encourages local production of a limited range of generic essential drugs that are affordable in order to increase self-reliance. However, the Department of Health is yet to come out with guidelines for Good Manufacturing Practices. Given the shortage of drugs in rural areas, local

production of affordable generic drugs can help in bringing down healthcare expenses for low-income families in PNG.

Health insurance is a potential high growth sector in PNG. Currently 42% of the disease burden in PNG comprises non-communicable diseases. Increasing prevalence of lifestyle diseases and the need for modernized healthcare facilities is expected to lead to an increase in out-of-pocket expenditure on health. Further, higher income levels among the local population and an expanded expatriate community are expected to boost demand in the health insurance market.²⁴³ Given that micro health insurance is currently unavailable, there is scope for impact enterprises to enter this segment with targeted offerings for the low-income population. Innovative health insurance models such as community-based models, bundling of facilities such as comprehensive hospitalization packages, compensation for lost wages, free medicines, and emergency transport could increase demand for health insurance.

GLOBAL CASE STUDY – CHANGAMKA

Changamka is an integrated health finance company, providing financing mechanisms for the delivery of affordable healthcare to the low income customers using appropriate, innovative technologies. These technologies are primarily mobile phone and smart card based and includes mobile data capture and electronic data management capabilities.

Only 20% of Kenyans have access to basic medical care. With a population of over 44 million, it means that as many as 35 million Kenyans are excluded from health care coverage. Despite the public health insurance scheme that is available for all since 1966, around 25% of total spending on health care comes from out-of-pocket expenses.²⁴⁴ Only 3% of Kenyan adults have any form of insurance, and that includes everyone on the government-run National Health Insurance Fund (NHIF).²⁴⁵ The working poor have essentially no access to affordable healthcare. Payment inefficiencies due to bureaucracy and paperwork further add to healthcare costs, putting essential care further out of reach of the poor.

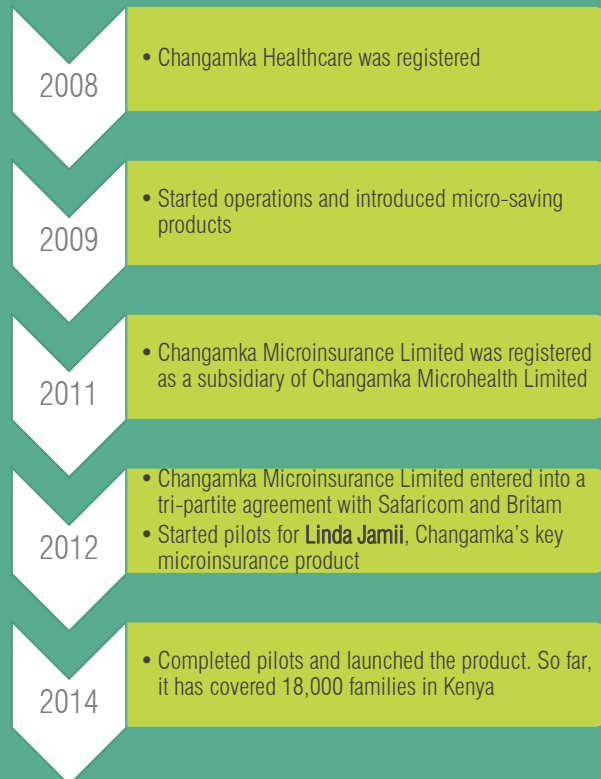
According to annual statistics published by the Association of Kenya Insurers (AKI), the overall insurance penetration in Kenya increased marginally from 3.1% in 2012 to 3.4% in 2013. The same report suggests that the insurance density²⁴⁶ in Africa is US\$ 66 against US\$ 1833 in Europe, implying significant scope for expansion of services. On the other hand, Kenya has 67% smartphone penetration attributable to a growing middle class²⁴⁷. Increasing use of mobile phones and technology supported services has created a market opportunity for the private sector to collaborate with the government in providing affordable and essential goods and services, particularly to achieve financial inclusion. To address the twin challenge of access and affordability in health insurance, Changamka Microhealth Limited leverages existing technology platforms to provide micro insurance products to families in Kenya.

Setting Up

Given their deep experience in the insurance sector, Samuel Agutu and Zack Oloo were familiar with the challenges in outreach and insurance adoption. Aware that a significant number of Kenyans did not have formal healthcare financing and were forced to bear heavy out-of-pocket expenses for medical care, Agutu and Oloo set up Changamka Microhealth Limited to provide savings and insurance solutions to the working poor with incomes between US\$ 1.50 and US\$ 10 per day.

The company initially launched a medical savings product offered through M-Pesa which allowed customers to load money on a smartcard. However, it soon realized that people do not always have enough savings to meet their medical needs. This led to the design and launch of Changamka's current flagship product that enables risk pooling through micro-insurance. Changamka Microinsurance Limited was incorporated in 2011, as a subsidiary of Changamka Microhealth Limited (started in 2008) following regulatory guidance from the Insurance Regulatory Authority (IRA). In order to diversify its product offerings for low income households, Changamka has also worked with development agencies to deliver maternal care to the poorer households using existing voucher schemes. Changamka's e-voucher system provides a transparent and accountable method to transfer donor subsidies to care providers for each registered patient at the time of care delivery.

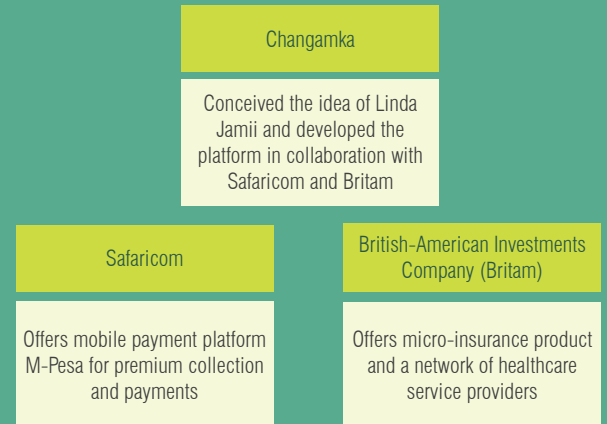
Figure 68: Chronology of developments at Changamka



Business and Operational Model

Changamka operates through a revenue sharing model with other partners that include the telecom network operator Safaricom and insurance service provider British American Insurance Kenya Limited (Britam). While Changamka conceived and designed the idea of using mobile platforms for providing insurance products, Safaricom provided its mobile money platform, M-PESA, cloud facilities for hosting the application, strategic marketing guidance as well as its network of more than 80,000 agents. Britam offers the insurance policy to consumers and has partnered with

Figure 69: Operational model of Changamka



a network of hospitals that cater to the medical needs of policy holders. As the insurance provider, Britam assumes the maximum risk and therefore accounts for the largest share of revenue in the partnership. Currently, Changamka is responsible for the electronic platform on which the product runs as well as non M-Pesa distribution channels. It provides micro-insurance products to more than 18,000 families in Kenya.

Its key product, Linda Jamii, is a low-cost flexible scheme that allows users to subscribe for the policy via mobile, pay for premiums by M-Pesa, and access health care in 630 'second-tier' or relatively affordable private hospitals around the country. The policy covers people from age 18-75 years at entry, and children below 18 years through their parents. It provides a comprehensive medical cover to the family at an annual subscription of KES 12,000 (approximately US\$ 140) for a cover valued at KES 290,000 (approximately US\$ 3500). Policy holders can access medical care in more than 600 hospitals countrywide and the goal is to reach to 1000 hospitals soon. Changamka also offers micro saving products which have a client base of nearly 3000 families.

Marketing activities are predominantly under the purview of Safaricom. For sales, each partner uses their own network and channels. Changamka has a field force in place that actively promotes insurance products in rural areas. In addition, with growing penetration of mobile phones, Safaricom also uses its rural networks to reach out to customers. Key sales channels include Safaricom outlets, local post banks and M-Pesa agents. The product carries the goodwill of brands of Britam and Safaricom, leveraged upon the distribution channel partnerships established by Changamka.

Changamka also partners with Safaricom for public relations activities including radio and television advertisements to educate customers on importance of health and insurance. Agutu mentions, "The government has an important role to play in generating awareness and integrating existing subsidy schemes to enable scaling of micro-insurance products to more people and regions." Changamka aims to leverage Government-run financial subsidy programs to provide affordable micro-insurance products to the community. Hence, Agutu and his partners are making efforts to increase participation from regulatory authorities to create awareness and induce behavior change among community members. Use of mobile platforms not only helps increase the reach of products but also reduces the cost of setting up physical infrastructure and employing several agents. The savings in cost can be passed on to customers in order to make the products more affordable for them.

Key Challenges and Strategies

Access to finance

As with most start-ups, Agutu and Oloo struggled to get their idea off the ground. Initially, they participated in calls for proposals, and received grants from donors such as Bill and Melinda Gates

Foundation, to carry out research and establish proof of concept. This helped them secure funds and start operations. However, as they continue to scale up their operations, Changamka needs funds for marketing and expanding infrastructure.

Relationship management

Changamka initiated the solution and owns the service, but it has to work with two strong and significantly larger partners to deliver the service to the customer. Agutu emphasizes that being a smaller player in comparison to Safaricom and Britam, it is important for Changamka to demonstrate its value proposition, understand its partners' needs and manage these relationships well. Changamka's strong relationship with Safaricom is instrumental in ensuring success since the entire infrastructure is based on the network provider's platform. Likewise, Britam underwrites the risk, and hence is critical. In addition, going forward Changamka plans to partner with other insurance providers to increase the variety of product offerings to different types of customers. In this context, Agutu emphasizes, "It is a challenge to develop something new in collaboration with many stakeholders. You want to design the best product and platform but at the same time you also want to protect your idea."

Client selection

Selection of appropriate customers is critical in all insurance models. As a savings product, Changamka offered m-health that allowed users to save and transfer money via M-Pesa to a prepaid smart card. This product focused on maternity and obstetrics care, and was offered in partnership with Pumwani Maternity Hospital. However, the same product could not be offered under insurance, as it led to adverse selection²⁴⁸ of customers.

Managing distribution and manpower

As the company expands its operations to new areas and different segments of the population, sales and distribution of products will get complex. This will also require technically adept professionals on field who can explain products to customers and resolve their queries. Changamka will need to invest in skilled staff as it expands its operations.

Road Ahead

In the next couple of years, Changamka plans to diversify its customer base. It also seeks to identify and build new partnerships with insurance providers in order to diversify its offerings and reach new regions. The company plans to adopt different ways of distributing its insurance products, including bundling of healthcare products with other insurance requirements of customers. Changamka also wants to explore a mechanism for measuring the impact of its work and its contribution to financial on efforts in Kenya.



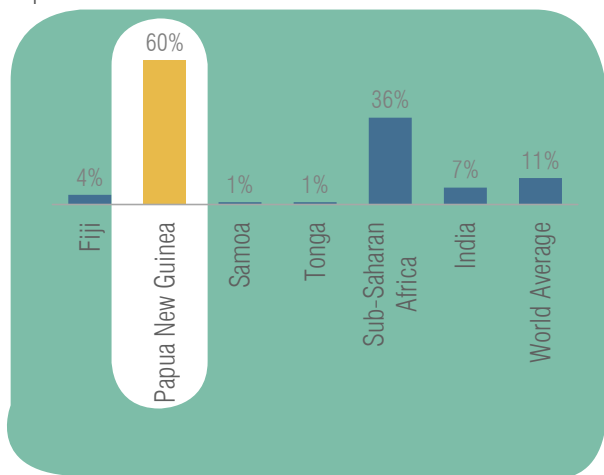
WATER AND SANITATION

Water and sanitation (watsan) services are key agents for sustainable development in emerging economies.²⁴⁹ In most developing countries, provision of these services is the responsibility of the government.²⁵⁰ In PNG too, the government, NGOs and donor agencies play a significant role in the watsan sector. Private sector participation in the watsan sector is emerging, but is largely concentrated in the two major cities of Port Moresby and Lae.

Supportive government policies such as promotion of public-private partnerships and various initiatives by donor and development agencies towards capacity building and awareness improvement are likely to boost the Watsan sector. However, bottlenecks such as limited government funding, lack of awareness among people about the need for improved drinking water and sanitation, and shortage of skilled manpower to expand watsan services impede the progress of the sector. A recent World Bank report estimates that more people are without improved water supply and sanitation in PNG today than there were two decades ago.²⁵¹

Nearly 60% population in PNG does not have access to improved drinking water sources,²⁵² and nearly 80% of the population does not have access to improved sanitation facilities.²⁵³ The situation is worse in rural areas with around 80% of the population having no access to an improved drinking water supply and nearly 90% of the population lacking improved sanitation facilities. Given the present level of access, PNG will be unable to meet the MDG targets for providing improved water supply and improved sanitation to 70% of its population by 2015.

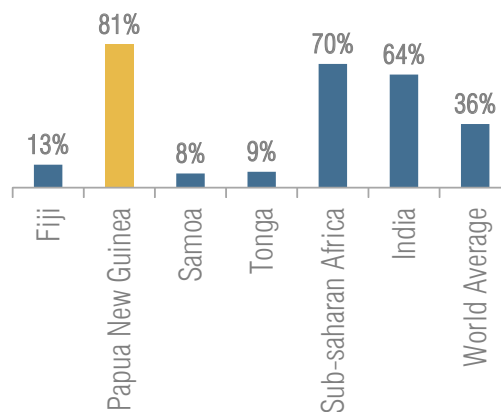
Figure 70: Percentage of population without access to improved water



Source: UNICEF/ WHO Drinking Water Statistics, 2012

Tap water piped into households is the most common source of drinking water in urban areas, while people in rural areas consume water from unprotected surface water sources. Around 65% of urban households in PNG have access to tap water piped into their homes or in their community

Figure 71: Percentage of population without access to improved sanitation



Source: UNICEF/ WHO Drinking Water Statistics, 2012

supplied by the government through pipe lines and water carts on a continuous basis. Around 15% of the urban population and 11% of the rural population utilizes rainwater for meeting their drinking water needs.²⁵⁴ PNG has two monsoon seasons²⁵⁵ spread across six months a year. During this period, supply of rainwater is abundant in most regions of the country. Hence, while water is abundant, there is a challenge in access to improved sources of drinking water in rural areas. A majority of the population is dependent on unprotected surface water sources such as rivers, springs, and wells to meet their water requirements, and people often have to travel for more than 15 minutes to access a source of drinking water.²⁵⁶

Unimproved household sanitation methods such as pit latrines without slabs are common in PNG, while waste collection and disposal methods are often inadequate.

Access to improved sanitation is comparatively higher in the urban areas of PNG with around 70% of the households utilizing flush toilets and improved pit latrines with slabs. Unimproved solutions such as pit latrines without slabs are common in rural areas, while around 13% of rural households have no toilets at all. Local government authorities are responsible for household waste collection and disposal in the urban areas, and landfills are the most common waste disposal method. The government often engages local contractors to collect waste and dispose at the landfills. There is negligible household waste treatment and open burning of waste is often practiced for disposal.²⁵⁷

Unsafe drinking water and poor sanitation facilities has adverse health impacts, leading to higher child mortality and healthcare expenditure in PNG. The WHO estimates that 10.4% of all the deaths in PNG are due to diseases that occur because of poor water and sanitation.²⁵⁸ Diarrhoea is a major cause of illness in the country especially among children under five years of age. Diarrhoea and related malnutrition accounts for nearly 4,000 under five children deaths every year in PNG.²⁵⁹ Cholera outbreaks, unheard until 2011 in PNG, rapidly spread throughout the coastal regions of the country,²⁶⁰ and by 2012, there were more than 15,000 reported cases of cholera and over 500 deaths in the next one year. Access to safe drinking water and adequate sanitation are critical to prevent diarrhoea and cholera outbreaks in PNG.

Several studies in PNG have indicated that lack of access to improved and covered sanitation facilities impacts the lives of women and girls and could be responsible for higher rates of abuse and gender violence in PNG.²⁶¹ Women are thus most likely to use improved sources of sanitation such as a flush based toilets and covered slab pit latrines.

Until recently, there was no comprehensive watsan policy in PNG. With World Bank Water and Sanitation Program support,

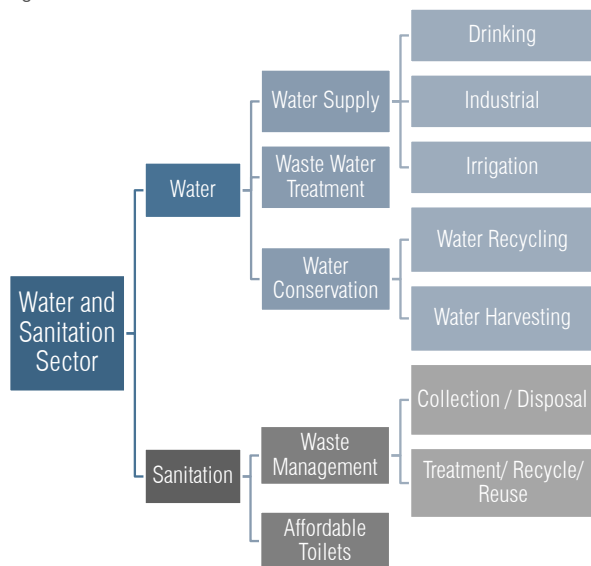
Rural Water Supply and Sanitation Programme (RWSSP)

RWSSP was funded by the government of PNG and the European Union, and was aimed at setting-up good practices for rural water, sanitation and hygiene service delivery in PNG. The program operated for 6 years from 2006 to 2012, but had to face the challenges of low funding and absence of institutional framework. However, lessons learned from the program were helpful in drafting the watsan policy for establishment of National Water, Sanitation and Hygiene Authority (NWSHA).

the PNG government has prepared the National Water, Sanitation and Hygiene (WASH) Policy, which was expected to be ratified by the National Economic Committee in early 2015. The draft WASH Policy has the following targets: (i) 70% of the rural population, 95% of the urban population, and 100% of educational institutions and medical centers have access to a safe, convenient, and sustainable water supply; (ii) 70% of the rural population, 85% of the urban population, and 100% of educational institutions and medical centers have access to safe, convenient, and sustainable sanitation facilities; (iii) 100% of educational institutions and medical centers have hand-washing facilities with running water and soap; and (iv) 100% of households have access to improved water supply and total sanitation.

The government's key strategy is to improve sector coordination and leadership by establishing the National Water, Sanitation and Hygiene Authority (NWSHA), to be headquartered in Port Moresby and with offices in provinces and districts. The board of the NWSHA will comprise representatives from the public and private sectors as well as civil society, and will supersede the existing National WASH Coordinating Committee. The NWSHA is mandated to undertake water supply and sanitation service delivery at the national, urban, and rural levels and work together with existing sector institutions and organizations.²⁶²

Figure 72: Water and Sanitation sector in PNG



Source: Intelicap Analysis

Watsan sector structure in PNG

The watsan sector in PNG can be segregated into two major sub-sectors: 1) water products and services and 2) sanitation products and services.

The water sub-sector can be further segregated into three segments: 1) water supply consisting of drinking water products such as water purifiers, industrial water and irrigation water, 2) waste water treatment and 3) water conservation, consisting of water recycling and water harvesting products and services.

The sanitation sub-sector can be segregated into two segments: 1) waste collection units including affordable toilets for households as well as community and 2) waste management services for households and industries consisting of waste collection/disposal and waste treatment/ waste reuse services such as waste to energy conversion.

The Islands region has the most access to safe water and

improved sanitation facilities. While the Islands region has the highest access to safe and improved water, 30% of the population in the region uses rain water for consumption. The Highlands region has the lowest percentage of the population with access to safe drinking water. None of these regions have access to bottled drinking water. Among the population that does not have access to safe drinking water, there is a huge reliance on surface water for consumption.

Access to hygienic or improved sanitation facilities is very limited in PNG with more than half of its population having no access. The percentage of the population with access to hygienic and improved sanitation is the highest in the Islands region (34%) while access is the lowest in the Momase region.

Demand

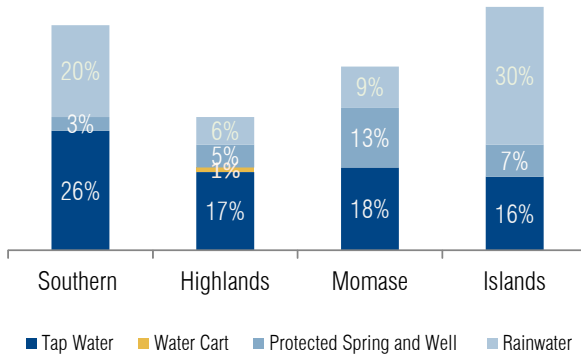
Water

There is emerging demand for improved drinking water products in urban areas as urban households in PNG become aware of its benefits. Currently, packaged water and drinking water treatment products such as RO/UV filters are

Rainwater Harvesting in PNG

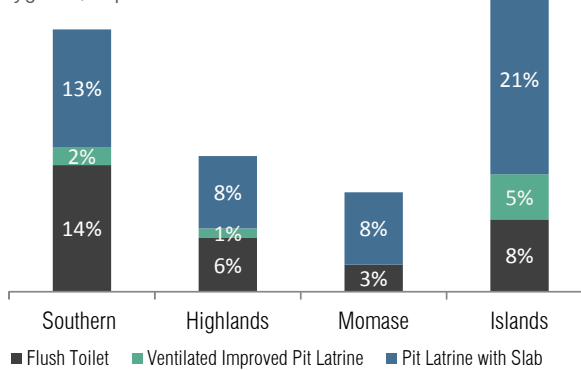
Rainwater could be utilized for drinking and cooking in many regions of PNG. A few development and donor agencies such as ChildFund Australia and Nature Conservancy have been working with rural communities in PNG towards rainwater harvesting. The Nature Conservancy has been working in the Adelbert Mountain range since 2007, and has been able to ensure that the villagers have access to water all year round through effective rainwater harvesting. ChildFund's PNG Oman Program Area has been able to ensure year round availability of clean water in several villages of the Rigo District that earlier found it difficult to collect clean, safe water in the rainy season.

Figure 73: Percentage of population with access to safe drinking water



Source: HIES Household Survey 2010

Figure 74: Percentage of population with access to hygienic/improved sanitation facilities



Source: HIES Household Survey 2010

used by around 30% of the households in the urban areas of Port Moresby and Lae region.²⁶³ Demand for drinking water in the urban centres of PNG has been largely met by government owned enterprises. These enterprises have negligible presence in rural areas of PNG. Improved drinking water products have seen a surge in demand from urban households in the last few years as a result of increase in customer awareness. Initiatives by international donor agencies and government aim to improve customer awareness, particularly in rural areas.

There is limited demand for rainwater harvesting products from rural households in PNG, although there is a need for

them. Rainwater harvesting provides a sustainable source of improved water in PNG. The country has high levels of humidity and many of its areas receive high rainfall with average annual precipitation varying between 2,000 and 5,000 mm.²⁶⁴ Rainwater catchment systems consisting of water tanks and rainwater filters have been successfully installed in some rural locations in PNG providing villagers access to improved water throughout the year. However, the present demand of rainwater harvesting products is limited in PNG due to limited customer awareness and difficulty for transportation and installation of the catchment systems in remotely located rural areas, especially in the Highlands region.

Demand for wastewater treatment services is primarily driven by the extractive nature of industrial activity in PNG. Majority of the rural households and farmers in PNG are dependent on surface water from streams, rivers, lakes and ponds to meet their water needs. Discharged wastewater from industries could lead to harmful pollution in the surface water resource. Hence, wastewater has to be treated at source before discharge into any water body as per local as well as international

Community Led Total Sanitation (CLTS)

The CLTS approach addresses the need for hygiene and sanitation behavioral change. It was pioneered in Bangladesh and has now been adopted in more than 40 countries. The key objective of CLTS is to invest in community behavior change towards improved sanitation, by building awareness about potential health problems.

CLTS was initiated in PNG in 2008 with RWSSP adopting CLTS to promote sanitation across 15 rural provinces in PNG. CLTS has since spread to 19 provinces in PNG covering nearly 95% of the geographical landscape.

The first 100% Open Defecation Free (ODF) community where every household had a toilet was achieved in 2010 and many rural communities are expected to achieve ODF in near future.

regulations. Mining industries are the key customer segments for wastewater treatment in PNG.

Sanitation

There is a limited demand for affordable toilets among the urban poor and rural households of PNG. Most rural and urban poor households utilize unimproved sanitation methods such as open pit latrines and open defecation. Currently, there seems to be a lack of demand for affordable and improved toilets from low-income households in PNG due to limited awareness. Demand is expected to increase as the private sector, along with NGOs and international development agencies play a key role in catalyzing behavioral change towards hygiene and improved sanitation.

Demand for household waste collection and disposal in urban areas is driven by initiatives from local municipal government bodies in PNG. Currently, waste management practices are adopted in the urban centres, and involve collection and disposal of untreated waste from households, public markets, commercial waste and medical waste. Waste from these sources is disposed at landfills, while hazardous waste such as medical and industrial waste is incinerated.²⁶⁵ The municipal authorities in the major urban cities of Lae and Port Moresby primarily seek waste collection and disposal services from private enterprises. The current demand for these services is, however, limited to these major urban centres.

Supply

Water and sanitation services in PNG are dominated by government entities that typically serve the urban markets. Rural markets are largely unserved, except for a few active NGOs and donor agencies. Private sector participation is largely for imports of products such as water filters, waste treatment plants, and water harvesting equipment. The private sector impact enterprise landscape in the watsan segment in PNG is still evolving and their

Role of NGOs and donor agencies

A number of international NGOs and donor agencies such as WaterAid, Oxfam and CARE are active in the watsan sector in PNG. These NGOs have played a key role in building awareness about health and hygiene in rural communities.

Oxfam, for instance, is active in the Bougainville region, training rural communities to build and maintain water supply systems and sanitation. WaterAid is working with several rural schools to set up toilet facilities, clean water for drinking and hand-washing and runs educational and awareness programs.

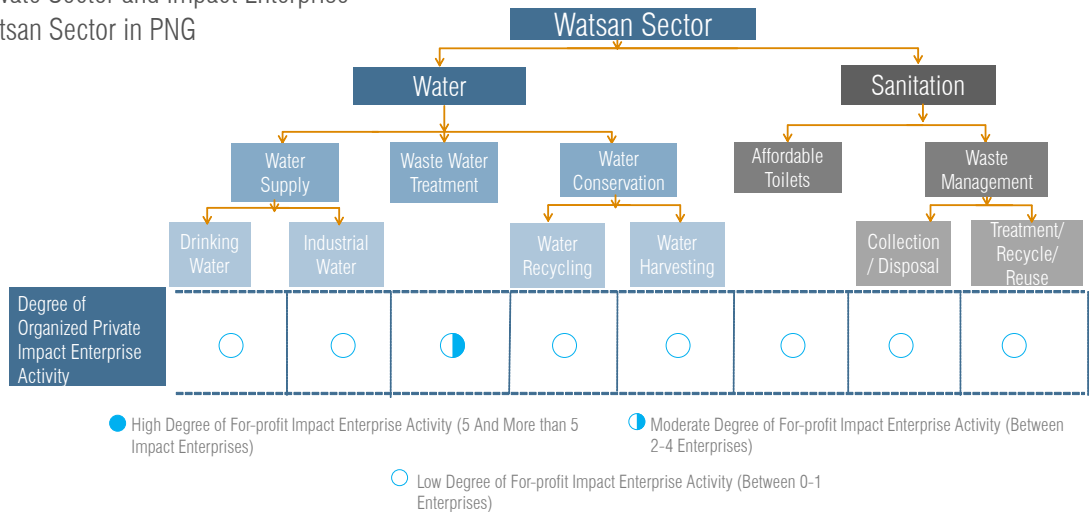
presence is limited to a few sub-segments.

Water PNG and Eda Ranu are the key suppliers of water and related services in urban centres. Water PNG, a state owned enterprise, provides water and sanitation services in major urban centres and towns on a commercial basis. However, due to capacity and resource constraints, it is active only in 14 of the 19 provinces in PNG. Another government owned enterprise, Eda Ranu provides metered water and improved sanitation services to commercial businesses and households in the National Capital District (NCD) region in Port Moresby.²⁶⁶ NGOs and church groups are largely focused on providing water and sanitation services in rural areas.

Most of the private sector enterprises in the watsan products segment are importers of equipment and machinery and seem to serve the higher income population in the urban areas. There is limited private sector impact enterprise activity in the supply of drinking water and rain water harvesting products with 1-2 firms mainly operating in major urban centres. Similarly, there are 2-3 firms providing waste water treatment services to industries and local municipalities.

The government provides sanitation services in PNG, while

Figure 75: Private Sector and Impact Enterprise Activity in Watsan Sector in PNG



Source: Papua New Guinea Country Report to the FAO, Intellecap Analysis

Note: Corporates in the above figure refer to large multinational corporations (MNC) or subsidiaries of MNC and importers of water and sanitation products. Local Enterprise activity refers to formal private sector PNG own businesses.

a few private sector enterprises provide waste management services. Private sector impact enterprise activity in the sanitation sector is only seen in waste management and waste treatment services. A few private sector enterprises have emerged in the waste disposal and reuse segment in the last few years, but their activity seems to be limited to the Port Moresby and Lae region. Most of the product companies in the sanitation segment are importers of products, equipment and machinery; they provide after sales support and services only in the urban centres. There seems to be no local manufacturer for sanitation products such as deodorizers, hand sanitizers or sanitation equipment such as portable toilet units in PNG.

Challenges

Lack of awareness about improved watsan products and services, and the resulting low demand constrains private sector activity. Potential consumers, especially in rural areas, are largely unaware about the health and social benefits of improved watsan products and services. Moreover, since safe

water and sanitation is seen as the government’s responsibility, people expect to receive it free or at extremely subsidized rates. This makes it difficult for private sector enterprises to spot viable opportunities in the watsan sector in PNG.

Human resource capacity constraints make it difficult for the government and private sector enterprises to provide improved watsan products and services to a wider customer base. Skilled human resources for watsan such as civil and environmental engineers, mechanical/ electrical engineers for design or operation of facilities or infrastructure are difficult to find in PNG. Semi-skilled resources such as technical support staff, community workers and health promoters can be usually hired in urban areas, but their presence is limited in rural areas.²⁶⁷ The International Water Association (IWA) estimates a total personnel shortage of over 7,500 people to meet the MDG goals for watsan. Local private sector enterprises that are interested in exploring opportunities in the watsan segment in PNG may struggle to find well trained resources for market entry and future expansion.

Table 20: MDG Water and Sanitation Targets

| Goal Evaluation Parameter | MDG Target | Status in PNG (2012 data) | |
|---------------------------------------------------|------------|---------------------------|---------------------------------------------|
| Population with improved source of drinking water | 88% | 40% | Expected to meet the target only after 2030 |
| Population with improved source of sanitation | 75% | 19% | Expected to meet the target only after 2030 |

Source: UNICEF/ WHO data statistics

Limited investment in physical and organizational infrastructure fails to create an enabling environment for private sector participation.

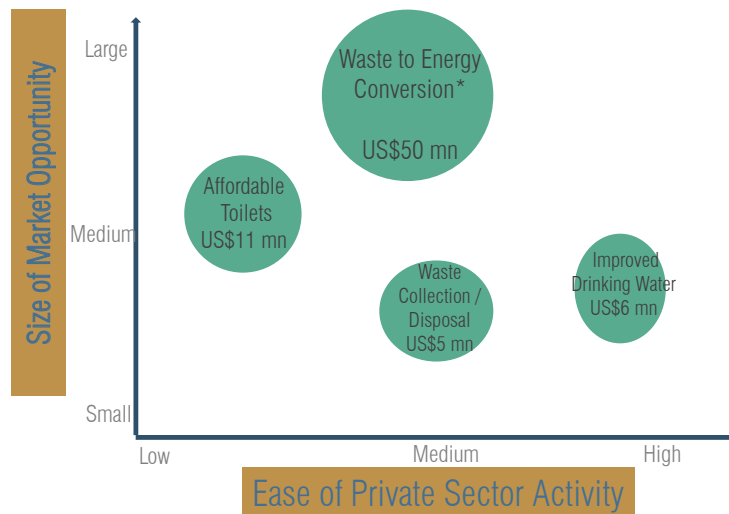
The implementation of existing watsan policies suffers from poor organizational co-ordination among various government departments at central, provincial and district level. In the last few years, the Government’s investment in the watsan sector has averaged 0.3% of the GDP – just a third of the internationally recognized minimum allocation of 1% for improved water and sanitation facilities.²⁶⁸ A majority of this investment seems to have been directed to urban areas to create better infrastructure for water / waste transportation and waste management services. Little has been done to improve the rural watsan landscape. With limited government funding and lack of institutional reforms, private sector companies lack an enabling environment for improved watsan products and services in PNG.

Opportunities and Whitespaces

As government investment is inadequate to meet the growing watsan needs in PNG, public-private partnerships present opportunities for the private sector. The Joint Monitoring Programme

(JMP)²⁶⁹ for water supply and sanitation in PNG estimates that an investment of more than PGK1.5 bn (US\$600 mn) in water supply and more than PGK3.5 bn (US\$1400 mn) in sanitation would be required to develop the necessary infrastructure and facilities for the government to achieve its water supply and sanitation access targets for 2030.²⁷⁰ In addition, more than PGK50 mn (US\$ 20 mn) will be additionally required annually to finance operations and maintenance of current and future infrastructure.²⁷¹ As capacity and capital will be strong constraints, the government can involve the private sector through public private partnerships to meet its watsan targets. The participation of the private sector not only ensures better operational efficiency, but also infuses latest technology and innovations in providing watsan services in remote and sparsely populated regions. As manpower is identified as a key challenge, the private sector could also play a key role in developing suitable vocational training and education infrastructure to train people in skills such as masonry and plumbing.

Figure 76: Market potential for Watsan sector in PNG



Source: Intellecap Analysis

Note: Ease of private sector activity has been considered as a function of three factors: Level of competition (in terms of private sector activity); barriers to entry and enabling policies; capital requirements (for setting up the business)..

*Future market potential for agriculture waste to energy conversion in PNG

Septimus Limited

Established in 2010, Septimus Limited manufactures healthy and hygienic rural toilet slabs made of fiber glass. The enterprise was formed with the objective of addressing the livelihood and sanitation needs of rural communities in PNG. It currently operates in a number of rural and coastal communities and also provides toilet slabs for primary schools in Milne Bay Province.

In order to diversify its business and address a larger customer base, Septimus Limited provides maintenance services for fiber-glass boats used in marine and coastal communities in PNG. It also produces fiber-glass water tanks, which can be used for storing clean rain water and fiber-glass flower pots, which are used for beautification in hotels and houses.

Drinking water supply and rain-water harvesting segments have high potential for impact enterprises. Drinking water supply for households holds promise, particularly given the steady population growth coupled with increasing urbanization. Dependence on open surface water in rural areas and negligible supply of piped water in urban slums makes these communities vulnerable to water-borne diseases, and could drive the demand of low cost water purification products and services. Rain water harvesting also presents opportunities for impact enterprises in PNG. Basic clean water storage solutions for domestic use and irrigation such as sand-bed filters and masonry tanks would ease hardship in water access. As these solutions are comparatively inexpensive and environmentally friendly, they would benefit low-income households in rural and urban areas.

In sanitation, impact enterprises can tap opportunities in waste collection and disposal and access to affordable toilets. The present waste collection and disposal services market is concentrated in urban centres such as Port Moresby and Lae.

Increasing household and commercial waste generation in cities will require private sector solutions. Public-private partnerships between impact enterprises and local municipal authorities would ease service delivery constraints in waste collection and disposal, and waste management.

Providing access to affordable toilets for low-income households, especially in rural areas and urban slums is another potential segment for impact enterprise activity. Customer awareness about the link between sanitation and good health is likely to improve through the efforts of various donor programs. However, customers' willingness to pay for these affordable toilets could prove to be a challenge.

Waste treatment and recycling services, particularly conversion of waste to energy, has significant opportunities for impact enterprises. Increasing industrial waste as well as generation of waste and by-products from farming of some of the key export-oriented agriculture products such as palm oil, kopra (coconut) and sugarcane could be utilized for electricity generation. Such waste is currently discarded and incinerated, and therefore presents opportunities for the private sector to resolve not only the waste management challenge, but also address the ever increasing demand for energy in the country.

Community Sanitation Facilities

Currently in its idea stage, Community Sanitation Facilities aims to provide sanitary bathing facilities with septic toilets to communities lacking such facilities in Lae city. These facilities will be affordable and will provide complimentary soap and shampoo.

The enterprise also plans to sell toiletries such as sanitary pads, toothpaste, toothbrush, shaving razors, and other associated products at its facilities.

GLOBAL CASE STUDY - JIBU

Jibu provides safe and affordable drinking water to low and middle income households. It has started operations in Uganda and Rwanda, with a pilot in Congo. It works through a franchisee model which encourages local entrepreneurship and increases outreach

According to a recent United Nations report ²⁷², more than 2.9 billion people in 48 countries will face water shortages in the next 10 years. Access to safe water is an even bigger challenge - even in places where water is readily available, it is not always safe to drink.²⁷³ Despite piped water schemes and bore-hole access, the vast majority of urban East Africa still lack reliable access to affordable and safe drinking water. According to a recent Joint Monitoring Program (JMP) Report by UNICEF and the WHO ²⁷⁴, 95% of people in urban areas and 71% in rural areas in Uganda have access to safe water. Despite significant water infrastructure, the lack of strong operations and maintenance mechanisms results in broken systems that do not meet government standards for access, quantity, and quality.²⁷⁵ In Rwanda, almost one-third of the population does not have access to safe water, and more than 3,000 children die every year from diarrhea caused by unsafe water and poor sanitation.²⁷⁶

Setting up

As part of his work with World Vision, a child-focused Christian relief and development agency, Randy Welsch was involved with a pilot project on clean drinking water in Mexico. Although World Vision decided against scaling the project in Mexico, Randy had worked in Africa earlier and spotted the need for a safe water model. Meanwhile, having lived in Africa and served in the Peace Corps, Galen Welsch developed the concept of a profitable, scalable, and locally-owned business model. In July 2012, Galen and Randy Welsch co-founded Jibu. Jibu currently provides safe water to urban and peri-urban communities in Uganda and Rwanda, and has a pilot project in the Democratic Republic of

Congo. Randy provides a new perspective on the business model of Jibu. He says, "People view us as a water company. We don't really see ourselves that way. We see ourselves as an opportunity company. What we are really excited about is creating organic growth through job creation in the local economy that makes a real difference to those in the communities. So we're raising the economic level throughout the community by creating jobs and keeping that money in the community."

Business and Operational Model

In order to scale rapidly and make safe water available in more communities, Jibu adopted a franchisee model. It supports and trains franchisees and supplies the water purification units, bottles with seals, labels, detailed operations manuals, marketing, and ongoing business consulting.²⁷⁷ In the current model, the franchisee operates a water depot where customers purchase water packed in sealed bottles and pay in cash. They can leave their old bottles in the depot for reuse. The franchise owner ensures that these bottles are cleaned, sanitized and reused for packaging water.

Demonstration and word of mouth has helped Jibu reach 6 franchisees so far, with 2 more in the pipeline. Each franchisee pays a deposit of US\$ 500- 1000 to Jibu, and invests another US\$ 500 in infrastructure. In return, Jibu provides them with the water purification units, bottles, posters for the water depots and training to start operations. All the franchisees are managed by a regional manager. Jibu has worked with Healing Waters International, a non-profit organization based in the United States to design the

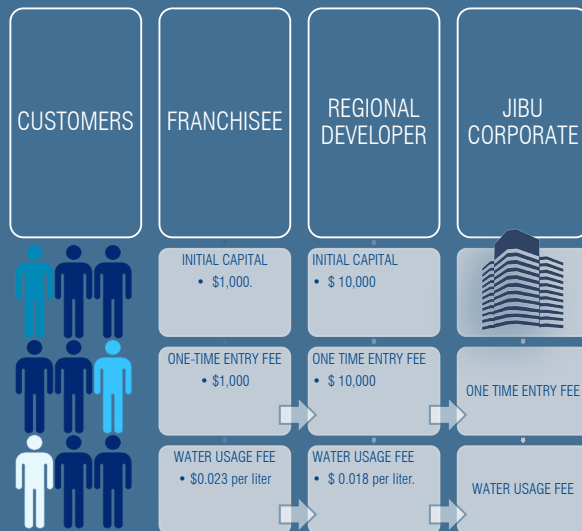
water purification unit.

Before starting operations, franchisees participate in a one-day training program followed by a month of on-the-job training. Jibu trains all employees and partners in customer relations, water treatment system operations, packaging, and walks them through the intensive operations manual to ensure quality control and adherence to procedures. The regional manager is primarily responsible for franchise quality assurance, although third party entities are also engaged for monitoring and evaluation. Remote monitoring of sales and production is made possible by providing each Jibu franchise with a tablet as the point-of-sale system. The Jibu team is also developing a solution for remote monitoring of water treatment output and water quality. The regional managers are key partners in franchisee selection and expanding Jibu's presence. They, along with the franchisees are also key points of contact with end customers. Jibu Corporate provides marketing support such as advertising and brand building to sell the prod-

ucts. The primary focus is on driving sales through specific offers. Going forward, the company is keen to partner with marketing firms in Africa to enhance marketing for franchisees.

Although Jibu targets an average price of US\$ 1 per 20 liters, its pricing strategy is unique and demand-driven. Pricing is determined by two factors - local market willingness to pay for safe water and sustainability of the operations to provide cash flow for the launch of new franchisees. The price is set after taking into account the time that people spend collecting, storing and purifying water, and the price they pay for alternatives such as coal for boiling water. The team conducts informal interviews in communities with high population density and disposable incomes to spend on safe drinking water to validate the price. For now, Jibu intends to fix the price across all franchisees to facilitate easy tracking of sales and maintain transparency. Jibu estimates that if a franchisee operates at a minimum projected threshold, it can break-even in about 3 months.

Figure 77: Flow of Funds for Jibu



Source: Primary Interviews, 2015

Key Challenges & Strategies

Franchise Co-ordination

The geographical distance between the management in the United States and on-ground staff in Africa leads to co-ordination issues, and often is a major obstacle to finding the right windows of opportunity.²⁷⁸ In order to address this challenge, Jibu recruits regional managers to coordinate with multiple franchisees in each country.

Supply Chain

As Jibu provides the bottles, seals and labels as well as marketing materials, supply chain has been an ongoing challenge. It

becomes difficult to ensure that all the materials reach the franchisee on time. As the numbers of franchisees grow, Jibu plans to streamline logistics to meet these requirements.

Training

Currently, the core team at Jibu manages the training program along with the regional managers. Franchisees that are doing business for the first time are taught the basics of business such as accounting and recording sales, and introduced to operational nuances. As franchisee numbers increase, it might be difficult for the small core team to provide such intense, one-on-one training. Therefore, Jibu is planning to streamline the training process in a manner that regional managers or older franchisees can train the new franchisees.

Marketing

Anne Welsch, Relationship Manager at Jibu states, “The need for clean drinking water is already established in the countries we operate in. So, we do not have to coax people to buy Jibu water, we have to increase awareness that the water is available.” Although there already is a demand for affordable clean drinking water in Uganda and Rwanda, Jibu will need to communicate to its potential customers where and how to find its water depots. It is planning to partner with marketing agencies in the region to communicate about its services and educate customers through radio and television advertisements.

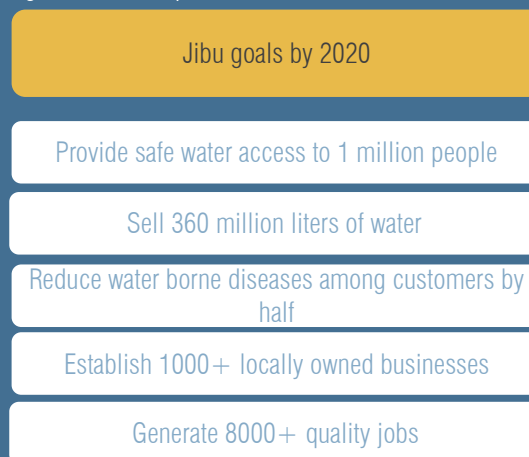
Road Ahead

The Jibu founding team has envisioned clearly defined goals for the business, and has also made plans for attractive returns on investment and organic profitability for Jibu corporate, the regional managers and franchisees. In the next two to five years,

the team plans to expand and streamline operations. Currently, the regional managers are recruited by Jibu, but the plan is to make this role entrepreneurial, such that when the franchisee starts making profits, a certain proportion of the profits accrue to the regional manager. The regional manager pays a royalty to Jibu from the income earned. The objective is to encourage and incentivize regional managers to get more franchisees on board.

Jibu intends to grow by one franchisee per month in each country that it operates. Over the next five years, it plans to launch 400 profitable local franchisees, of which half will be owned and operated by women.²⁷⁹ It has plans to explore mobile money technology for payment which will enable even the poorest customers to pay for water via electronic ‘water credits’ funded by traditional donation money.²⁸⁰ franchisees on board.

Figure 78: Future plans of Jibu



Source: Mission, Jibu, available at : <http://jibuco.com/mission/>



FINAL NOTES

Data from both primary and secondary sources suggests that the impact enterprise landscape in PNG is still in its nascent stage, but holds a lot of promise. Most of the for-profit impact enterprises we spoke with operate in the agricultural, clean energy, healthcare, education and waste management sectors. Many other enterprises which are in their pre-revenue stages are engaged in businesses across a range of sub-sectors. ICT and vocational education lead the set, followed by retail, ecommerce, engineering and real estate.

Our analysis of the survey responses suggests that most of the new impact enterprises in PNG are being led by the youth – most of them are first generation entrepreneurs from within local communities. Several of them hold university degrees and are motivated because they wish to make a difference. A majority of these enterprises believe that prioritizing profit maximization is a suitable strategy to maximize impact in the long-run. Unfortunately, when it came to raising money for their businesses, most of these enterprises faced difficulty in raising seed capital from financial institutions, and had to rely on personal funds or borrowings from family and friends for initial capital. Other challenges that these enterprises faced included inadequate infrastructure, specifically in terms of access to technology and internet, and lack of mentorship support. On the other hand, entrepreneurs identified a strong and growing customer base in PNG as a strong growth driver. This incentivized many enterprises to consider expanding into new geographies within PNG and also to diversify into new business segments.

The recent development of ICT services in PNG and increasing mobile money penetration in the economy are likely to foster impact enterprise activity by allowing them to operate more efficiently and easily with lean teams. Public-private partnerships are also likely to play a key role in the impact enterprise landscape in PNG in the near future. Most sector and country experts see ample opportunities for impact enterprises given a suitable regulatory and administrative environment. In the agricultural sector, impact enterprises see market potential in the fresh produce, processed food, poultry, cold storage facilities, and input manufacturing sub-sectors. In the clean energy sector, there exists potential for impact enterprises in providing solar energy products and electricity to off-grid communities through



mini and micro-grid systems. There is also ample potential for impact enterprises in the financial inclusion sector particularly by leveraging ICT for mobile money services. In the healthcare sector, impact enterprises can see growth around providing diagnostic services, baby products, paramedical services, and drug distribution. Enterprises focusing on water and sanitation are likely to enjoy growth in providing waste management services, both for industries and households, and in sewage treatment.

Interviews with sector experts and the analysis of enterprise survey responses reveal that for-profit impact enterprises across sectors need significant support to reach sustainability and scale. Interventions such as incubator platforms, seed and crowd funding, improved access to finance, better governance and information on land ownership and acquisition would boost the sector. Efforts to mitigate information asymmetry, both among enterprises and consumers, will encourage ecosystem development. The Government of PNG has initiated several programs and regulations to promote entrepreneurship in PNG, however, corruption and other security concerns can render many of these reforms ineffective.

During the course of this research, we were keenly aware of the paucity of data. We realize that there is a need for much more research that will support an enabling ecosystem for impact entrepreneurship. Understanding challenges and the interplay of some of the cross-cutting themes such as women employment and entrepreneurship and ICT will support the design of more targeted interventions. This research, therefore represents, baby steps in developing an enabling support ecosystem for impact enterprises. We hope it encourages future research that can engender inclusive growth in PNG.



RESEARCH METHODOLOGY

For a detailed analysis of the social entrepreneurship environment in PNG, the research team examined all prominent sectors in the country, and identified those sectors that indicate a presence of for-profit impact enterprises. These included several sub-sectors in agriculture, clean energy, education, financial inclusion, healthcare, and water and sanitation.

For each of these areas, the team drew insights and inferences through a comprehensive literature review of research reports, journal articles and working papers. The team collected secondary data from a number of sources including the Government of PNG, ILO, and the World Bank. It also used data bases available with large development finance institutions within the United Nations umbrella. The team interviewed around 20 sector and country experts from a wide range of organizations including FAO, World Bank, New Zealand Aid, and the Australian Department of Foreign Affairs and Trade.

The research team also conducted a survey of impact enterprises in PNG in order to develop an unbiased and grass-roots level understanding of the impact entrepreneurship landscape in the country. Finally, the team identified enterprises that are operational in other countries to share global experiences through short case studies.

The research effort can be divided into four parts:

Part 1: Assessment of the focus sectors in PNG:

The team conducted a review of secondary data sources and other publications to understand the background and performance of each of the six focus sectors. It analyzed key trends, how the different sectors have evolved, and how they interact with the low-income population. This was done by identifying the role that impact enterprises play in the demand and supply side of each sector. A special focus of the assessment was on value-chain analysis.

Part 2: Evaluation of growth drivers, challenges, opportunities and whitespaces:

The research team conducted a study of the growth drivers, challenges, opportunities and whitespaces in each of the sectors. The assessment of these attributes was primarily based on interviews with key stakeholders and sector experts. Interviews mostly involved discussions around private sector activity, government initiatives to support social enterprises, key growth drivers, major challenges and barriers to growth, engagement with aid programs, and other cross-cutting themes. The team also conducted a survey of 80 enterprises (both, at pre-revenue and operational stages) in PNG. The

survey helped the team gain insights about the social enterprise landscape in PNG. The team also used insights from published research papers and publicly available data.

Part 3: Market potential estimation:

The team took a top-down approach to determine the opportunities available for impact enterprises. Given the limited data at the household level, the team arrived at the market potential for each sector by considering the addressable population, an average price that each customer is willing to pay for the sector's product, and an estimate of the time for which the product will be used.

$$\text{Market potential} = P \times C \times Q$$

P represents the population of low-income households in PNG, C represents the average price of a sector's product or service, and Q represents the average annual consumption of the sector's product or service. The market potential estimation is based on a number of assumptions that have been obtained from publicly available sources.

Part 4: Case studies of enterprises from other geographies which can be replicated in PNG:

The research team created short case studies of 7 successful impact enterprises that have seen growth and momentum in recent years. In order to ensure they could offer insights to entrepreneurs in PNG, the team shortlisted countries where conditions in which the focus sectors operated were similar to PNG. This was done by comparing the countries across select indicators. Impact enterprises were identified in the shortlisted countries, and the most relevant ones were then selected. The case studies in the report focus particularly on the motive behind setting up the enterprise, the business/operational model of the enterprise, the challenges that these enterprises faced, and the future plans of these enterprises.

LIST OF RESPONDENTS / INTERVIEWEES / CASE STUDY

LIST OF INTERVIEWEES

1. Sweta Shud, Institute of Banking and Business Management
2. Paul Barker, CIMC-PNG
3. Aaron Batten, ADB
4. Shigeru Sugiyama, JICA
5. Stefanie Stallmeister, World Bank
6. Mrs Winifred Kula Amini, Member: PNG ICT Cluster and Google-Port Moresby Group of Software Developers
7. Dr Mike Bourke, The Australian National University
8. James Aipale, NZ Aid
9. Ken Shimuzu, FAO PNG
10. Steve Hills, DFAT
11. Hussain Haider, ADB
12. David Letichevsky, AusAid-Dfat
13. Dr Peter Van Maren, WHO
14. Sudhir Guru, City Pharmacy

CASE STUDY PARTICIPANTS

1. EA Fruits Farm
2. Cobitech Solar
3. PowerGen Renewable Energy
4. Bridge International Academies
5. Zoona
6. Changamka
7. Jibu

LIST OF SURVEY RESPONDENTS

1. Active Niugini Limited
2. Allegiance Health
3. Angel Womb
4. ASK Sanctuary Tilapia Farm and Orufona Community Fish Farmers Cooperative Society Ltd.
5. Cyberald Solutions
6. Dayspring Investments Limited
7. Doctor on Wheels
8. Eco Services Limited
9. EJ GIS Mapping Consultant
10. Food Republic Ltd
11. Fresh Produce Innovation
12. Grimcore Solutions
13. High Glass Limited
14. IsiLinkIT Limited
15. Jorku Project Management Consultancy Services
16. Mercury Consolidates
17. Momoti Investment Limited
18. National Accounting Data Base System for Women
19. Pacific Cloud International
20. PNG Bioengineering
21. PNG Mortgage Brokers
22. Pulga Women's Group
23. Q-Net-Network Marketing
24. Septimus Ltd
25. Solar Solutions PNG Ltd.
26. TLF Limited
27. Triple H Bus Service
28. Unique PNG Branding and Advertisement Services
29. Wallace and McLeod Limited
30. Wia Trade Enterprises Limited
31. Win-IT

LIST OF ACRONYMS

| | |
|--------|-------------------------------------------------|
| ADB | Asian Development Bank |
| Afdb | African Development Bank |
| AMS | Area medical stores |
| BPNG | Bank of Papua New Guinea |
| BoP | Bottom of the Pyramid |
| CAGR | Compounded Annual Growth Rate |
| CDC | Control and Prevention |
| CEO | Chief Executive Officer |
| COBE | Certificate of Basic Education |
| CSR | Corporate Social Responsibility |
| DDA | District Development Authorities |
| DFAT | Department of Foreign Affairs and Trade |
| EFTPOS | Electronic Funds Transfer at Point of Sale |
| FAO | Food and Agriculture Organization |
| FODE | Flexible Open and Distance Education |
| FPDA | Fresh Produce Development Agency |
| GDP | Gross Domestic Product |
| GPI | Gender Parity Index |
| GST | Goods and Services Tax |
| HDI | Human Development Index |
| HIES | Household Income and Expenditure Survey |
| HSIP | Health Services Improvement Program |
| ICCC | Independent Consumer and Competition Commission |
| ICT | Information and Communications Technology |
| IEA | International Education Agency |
| IFC | International Financial Corporation |
| ILO | International Labor Organization |
| JMP | Joint Monitoring Program |
| KES | Kenyan Shilling |
| MDG | Millennium Development Goal |
| MFI | Microfinance Institutions |
| MiBank | Nationwide Microbank |
| MMR | Maternal Mortality Rate |
| MNO | Mobile Networks Operators |
| MOOC | Massive Open Online Content Systems |
| MSP | Minimum Support Price |
| MTDP | Medium Term Development Plan |

| | |
|--------|------------------------------------------------------------------|
| NADP | National Agriculture Development Plan |
| NARI | National Agricultural Research Institute |
| NCD | Non-Communicable Disease |
| NCD | National Capital District |
| NDAL | National Department of Agriculture and Livestock |
| NDB | National Development Bank |
| NER | Net Enrollment Ratio |
| NEROP | National Electrification Roll-Out Plan |
| NHIS | National Health Information System |
| NICTAA | National Information and Communication Technology Authority |
| NMB | Nationwide Microbank |
| NTFP | Non-timber Forest Products |
| NWSHA | National Water and Sanitation Authority |
| NZAid | New Zealand Aid Programme |
| PFIP | Pacific Financial Inclusion Program |
| PGK | Papua Guinea Kina |
| PNG | Papua New Guinea |
| PNGUOT | Papua New Guinea University of Technology |
| PPL | PNG Power Ltd |
| RED | Reaching Every District program |
| SLS | Savings and Loan Society |
| SME | Small and Medium Enterprises |
| SMK | Salim Moni Kwik |
| STEPS | STEPwise Approach to Surveillance of NCD Risk Factors Report |
| TAFE | Technical and Further Education |
| TFF | Tuition-Fee Free |
| TTC | Technical Training Certificate |
| TVET | Technical and Vocational Education and Training |
| UNDP | United Nations Development Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| WASH | Water, Sanitation and Hygiene |
| Watsan | Water and Sanitation |
| WHO | World Health Organization |

LIST OF FIGURES

| | TITLES | PAGE NO |
|-----------|----------------------------------------------------------------------------------|---------|
| FIGURE 1 | Sector wise distribution of enterprises for survey | 8 |
| FIGURE 2 | Market size estimation for impact enterprises in PNG | 9 |
| FIGURE 3 | Sources of income in PNG | 15 |
| FIGURE 4 | Growth drivers for impact enterprises in PNG | 17 |
| FIGURE 5 | Stage of operations of surveyed enterprises | 22 |
| FIGURE 6 | Sample size by sector | 22 |
| FIGURE 7 | Geography of operations* | 23 |
| FIGURE 8 | Sample size by target market | 23 |
| FIGURE 9 | Gender (Senior Management) | 23 |
| FIGURE 10 | Educational qualifications of entrepreneurs | 24 |
| FIGURE 11 | Motivations for being an entrepreneur | 24 |
| FIGURE 12 | Geography of Operations of surveyed enterprises* | 25 |
| FIGURE 13 | Age of Enterprises | 25 |
| FIGURE 14 | Primary Customers* | 26 |
| FIGURE 15 | Revenue of enterprises in last fiscal year | 26 |
| FIGURE 16 | Initial sources of funding* | 26 |
| FIGURE 17 | Challenges faced by entrepreneurs* | 27 |
| FIGURE 18 | Drivers of growth* | 28 |
| FIGURE 19 | Growth strategy of enterprises* | 28 |
| FIGURE 20 | Planned source for future funding* | 28 |
| FIGURE 21 | Demand for support services* | 29 |
| FIGURE 22 | Challenges in access to support services* | 29 |
| FIGURE 23 | GDP Growth and Food Production per Capita Trends in PNG | 30 |
| FIGURE 24 | Trends in Production of Key Commodities in PNG (000' Metric Tons) | 31 |
| FIGURE 25 | Agriculture Sector in PNG | 33 |
| FIGURE 26 | Households involved in commercial agriculture activities across provinces in PNG | 34 |
| FIGURE 27 | Gross Returns on Labor Inputs for Selected Crops in PNG, 2009 | 35 |
| FIGURE 28 | Private Sector and Impact Enterprise Activity in Agriculture Sector in PNG | 37 |
| FIGURE 29 | Market potential for agriculture sector in PNG | 39 |
| FIGURE 30 | Operational model of EA Fruits Farm | 42 |
| FIGURE 31 | Percentage of Population with Access to Electricity | 44 |
| FIGURE 32 | Energy Supply by Sources in PNG | 44 |
| FIGURE 33 | Clean Energy Sector in PNG | 46 |
| FIGURE 34 | Access to grid electricity: Provincial Data | 47 |
| FIGURE 35 | Private sector and impact enterprise activity in the clean energy sector in PNG | 48 |
| FIGURE 36 | Market Potential for Clean Energy Sector in PNG | 50 |
| FIGURE 37 | Primary customer segments of Cobitech | 51 |
| FIGURE 38 | Operational Model of Cobitech | 52 |
| FIGURE 39 | PowerGen's Kiva Financed Micro-grid Model | 54 |

| | | | |
|--------|----|----------------------------------------------------------------------------------------|-----|
| FIGURE | 40 | Adult (15 years and above) literacy rates as a percentage of population | 56 |
| FIGURE | 41 | Gender Parity Index (GPI) for gross enrollment rate for primary education | 56 |
| FIGURE | 42 | Region wise percentage of people who cannot read or write (8 years+) | 57 |
| FIGURE | 43 | Reasons for high drop-off rates | 57 |
| FIGURE | 44 | Education Sector in PNG | 60 |
| FIGURE | 45 | Education at provincial level | 61 |
| FIGURE | 46 | Private Sector and Impact Enterprise Activity in Education Sector in PNG | 62 |
| FIGURE | 47 | Break up of tertiary education segment in PNG | 63 |
| FIGURE | 48 | Market potential for education sector in PNG | 66 |
| FIGURE | 49 | Key divisions in Bridge International Academies | 68 |
| FIGURE | 50 | Access to financial services in PNG | 70 |
| FIGURE | 51 | Domestic credit as a percentage of GDP | 71 |
| FIGURE | 52 | Percentage of population availing loans by gender | 71 |
| FIGURE | 53 | Financial inclusion services in PNG | 74 |
| FIGURE | 54 | Penetration of financial services in PNG | 74 |
| FIGURE | 55 | Private sector and impact enterprise activity in the financial inclusion sector in PNG | 77 |
| FIGURE | 56 | Market potential for financial inclusion in PNG | 82 |
| FIGURE | 57 | Key Partnerships | 85 |
| FIGURE | 58 | Total healthcare expenditure as a percentage of GDP | 88 |
| FIGURE | 59 | Adult Mortality Rate per 1,000 people (2007-2012) | 88 |
| FIGURE | 60 | Disease Burden in PNG and Communicable Diseases Causing Mortality | 89 |
| FIGURE | 61 | Number of health workers in comparable geographies | 89 |
| FIGURE | 62 | Healthcare Sector in PNG | 92 |
| FIGURE | 63 | Healthcare delivery in PNG | 92 |
| FIGURE | 64 | Provincial level information on key healthcare indices in PNG | 93 |
| FIGURE | 65 | Years of Life Lost (in '000s) | 94 |
| FIGURE | 66 | Private Sector and Impact Enterprise Activity in Healthcare Sector in PNG | 95 |
| FIGURE | 67 | Market potential for healthcare sector in PNG | 98 |
| FIGURE | 68 | Chronology of developments at Changamka | 100 |
| FIGURE | 69 | Operational model of Changamka | 100 |
| FIGURE | 70 | Percentage of population without access to improved water | 104 |
| FIGURE | 71 | Percentage of population without access to improved sanitation | 104 |
| FIGURE | 72 | Water and Sanitation sector in PNG | 106 |
| FIGURE | 73 | Percentage of population with access to safe drinking water | 107 |
| FIGURE | 74 | Percentage of population with access to hygienic/improved sanitation facilities | 107 |
| FIGURE | 75 | Private Sector and Impact Enterprise Activity in Watsan Sector in PNG | 109 |
| FIGURE | 76 | Market potential for Watsan sector in PNG | 110 |
| FIGURE | 77 | Flow of Funds for Jibu | 113 |
| FIGURE | 78 | Future plans of Jibu | 114 |

LIST OF TABLES

| | TITLES | PAGE NO |
|----------|-----------------------------------------------------------------------|---------|
| TABLE 1 | Policies and Projects to promote women entrepreneurship in PNG | 16 |
| TABLE 2 | Policies and Projects to Improve Transportation Infrastructure in PNG | 22 |
| TABLE 3 | Policies and Projects to Support Agriculture Sector in PNG | 32 |
| TABLE 4 | Policies and Projects to Promote Access to Electricity in PNG | 45 |
| TABLE 5 | Education Indicators in PNG | 56 |
| TABLE 6 | Policies and Projects to Support Education Sector in PNG | 59 |
| TABLE 7 | Universities in PNG | 63 |
| TABLE 8 | Technical and Vocational Education Institutes in PNG | 64 |
| TABLE 9 | Institutes Offering Distance Education | 65 |
| TABLE 10 | Financial Service Providers in PNG | 70 |
| TABLE 11 | Policies and Projects to Support Financial Inclusion in PNG | 73 |
| TABLE 12 | Savings Services of Micro-banks | 78 |
| TABLE 13 | Credit Services of Micro-banks | 79 |
| TABLE 14 | Mobile Money Services in PNG | 80 |
| TABLE 15 | Policies to Support Healthcare in PNG | 90 |
| TABLE 16 | Projects to Support Healthcare in PNG | 91 |
| TABLE 17 | Private Sector Activity in Immunization | 96 |
| TABLE 18 | Private Sector Initiatives to Build Awareness | 96 |
| TABLE 19 | Private Sector Activity in Life and Health Insurance Industry | 97 |
| TABLE 20 | MDG Water and Sanitation Targets | 110 |



NOTES

INTRODUCTION

- ¹ World Bank data.
- ² Human Development Index, UNDP.
- ³ 2015 PNG Budget speech; available at http://www.treasury.gov.pg/html/national_budget/files/2015/Budget%20Speech.pdf.
- ⁴ Amendment Bill on District Development Authority available at <http://www.pngperspective.com/news/district-development-authorities-to-replace-jdbpc/>
- ⁵ 2013 budget instructions, accessed from the Budget Speech 2013, PNG
- ⁶ FAO Stat, FAO of the UN, 2014 data, accessed in March 2015
- ⁷ Business coalition for Women statistics available at <http://bcfw.org.pg/empowering-women/>, accessed in March 2015
- ⁸ Stephen Howes et al (2014), Good news on the gender front in Papua New Guinea
- ⁹ Clinic managers are the officers in charge of health centres and aid posts
- ¹⁰ Stephen Howes et al (2014), Good news on the gender front in Papua New Guinea
- ¹¹ IFC (2010), Economic Opportunities for Women in the Pacific
- ¹² IFC (2010), Economic Opportunities for Women in the Pacific
- ¹³ IFC (2010), Economic Opportunities for Women in the Pacific
- ¹⁴ Makereta Komai, article in Pacific Women Shaping Pacific Development available at <http://www.pacificwomen.org/news/pngs-first-woman-aviation-company-owner-shares-her-story>
- ¹⁵ Article on NDB website available at <https://ndbpng.wordpress.com/tag/papua-new-guinea/page/6/> accessed in March 2015
- ¹⁶ World Bank data available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2015/01/06/000333037_20150106222350/Rendered/INDEX/935160BRIOP1200nce0Project0APPROVED.txt
- ¹⁷ International Finance Corporation (2010), PNG-Gender and Investment Climate Reform Assessment
- ¹⁸ 2015 PNG Budget speech; available at http://www.treasury.gov.pg/html/national_budget/files/2015/Budget%20Speech.pdf
- ¹⁹ PNG: 2013 data, ITU statistics available at <http://www.itu.int/>
- ²⁰ Radio sets per 100 households: 22, HIES 2010 data
- ²¹ Television Sets per 100 households in PNG: 15, HIES 2010 data
- ²² National Information and Communication Technology Authority (NICTA) is the ICT regulator in PNG
- ²³ Informal nature indicates that these enterprises are not formally registered, neither taxed, nor monitored by any form of government.
- ²⁴ Rebutt Research (2013), Report for SME Baseline Survey for the Small-Medium Enterprise Access to Finance Project
- ²⁵ Papua New Guinea - Telecoms, Mobile and Broadband - Market Insights and Statistics
- ²⁶ Defined as kilometer (km) of road per 100 sq. km of land area, World Bank development indicators
- ²⁷ World Bank development indicators, 2004 data
- ²⁸ Profiles of PNG owned companies report 2010 to 2013, available at www.enterprisecentre.com.pg, accessed in March 2015
- ²⁹ Data available at <http://www.airniugini.com.pg/papua-new-guinea-tourism/papua-new-guinea-airports/>, accessed in March 2015
- ³⁰ Intellectap analysis based on World Bank development indicators, 2010 to 2014 data
- ³¹ Intellectap analysis based on World Bank development indicators, 2011 to 2014 data
- ³² Papua New Guinean food security wilts, Catherine Wilson, 2012, Asia Times
- ³³ HIES report 2009-10 by National Statistical Office, PNG

NOTES

³⁴ Data available at <http://pacificopendata.com/papua-new-guinea/papua-new-guinea-spending-wheel/>, accessed in Feb 2015

³⁵ Available at <http://www.worldbank.org/en/results/2013/04/04/papua-new-guinea-improving-road-access>, accessed in March 2015

³⁶ Available at <http://www.pngtssp.com/about/index.htm>, accessed in March 2015

AGRICULTURE

³⁷ World Bank development indicators data for 2012-13

³⁸ Dr Mike Bourke (2012), The role of agriculture in a national economy dominated by gas, petroleum and mineral exports

³⁹ R. Michael Bourke and Tracy Harwood (2009), Food and Agriculture in Papua New Guinea Food production: Food production is reported at the farm level for primary crops (i.e. excluding harvesting losses for crops) and livestock items and in terms of live weight (i.e. the actual ex-water weight of the catch at the time of capture) for primary fish items. Definition obtained from <http://faostat.fao.org/site/375/default.aspx>

⁴⁰ Food production: Food production is reported at the farm level for primary crops (i.e. excluding harvesting losses for crops) and livestock items and in terms of live weight (i.e. the actual ex-water weight of the catch at the time of capture) for primary fish items. Definition obtained from <http://faostat.fao.org/site/375/default.aspx>

⁴¹ World Bank development indicators

⁴² FAOSTAT, FAO of the UN. Available from: http://faostat.fao.org/CountryProfiles/Country_Profile/Direct.aspx?lang=en&area=168

⁴³ FAOSTAT, FAO of the UN. Available from: http://faostat.fao.org/CountryProfiles/Country_Profile/Direct.aspx?lang=en&area=168

⁴⁴ Norah Omot(2012), Food security in Papua New Guinea, NARI, available at http://aci.gov.au/files/node/14932/tr080_food_security_in_east_.pdf

⁴⁵ FAO (2011) The State of Food Insecurity in the World, available at <http://www.fao.org/docrep/014/i2330e/i2330e.pdf>

⁴⁶ Shearman et al (2008)The State of Forests of Papua New Guinea, University of Papua New Guinea.

⁴⁷ R. Michael Bourke and Tracy Harwood (2009), Food and Agriculture in Papua New Guinea R. Michael Bourke and Tracy Harwood (2009), Food and Agriculture in Papua New Guinea

⁴⁸ FAOSTAT, FAO of the UN. Available from: http://faostat.fao.org/CountryProfiles/Country_Profile/Direct.aspx?lang=en&area=168

⁴⁹ R. Michael Bourke and Tracy Harwood (2009), Food and Agriculture in Papua New Guinea

⁵⁰ In 2007 the National Department of Agriculture and Livestock (NDAL) formulated the National Agriculture Development Plan 2007-2016 (NADP).

⁵¹ A Guide to the Taxation Incentives for Business & Investment in Papua New Guinea, 2013 accessible at [http://www.irc.gov.pg/PDF_files/Taxation%20Incentives%20for%20Business%20%20Investment%20in%20PNG%202013%20v8%20\(180613\).pdf](http://www.irc.gov.pg/PDF_files/Taxation%20Incentives%20for%20Business%20%20Investment%20in%20PNG%202013%20v8%20(180613).pdf)

⁵² FAOSTAT database, FAO of the UN

⁵³ OECD-FAO (2009), Global consumption of palm oil is expected to rise by more than 30% over the next ten years from 2010, Agricultural Outlook 2009

⁵⁴ Intellect primary research with relevant stakeholders 2014

⁵⁵ Intellect primary research with relevant stakeholders 2014

⁵⁶ Poultry News, 2014 accessible at <http://www.thepoultrysite.com/poultrynews/32340/poultry-helps-boost-papua-new-guineas-economy>

⁵⁷ Country Profile: Papua New Guinea, INFOFISH International 2012

⁵⁸ Food and Agriculture in Papua New Guinea. R. Michael Bourke and Tracy Harwood, 2009, Intellect primary research with relevant stakeholders 2014

⁵⁹ Intellect primary research with relevant stakeholders 2014

⁶⁰ Status Of Tropical Forest Management, Papua New Guinea 2005

⁶¹ PNG population annual growth rate from 2006-2011, Census figures from National Statistical office

⁶² Defined by the FAO as including both crop and livestock products at <http://data.fao.org/dimension-member?entryId=4ee4cc2b-204e-41d2-9d2d-a39af158900d>

⁶³ Food in Papua New Guinea, Chapter 2, Bourke, Gibson, et al accessible at http://www.academia.edu/834385/Food_Production_Consumption_and_Imports



NOTES

⁶⁴Intellectap primary research with relevant stakeholders 2014

⁶⁵Intellectap primary research with relevant stakeholders 2014

⁶⁶Country Profile: Papua New Guinea, INFOFISH International 2012

⁶⁷R. Michael Bourke and Tracy Harwood (2009), Food and Agriculture in Papua New Guinea

⁶⁸Chang et al (2014), Improving access to credit for smallholder farmers in Papua New Guinea. at <http://aciar.gov.au/files/pr141/paper-2.html>

⁶⁹ADB. (2009), Technical Assistance project to Papua New Guinea for Preparing the Pilot Border Trade and Investment Project, <http://www.adb.org/sites/default/files/project-document/67894/42135-png-tar.pdf>

⁷⁰Dr.Mike Bourke (2009), Agriculture in Papua New Guinea: Conditions, Future Prospects and Dispelling some Myths, Speech Series No. 19, Institute of National Affairs, NAU

⁷¹Isis Gaddis, Waly Wane, Jacques Morriset, World Bank- Land of opportunity: Should Tanzania encourage more large-scale farming?, available at: <http://blogs.worldbank.org/african/land-of-opportunity-should-tanzania-encourage-more-large-scale-farming>

⁷²Benjamin Romano, "Fledgling" Startups Provide Power, Light, and Food in East Africa, available at : <http://www.xconomy.com/seattle/2014/05/06/fledgling-startups-provide-power-light-and-food-in-east-africa/>

⁷³Franchisees are farmers/entrepreneurs who work on the farmlands owned by EA Fruits Farm. They are provided farm inputs and training by the company to cultivate fruits and vegetables for distribution.

CLEAN ENERGY

⁷⁴2010 data, Source: Pacific Lighthouses- Papua New Guinea report, IRENA 2013

⁷⁵PNG's Development Strategic Plan 2010-2030 indicates 12.4% as the electrification rate in 2010. PNG National Household & Income Expenditure Survey 2009-2010 indicates that 16.7% of households have access to grid electricity. IRENA estimates that in 2010, around 13% of the population had access to electricity

⁷⁶World Bank data series on access to electricity %,2000 to 2010 data

⁷⁷PNG National Household & Income Expenditure Survey 2009-2010, available at <http://catalog.ihsn.org/index.php/catalog/3243>

⁷⁸PNG National Household & Income Expenditure Survey 2009-2010

⁷⁹Papua New Guinea energy report, 2014, Enerdata, available at <https://estore.enerdata.net/energy-market/papua-new-guinea-energy-report-and-data.html>

⁸⁰Un-served households refer to households without access to grid electricity in PNG

⁸¹PNG National Household & Income Expenditure Survey 2009-2010

⁸²Lloyd P. Werry, (2005), Respiratory health effects associated with exposure to indoor wood burning in developing countries: a Papua New Guinea perspective

⁸³Reegle Policy Database, Papua New Guinea , available at <http://www.reegle.info/countries/papua-new-guinea-energy-profile/PG>

⁸⁴Guide to the Taxation Incentives for Business & Investment in Papua New Guinea, 2013

⁸⁵IFC (2013), Lighting Papua New Guinea report , 2013, available at https://www.lightingglobal.org/wp-content/uploads/2014/07/PNG-Off-Grid-Lighting-Market-Analysis_May-2014_1.pdf

⁸⁶PNG National Household & Income Expenditure Survey 2009-2010

⁸⁷PNG National Household & Income Expenditure Survey 2009-2010

⁸⁸Dr. Gio Braidotti (2011), Fuelwood tensions spark opportunity , available at http://aciar.gov.au/files/node/13748/fuelwood_tensions_spark_opportunity_15728.pdf

⁸⁹IFC (2013), Lighting Papua New Guinea Report https://www.lightingglobal.org/wp-content/uploads/2014/07/PNG-Off-Grid-Lighting-Market-Analysis_May-2014_1.pdf

NOTES

- ⁹⁰Some of the international suppliers of clean cook stoves such as VANREPA owned Green Power have offices in PNG
- ⁹¹PNG National Household & Income Expenditure Survey 2009-2010
- ⁹²IFC (2013), Lighting Papua New Guinea Report
- ⁹³Energy Access and Security in Eastern Africa, United Nations Commission for Africa, 2013, available at: http://www.uneca.org/sites/default/files/publications/energy_access_and_security_in_ea_eng_fin_lowres_27dec2013.pdf
- ⁹⁴About the enterprise, PowerGen Renewable Energy, available at: <http://powergen-renewable-energy.com/about-pre/>
- ⁹⁵Partners, Kiva, available at: <http://www.kiva.org/partners/340>
- ⁹⁶Elizabeth's interview with Sankalp Africa, 2015, available here:
<http://www.inclusivebusinesshub.org/page/sankalp-africa-2015-interview-series-powergen-renewable-energy>

EDUCATION

- ⁹⁷Percentage of people who can who can with understanding, both read and write in any language a short simple statement or paragraph on their everyday life
- ⁹⁸Ratio of enrollment of the official age-group for a given level of education expressed as a percentage of the corresponding population
- ⁹⁹HIES report 2009-10 by National Statistical Office, PNG, Intellect analysis
- ¹⁰⁰World Bank Data
- ¹⁰¹Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education
- ¹⁰²HIES report 2009-10 by National Statistical Office, PNG
- ¹⁰³Bev & Vic Romanyshyn , Obstacles to Student Success in Papua New Guinea ,available at: <http://rausimobe.files.wordpress.com/2010/11/obstacles-to-student-success-in-papua-new-guinea1.pdf>
- ¹⁰⁴F. Halsey Rogers and Emiliana Vegas, No More Cutting Class?, available at <https://openknowledge.worldbank.org/bitstream/handle/10986/4043/WPS4847.pdf?sequence=1>
- ¹⁰⁵UNICEF, Division of Policy and Practice, Statistics and Monitoring Section, available at www.childinfo.org/EAPR_Papua_New_Guinea.pdf, May 2008
- ¹⁰⁶PNG facts, Quality of education in PNG questioned. Available at <http://edu.pngfacts.com/education-news/quality-of-education-in-png-questioned>
- ¹⁰⁷2014 National Budget, available at http://www.treasury.gov.pg/html/national_budget/files/2014/budget_documents/Volume1/2014%20Budget%20Volume%201.pdf
- ¹⁰⁸Universal Basic Education Plan 2010-2019, available at http://www.education.gov.pg/QL_Plans/plans/ube-plan-2010-2019.pdf
- ¹⁰⁹Kavanamur Baki and Baird , Devpolicy,2014 Policy Update,available at <http://devpolicy.org/presentations/2014-PNG-Update/Day-2/S6-Kavanamur-Baki-and-Baird.pdf>
- ¹¹⁰Department of Education, PNG, 2008 Education Statistics, available at <https://www.spc.int/prism/images/EducationDigests/PNG/statistical-bulletin-2008.pdf>
- ¹¹¹Kavanamur Baki and Baird , Devpolicy,2014 Policy Update, available at <http://devpolicy.org/presentations/2014-PNG-Update/Day-2/S6-Kavanamur-Baki-and-Baird.pdf>
- ¹¹²Pacific Adventist University, available on <http://www.pau.ac.pg/>
- ¹¹³Jayasundara J. Banda, Reorienting policy towards excellence in TVET education. For sustainable development for Papua New Guinea , available at http://www.unevoc.unesco.org/up/PNG_Country_Paper.pdf,
- ¹¹⁴National Training Council, Ministry of Labor and Industrial Relations, available at <http://www.ntcwebsite5.com/#!approvals/cezy>
- ¹¹⁵Prof. Abdul Mannan, In search of a dual mode organizational structure, available at http://wikieducator.org/images/9/9e/PID_258.pdf
- ¹¹⁶Prof. Abdul Mannan, Open and distance learning student retention: A case study of the University of Papua New Guinea Open College
- ¹¹⁷Terence Miro Laufa , Open and Distance Learning in Papua New Guinea:
Case Study of a Private Training Provider, available at http://www.dwu.ac.pg/en/images/Research_Journal/2009_Vol_10/7_Laufa_91-101_Open_and_distance_



NOTES

learning.pdf,

¹¹⁸International Council For Open and Distance Education, PNG profile, available at http://www.icde.org/projects/regulatory_frameworks_for_distance_education/country_profiles/papua_new_guinea/

¹¹⁹Dr Andrew Chola Nyondo, Open And Distance Learning Practice At The Papua NewGuinea University Of Technology , available at http://www.col.org/pcf3/Papers/PDFs/Nyondo_Andrew.pdf

¹²⁰Department of Education, PNG, 2008 Education Statistics, available at <https://www.spc.int/prism/images/EducationDigests/PNG/statistical-bulletin-2008.pdf>

¹²¹Primary interviews

¹²²Papua New Guinea - Telecoms, Mobile and Broadband - Market Insights and Statistics – available at <http://www.budde.com.au/Research/Papua-New-Guinea-Telecoms-Mobile-and-Broadband-Market-Insights-and-Statistics.html#sthash.yGEhyuQg.dpuf> available at <http://www.budde.com.au/Research/Papua-New-Guinea-Telecoms-Mobile-and-Broadband-Market-Insights-and-Statistics.html>, accessed in Feb 2015

¹²³Based on primary interviews

¹²⁴Ravinder Rena, Challenges for Quality Primary Education in Papua New Guinea—A Case Study, available at <http://www.hindawi.com/journals/edri/2011/485634/>

FINANCIAL INCLUSION

¹²⁵Household Income and Expenditure Survey, 2010

¹²⁶Poverty headcount ratio at \$1.25 a day, 2014 National Human Development Report, available at http://hdr.undp.org/sites/default/files/final_png_nhdr.pdf

¹²⁷Oxford Business Group, Papua New Guinea: Banking the Unbanked, available at <http://www.oxfordbusinessgroup.com/news/papua-new-guinea-banking-great-unbanked>

¹²⁸Ancilla Wrankuale, 80% of PNG Unbanked, available at <http://www.pfip.org/media-centre/in-news/2013-1/80-of-png-unbanked-post-courier-png.html>

¹²⁹2014 National Human Development Report Papua New Guinea, available at http://hdr.undp.org/sites/default/files/final_png_nhdr.pdf

¹³⁰Kina Securities Limited, available at <http://www.kina.com.pg/wp-content/uploads/2014/05/FAQs.pdf>

¹³¹Kina Securities Limited, available at <http://www.kina.com.pg/wp-content/uploads/2014/05/POMSOX-Stock-Performance-Review-2013.pdf>

¹³²Universal Postal Union Report, December 2013 available at http://news.upu.int/fileadmin/user_upload/PDF/Reports/annual_report_2013.pdf

¹³³Tilman Bruett and Janine Firpo, Building a mobile money distribution network in Papua New Guinea, available at http://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/financial+markets/news/putting+mobile+money+into+action+in+papua+new+guinea

¹³⁴Pacific Financial Inclusion Programme, available at <http://www.pfip.org/about/where-we-work-1/png/>

¹³⁵Poverty and Access to Roads in Papua New Guinea

¹³⁶World Bank Database, available at <http://data.worldbank.org/indicator/FB.CBK.BRCH.P5>

¹³⁷World Bank Database, available at <http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=g20-basic-set-of-financial-inclusion-indicators#>

¹³⁸Household Income and Expenditure Survey, 2010

¹³⁹Oxford Business Group, available at <http://www.oxfordbusinessgroup.com/overview/continued-expansion-robust-growth-draws-more-competition-and-new-regulations-are-works>

¹⁴⁰Based on primary interviews

¹⁴¹Tilman Bruett and Janine Firpo, Building a mobile money distribution network in Papua New Guinea, available at http://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/financial+markets/news/putting+mobile+money+into+action+in+papua+new+guinea

¹⁴²World Bank Database, available at <http://data.worldbank.org/indicator/FS.AST.DOMS.GD.ZS>

¹⁴³Bank Of PNG Annual Report, 2012

NOTES

- ¹⁴⁴Bank of Papua New Guinea estimates
- ¹⁴⁵Microfinance Expansion Project, Asian Development Bank, available at http://adb.org/projects/details?page=details&proj_id=44304-013
- ¹⁴⁶These institutions specifically serve Bottom of the Pyramid population
- ¹⁴⁷EFTPOS: Electronic funds transfer at point of sale
- ¹⁴⁸The National Research Institute (2010), Papua New Guinea District and Provincial Profiles
- ¹⁴⁹<http://www.pfip.org/media-centre/in-news/2013-1/80-of-png-unbanked-post-courier-png.html>
- ¹⁵⁰Caitlin Sanford, Lanna Lome-Jeremia and Samir Chand, New Financial Inclusion Data from the Pacific, available at <http://www.afi-global.org/blog/2013/10/24/new-financial-inclusion-data-pacific-islands>
- ¹⁵¹NCDF Inclusive Finance-Increasing access to financial services
- ¹⁵²Robyn Robertson, Financial Diaries: Portfolios of Low Income Households in Papua New Guinea, available at <https://www.microfinanceopportunities.org/4-work-with-us/mfo-in-the-field/project-list/financial-diaries-portfolios-of-low-income-households-in-papua-new-guinea/>
- ¹⁵³The survey was conducted by PFIP s a Pacific-wide programme helping low-income households gain access to quality and affordable financial services and financial education. It is jointly managed by the UN Capital Development Fund (UNCDF) and the United Nations Development Programme (UNDP) and receives funding from the Australian Government, the European Union and the New Zealand Government. This study was conducted between 2010-2013 studies in Fiji, Papua New Guinea (PNG), Samoa and Solomon Islands (SOI)
- ¹⁵⁴Pacific Financial Inclusion Programme, available at <http://pfip.org/resources/uploads/attachments/documents/Pacific%20Financial%20Competence%20Studies.pdf>
- ¹⁵⁵Paul Barker, Policy Backing to Enable Microfinance, available at http://www.inapng.com/pdf_files/Policies%20for%20microfinance.pdf
- ¹⁵⁶Busa Jeremiah Wenogo, New law tries to establish balance in PNG's informal economy, available at http://asopa.typepad.com/asopa_people/2014/10/considerations-in-the-regulation-of-pngs-informal-economy.html,
- ¹⁵⁷Business Advantage PNG, Microfinance sector in PNG expanding services, available at <http://www.businessadvantagepng.com/micro-finance-sector-papua-new-guinea-expanding-services/>
- ¹⁵⁸25% is arrived at by calculating 41% of the 61.6% of the employed population
- ¹⁵⁹Based on HIES Survey 2010
- ¹⁶⁰Business Advantage PNG, Microfinance sector in PNG expanding services, available at <http://www.businessadvantagepng.com/micro-finance-sector-papua-new-guinea-expanding-services/>
- ¹⁶¹Oliver Ullrich, Reducing the vulnerability of grassroots people in PNG, available at <http://blog.microsave.net/reducing-the-vulnerability-of-grass-roots-people-in-papua-new-guinea-delivering-microinsurance-in-a-particularly-challenging-environment/>
- ¹⁶²Intellectap Analysis
- ¹⁶³Tilman Bruett and Janine Firpo, Building a mobile money distribution network in Papua New Guinea, available at http://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/financial+markets/news/putting+mobile+money+into+action+in+papua+new+guinea
- ¹⁶⁴Migration Policy Institute, available at <http://www.migrationpolicy.org/programs/data-hub/charts/total-remittance-inflows-and-outflows>
- ¹⁶⁵ACP Observatory, available at <http://www.acpmigration-obs.org/sites/default/files/PNG-CtryOverview-15022013.pdf>, Accessed on Feb 2015
- ¹⁶⁶Bank that offers microfinance services is referred to as a Microbank
- ¹⁶⁷Oxford Business Group, available at <http://www.oxfordbusinessgroup.com/overview/new-chapter-plans-legislative-reform-sector-set-reach-out-new-customers->



NOTES

innovative-ways

- 168 BPNG website, available at http://www.bankpng.gov.pg/images/stories/banks__fin_institutions_act.pdf
- 169 Nationwide Mircobank Website, available at <http://www.microbank.com>, Accessed on Feb 2015
- 170 Nationwide Microbank website, available at <http://www.microbank.com.pg/products/products.html>, Accessed on Feb 2015
- 171 PNG Microfinance Limited Website available at <http://www.pml.com.pg/index.php/about-pml/savings-a-loans-stats>, Accessed on Feb 2015
- 172 PNG Microfinance Limited Website, available at <http://www.pml.com.pg/index.php/products/savings-products/fisa>, Accessed on Feb 2015
- 173 PNG Microfinance Limited Website, available at <http://www.pml.com.pg/index.php/products/savings-products>, Accessed on Feb 2015
- 174 KPML Website, available at <http://www.kpml.com.pg/Financial%20Report%202013.pdf>, Accessed on Feb 2015
- 175 Mixmarket database, Accessed at <http://www.mixmarket.org/mfi/country/Papua%20New%20Guinea>
- 176 Peter Biggs, Economic Roundup Winter in 2007, Accessed at http://archive.treasury.gov.au/documents/1304/HTML/docshell.asp?URL=04_The_Financial_Sector_in_PNG.asp
- 177 Mixmarket database, Accessed at <http://www.mixmarket.org/mfi/country/Papua%20New%20Guinea>
- 178 Mixmarket database, Accessed at <http://www.mixmarket.org/mfi/country/Papua%20New%20Guinea>
- 179 PML Website, Accessed at <http://www.pml.com.pg/index.php/products/loan-products>
- 180 PML Website, Accessed at <http://www.pml.com.pg/>
- 181 KPML Website, Accessed at <http://www.kpml.com.pg/products.html>
- 182 KPML Website, Accessed at <http://www.kpml.com.pg/PDF/Poroman%20Nius%20Issue%203%20-%20Final.pdf>
- 183 National Development bank PNG, available at <https://ndbpng.wordpress.com/products/>,
- 184 Nationwide Mircobank Website, available at <http://www.microbank.com.pg/products/MiLife.html>
- 185 Life Insurance International, available at <http://www.lifeinsuranceinternational.com/news/bank-of-papua-new-guinea-partners-with-capital-life-to-launch-new-life-insurance-product-260514-4277112>
- 186 PNG Website, available at <http://www.bankpng.gov.pg/licensed-institutions/558-other-licenses-mobile-operator-money-changers-remitters-fx-dealers>
- 187 Tilman Bruett and Janine Firpo, Building a mobile money distribution network in Papua New Guinea, available at http://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/financial+markets/news/putting+mobile+money+into+action+in+papua+new+guinea
- 188 Business Advantage, Accessed at <http://www.businessadvantagepng.com/banking-services-reach-papua-new-guineas-rural-population/>
- 189 Pacific Financial Inclusion Programme, available at <http://pfip.org/resources/uploads/attachments/documents/Financial%20Diaries%20of%20Low%20Income%20Households.pdf>
- 190 Ronald Duncan, Telecommunications in PNG, available at http://www.researchgate.net/publication/228445238_TELECOMMUNICATIONS_IN_PAPUA_NEW_GUINEA
- 191 Pacific Financial Inclusion Programme, available at file:///C:/Users/User/Downloads/PRESENTATION-OF-THE-PORTFOLIOS-OF-LOW-INCOME-HOUSEHOLDS-IN-PAPUA-NEW-GUINEA1-.pdf
- 192 Bima Mobile Website, available at <http://www.bimamobile.com/bima-receives-a-5-million-investment-from-digicel-group-to-bring-microinsurance-to-asia-pacific-and-the-caribbean/>
- 193 Pacific Financial Inclusion Programme, available at <http://pfip.org/resources/uploads/attachments/documents/Inclusive%20Insurance.pdf>

NOTES

HEALTHCARE

- ¹⁹⁴Human development Report 2014, Papua New Guinea available at: http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/PNG.pdf
- ¹⁹⁵World Bank data available at: <http://data.worldbank.org/indicator/SPDYN.IMRT.IN>
- ¹⁹⁶World Bank data available at: <http://data.worldbank.org/indicator/SH.XPD.PCAP>
- ¹⁹⁷World Bank data available at: http://www.who.int/gho/health_financing/per_capita_expenditure/en/
- ¹⁹⁸World Bank data available at: <http://wdi.worldbank.org/table/2.21>
- ¹⁹⁹CIA World Factbook available at: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2102rank.html>
- ²⁰⁰World Bank (2011), Reproductive Health in PNG
- ²⁰¹World Bank (2011), Reproductive Health in PNG, available at: http://www.ewc-popcomm.org/pdf/13_PNG_workshop/Sample%20factsheets/World%20BankRH.pdf
- ²⁰²WHO Country profiles 2014
- ²⁰³Papua New Guinea, Poverty Assessment (2004)
- ²⁰⁴The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.
- ²⁰⁵Solid waste management in Papua New Guinea,(2013), available at <http://devpolicy.org/solid-waste-management-in-papua-new-guinea-20130812/>
- ²⁰⁶ECB (2012), Disaster Need Analysis, Papua New Guinea
- ²⁰⁷GoPNG Department of Health SPAR report
- ²⁰⁸Australian Doctors International Statistics and Mark Anthony Gregorio (2011), Glimpse of workforce in PNG
- ²⁰⁹CIA World Factbook Database
- ²¹⁰Mark Anthony Gregorio (2011), Glimpse of workforce in PNG
- ²¹¹Australian High commission (2014), Australia's support for gender equality in PNG
- ²¹²IRIN article on PNG grapples with ageing health workforce, available at: <http://www.irinnews.org/report/97643/png-grapples-with-ageing-health-workforce>
- ²¹³<http://www.fsm.ac.fj/files/impact-ooop-expenditures-mnch-services-png.pdf>
- ²¹⁴WHO and National Department of Health (2012), Health service Delivery Profile
- ²¹⁵Springer statistics available at : http://download.springer.com/static/pdf/965/art%253A10.1186%252F1746-4269-8-47.pdf?auth66=1421755693_atf580846140f81d5c1bae10660c37108&ext=.pdf
- ²¹⁶WHO and National Department of Health (2012), Health service Delivery Profile
- ²¹⁷WHO and National Department of Health (2012), Health service Delivery Profile
- ²¹⁸WHO and National Department of Health (2012), Health service Delivery Profile
- ²¹⁹Department of National Planning and Monitoring (2010), PNG Medium Term Development Plan
- ²²⁰WHO (2014), Country Cooperation Strategy
- ²²¹Report on Healthcare by the government of PNG available at: http://www.health.gov.pg/publications/FPHCSSSP_2014.pdf
- ²²²Department of National Planning and Monitoring (2010), PNG Medium Term Development Plan
- ²²³Asian Development Bank, Rural Primary Health Services Delivery
- ²²⁴WHO and National Department of Health (2012), Health service Delivery Profile



NOTES

- ²²⁵Project Manager, PEPE, available at <http://devpolicy.org/medical-supplies-reform-in-png20110531/>
- ²²⁶PNG Health news available at: <http://health.onepng.com/insurance.html>
- ²²⁷Asian Development Bank (2010), Rise of Asia's middle class
- ²²⁸World bank (2004), Papua New Guinea- Poverty Assessment
- ²²⁹STEP is the The WHO STEPwise approach to Surveillance of NCD Risk Factors report developed by WHO as part of a global surveillance strategy in response to the growing need for country-level trends in noncommunicable diseases
- ²³⁰WHO (2014), Country Cooperation strategy
- ²³¹Milton J. Lewis and Kerrie L. MacPherson (2012), Health Transitions and the Double Disease Burden in Asia and the Pacific:
- ²³²Oxford Business Group article on Papua New Guinea-Insurance growth at risk, available at <http://www.oxfordbusinessgroup.com/news/papua-new-guinea-insurance-growth-risk>
- ²³³Household Survey, 2012
- ²³⁴PNG National Budget 2014
- ²³⁵World Bank data available at: <http://data.worldbank.org/indicator/SH.XPD.OOPC.ZS>
- ²³⁶WHO Database
- ²³⁷United Nations, Millennium Development Goals Database, 15 April 2015
- ²³⁸InterOil Corporation, InterOil Vaccinates Hundreds of Children Against Measles
- ²³⁹Oil Search Health Foundation Website
- ²⁴⁰PNG Health news available at: <http://health.onepng.com/insurance.html>
- ²⁴¹Colin Wiltshire and Andrew Anton Mako (2014) Financing health facilities and the free health policy in PNG: challenges and risks
- ²⁴²Ministry of Health PNG (1998), National Drug Policy for PNG
- ²⁴³Oxford Business Group (2015), Strong potential in Papua New Guinea's insurance market
- ²⁴⁴Improving healthcare for Kenya's poor, World Bank, 2014 available at: <http://www.worldbank.org/en/news/feature/2014/10/28/improving-healthcare-for-kenyas-poor>
- ²⁴⁵Safaricom Britam partner to provide health insurance in Kenya, available at:<http://www.theeastafrican.co.ke/business/Safaricom-Britam-partner-to-provide-health-insurance/-/2560/2204930/-/xttu95/-/index.html>
- ²⁴⁶Defined as 'Premium per person'
- ²⁴⁷Safaricom, 2013
- ²⁴⁸Defined as 'The tendency of those in dangerous jobs or high risk lifestyles to get life insurance'

WATER AND SANITATION

- ²⁴⁹World Health Organization (2004), Costs and benefits of water and sanitation improvements at the global level , available at http://www.who.int/water_sanitation_health/wsh0404summary/en/
- ²⁵⁰EPSU calls for the implementation of the Human Right to Water and Sanitation (2012). Available at <http://www.right2water.eu/de/node/43>
- ²⁵¹Water Supply and Sanitation in Papua New Guinea, World Bank study report, July 2013
- ²⁵²Safe and improved water sources for the purpose of this report includes bottled water, tap/ piped water, protected wells and rainwater as defined in the HIES report 2009-10 by National Statistical Office, PNG

NOTES

- 253 Improved sanitation for the purpose of this report includes flush toilet, ventilated improved pit latrine and pit latrine with slab as defined in the HIES report 2009-10 by National Statistical Office, PNG
- 254 HIES report 2009-10, National Statistical Office, PNG
- 255 The North West Monsoon season is from December to March while the South West Monsoon season is from May to October
- 256 HIES report 2009-10, National Statistical Office, PNG
- 257 Solid waste management in Papua New Guinea, (2013), available at <http://devpolicy.org/solid-waste-management-in-papua-new-guinea-20130812/>
- 258 WHO (2008). Safer Water, Better Health -, available at http://whqlibdoc.who.int/publications/2008/9789241596435_eng.pdf
- 259 AusAID (2011) Papua New Guinea Water, Sanitation and Hygiene Sector Brief, available at http://www.uts.edu.au/sites/default/files/ISF_PNGWASH.pdf
- 260 Horwood P and Greenhill A. (2012), Cholera in Papua New Guinea available at http://www.wpro.who.int/wpsar/volumes/03/1/2012_PE_Horwood_Greenhill/en/
- 261 The World Bank (2014), Water, Sanitation and Hygiene Policy Development in Papua New Guinea, May 2014
- 262 ADB Paper – Country Partnership Strategy: Papua New Guinea –2016-2020, April 2015 <http://www.adb.org/sites/default/files/linked-documents/cps-png-2016-2020-ssa-04.pdf>
- 263 HIES report 2009-10, National Statistical Office, PNG
- 264 Available at <http://www.weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine-in-Papua-New-Guinea>
- 265 Waste management in Papua New Guinea, (2009) available at <http://www.codwap.hs-bremen.de/02%20Material/reports/CODWAP-act4%20report%20UNITECH.pdf>
- 266 World Bank (2014) Papua New Guinea Water, Sanitation and Hygiene Policy Development Support report.
- 267 IWA (March 2013). Mapping human resource capacity gaps in the water supply and sanitation sector- Papua New Guinea.
- 268 World Bank study report (July 2013). Water Supply and Sanitation in Papua New Guinea
- 269 JMP (Joint Monitoring Programme) is a Water Supply and Sanitation program formulated by WHO and UNICEF to address the monitoring challenges in the run up to the MDG target year of 2015 and beyond
- 270 Original values in US\$, converted in PGK using the conversion rate of 1PGK=0.39US\$
- 271 WHO/UNICEF (2012) JMP (Joint Monitoring Programme) for Water Supply and Sanitation, Papua New Guinea,
- 272 The United Nations World Water Development Report 2015, available at <http://unesdoc.unesco.org/images/0023/002318/231823E.pdf>
- 273 The context, Jibu, available at: <http://jibuco.com/the-context/>
- 274 Progress on Drinking Water and Sanitation, UNESCO and WHO, 2014 update, available at: http://www.wssinfo.org/fileadmin/user_upload/resources/JMP_report_2014_webEng.pdf
- 275 Making a difference in Uganda, Water for People
- 276 Work in Rwanda, Wateraid.org
- 277 Randy's Interview with CEO Global, Published on YouTube on 19 February 2013, available at: <https://www.youtube.com/watch?v=uLwrrkU5yCO>
- 278 Randy's Interview with CEO Global, Published on YouTube on 19 February 2013, available at: <https://www.youtube.com/watch?v=uLwrrkU5yCO>
- 279 Mission, Jibu, available at : <http://jibuco.com/mission/>
- 280 Business model, Jibu, available at: <http://jibuco.com/business-model/>

About Intellecap Consulting and Research Practice

Intellecap's Business Consulting and Research Practice area offers strategic advisory services to international development organizations, businesses, and governments that seek to engage with BoP markets. These include market-based strategy solutions, high-quality and comprehensive research, and thought leadership that can be used to facilitate and direct business, investment, and market decisions to create a positive impact for people at the BoP. We combine our business acumen with a deep understanding of development issues to help clients around the world.

- Our expertise in solving strategic challenges across industries and markets enables us to bring a rigorous analytical approach to addressing development issues.
- Our research, independent and commissioned, drives thought leadership and is designed to promote actionable solutions to BOP challenges in Intellecap's Focus Sectors and to function at the enterprise, sector and policy levels.
- Our understanding of the rural and low income consumers drives our ability to address many of the complex challenges when working at the BoP.
- Our ability to drive multi-stakeholder partnerships that involve Corporations, Social Enterprises, Multilateral Agencies and Development Finance Institutions, and Donors enables us to innovate in delivering high impact solutions.

For more information, please contact:

Nisha Dutt,

nisha.dutt@intellecap.com

+91.40.4030.0277

