



PROMOTING SKILL TRANSFER FOR HUMAN CAPACITY DEVELOPMENT IN PAPUA NEW GUINEA

THE ROLE OF EXTERNALLY FINANCED INFRASTRUCTURE PROJECTS

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Contents

FIGURES, TABLES, AND BOXES	iv
FOREWORD	v
ACKNOWLEDGMENTS	vi
SUMMARY	vii
INTRODUCTION	1
UNDERSTANDING THE CHALLENGE—SKILL GAPS AND BARRIERS TO SKILL TRANSFER	2
RECOMMENDATIONS	8
CONCLUSION—OVERCOMING THE SKILL GAPS	15
APPENDIXES	
1 Case Study Data Sheets	16
A. Lae Port Development Project—Phase One	16
B. Road Construction and Maintenance on the Highlands Region	17
C. Bridge Replacement for Improved Rural Access Sector Project	18
D. New Terminal Building for Mount Hagen Airport	20
2 A Sample Report on Training and Human Resource Development	22
3 Papua New Guinea’s Basic Indicators	23
REFERENCES	24

Figures, Tables, and Boxes

FIGURES

A1	Total Workforce Composition in Lae Port Development Project	17
A2	Total Workforce in Highlands Region's Road Projects by Occupation	18
A3	Foreign and Domestic Workers in Highlands Region's Road Projects by Occupation	18
A4	Foreign and Domestic Workers in Central Province's Bridge Projects by Occupation	19
A5	Distribution of Foreign and Domestic Workers in West New Britain's Bridge Projects by Occupation	20
A6	Total Workforce Composition and Breakdown of Domestic Workers by Occupation	21

TABLES

1	Distribution of Citizen Population 15 Years and Over in Major Occupation Groups, Total Formal Sector and Construction Compared, Papua New Guinea 2011 Census	3
2	Number and Distribution of Citizens 15 Years and Over with Post-School Qualifications, Formal Sector and Construction, Papua New Guinea 2011 Census	4
3	The Top 15 Construction-Related Occupations Listed in Work Permits Approved in 2013 and 2014	10

BOXES

1	Method 1 in Sourcing Skills—Minimizing Costs	5
2	Method 2 in Sourcing Skills—Minimizing Operational Risks	6

Foreword

This paper considers the nature and extent of skill gaps in Papua New Guinea’s construction industry. It examines how skill gaps affect broader labor market efficiency and advances recommendations on how publicly funded infrastructure projects can be leveraged to narrow the skill gaps and make economic development more inclusive.

The challenges of underperforming labor markets, persistent skill shortages, and lack of formal employment opportunities exist in a number of the Pacific island countries. These challenges affect a wide range of stakeholders, including domestic populations, development organizations, and the private sector. Addressing skill gaps, particularly in the construction industry, stands to generate considerable value for each of these groups, at minimal costs, and over a relatively short period of time. Regional cooperation in implementing these recommendations would strengthen and extend the scope of their outcomes, ultimately leading to more inclusive economic growth across the Pacific.

Although the conclusions of this study are drawn from country-specific data, and case studies are based on projects financed by the Asian Development Bank, the study’s recommendations have broad potential applicability to other Pacific island countries and development partners.

Xianbin Yao

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Summary

Opportunities and Challenges

Amid critical fiscal challenges that led to a dramatic economic slowdown, Papua New Guinea (PNG) still managed to record its 15th consecutive year of growth in 2016. In spite of this, economic growth remains concentrated in a small portion of the population and opportunities for formal employment are scarce.

The majority of PNG's employed workforce form part of the informal sector. These jobs are typically lower paid, are less secure, and provide limited legal protection for workers. In addition, they often fall outside of the national tax benefit system, limiting the government's capacity to provide an adequate level of public services. In 2011, less than 10% of PNG's working-age population held a formal wage job, and although the formal economy is expanding, at current rates it will not be able to meet the need for jobs of PNG's rapidly growing population. Inclusive economic development is constrained by skill shortages in the domestic workforce and limited opportunities to form and transfer skills.



PNG workforce put up rock walls along Mendi-Kandep Road. Of the total local workforce that helped construct the Mendi-Kandep Road in Southern Highlands Province and the Laiagam-Porgera Road in Enga Province, 70% were laborers. Photo credit: ADB.

Missed opportunities are most pronounced in the construction industry, where Papua New Guinea has a lower share of qualified domestic workers than for the formal economy as a whole. In 2013 and 2014, one-half of all foreign work permits were granted for positions in the construction industry, indicating a clear dependence on foreign workers to fill key construction roles. The low share of skilled domestic workers in construction occupations generates both financial and operational inefficiencies for construction firms. Conversely, the skill gaps in PNG's construction industry reduce the potential for infrastructure projects to generate employment opportunities for the local workforce.

The Government of Papua New Guinea's Development Strategic Plan 2010–2030 seeks to extend the benefits of economic growth to the country's most disadvantaged communities, emphasizing improvements to transport and energy infrastructure as key measures for doing so. In line with these priorities, the Asian Development Bank (ADB) increased its investment from \$350 million in 2010 to a portfolio of \$1.4 billion in 2016, with transport and energy projects accounting for the majority of its lending activities. These projects represent considerable opportunities to promote skill transfer and increase the availability of wage jobs for PNG's workforce. However, current policy conditions and tender requirements do not encourage skill transfer between contractors and the domestic workforce, and will not do so if left to market pressure alone.

Enabling people to move from informal to formal sector employment requires investments in developing the capability of workers to become more productive. Creating opportunities for domestic workers to undergo on-the-job training and skill transfer is therefore an important strategy for workers to get the necessary experience that can be applied to other projects or to setting up their own small businesses, enabling them to move into formal sector employment.



At the end of the Mount Hagen Airport's terminal building project, 53% of the PNG workforce were laborers, with only 3% in semiskilled occupations.
Photo credit: ADB.

If leveraged properly, publicly financed infrastructure projects can address two key barriers affecting PNG's labor markets: they can promote skill transfer and increase the availability of wage jobs for the domestic workforce. Bridging skill gaps in the construction industry also stands to address procurement barriers faced by contractors, and add value to donor-funded projects by advancing inclusive economic growth.

Recommendations

The following recommendations seek to promote increased skill transfer to PNG's domestic workforce by creating favorable policy and market conditions to encourage the process. Successful implementation of these recommendations will require participation of several stakeholder groups—namely, policy makers, development partners, contractors, professional associations, and academic institutions across the Pacific.

While the following recommendations are sequenced according to the likely progression of outputs (from short term to long term), steps toward implementing the different recommendations can and should be taken in parallel. A more detailed presentation of these recommendations can be found on pages 8–14 of the present study.

- (i) **Improve the process of workforce data collection, using reports prepared by contract supervisors and work permit documentation.** Currently, there are no requirements to standardize the format in which contractors submit workforce data. The PNG government should specify a standard method for reporting this information, and issue instructions for contract supervisors to assess and report on skill transfer arrangements undertaken during projects. The goal of this recommendation is to improve consistency and accuracy of workforce data. Doing so will support ongoing assessment of labor market performance and strengthen arrangements to promote skill transfer.



Laborers worked on paving asphalt on Angabanga Bridge along the Hiritano Highway in PNG's Central Province.
Photo credit: ADB.

- (ii) **Identify specific skills to be transferred at each level by developing skill transfer arrangements that correspond to different skill levels.** Successful skill transfer will require distinct approaches to training various skill levels. It is proposed that skill transfer arrangements be organized into the following four categories, which can be used to further identify specific construction skills to be transferred:
- (a) *Basic skills.* Most appropriate for casual day laborers. Opportunities for skill transfer may include short training sessions covering construction basics, such as use of battery-powered hand tools and other equipment.
 - (b) *Trade and technical skills.* Most appropriate for workers who have already received some occupation-based training, either formally or informally, to enable them—through on- and off-the-job learning—to reach designated standards of occupational competency.
 - (c) *Managerial and professional skills.* Most appropriate for workers with formal education in professional occupations—such as graduate engineers and architects—who require on-the-job experience and training to qualify for membership in professional associations (see recommendation vi).
 - (d) *Organization-wide skills.* Most appropriate for local firms. Capacity building could focus on enhancing the firm’s ability to manage complex projects while ensuring quality standards and workplace health and safety.
- (iii) **Design contractual obligations to promote skill transfer.** Donor-financed projects should include skill transfer as a contractual requirement for construction firms. Consideration should be given, on a project-by-project basis, as to whether the obligation should be framed as a project input, output, or outcome. Framed as an input, all contractors would be obligated to provide a particular type of skill transfer opportunity, such as a given number of training opportunities for a minimum number of workers. Framed as an output, contract requirements would be designed to focus on providing training in specific skills. Framed as an outcome, contractors would be required to provide training in specific skills to an externally assessed competency standard. Each of these approaches has strengths and challenges associated with it, and detailed consideration of each is provided on pages 9–11.



PNG workforce installed beams in the new port terminal in Lae. Nearly 97% of the workforce were laborers.
Photo credit: ADB.

- (iv) **Develop framework agreements that provide incentives for contractors to deliver positive social and environmental impacts.** In addition to contractual requirements, positive incentives are also needed to encourage contractors to make these changes. It is suggested that ADB develop a regional framework agreement to encourage and reward contractors who provide positive social and environmental impacts. Creating a structure to highlight good practice and to reward companies that can demonstrate a record of positive social and environmental performance would generate additional stimulus for construction firms to expand their corporate social responsibility effort. Such an agreement would provide the opportunity for construction firms to improve their reputation and thereby increase their chances of winning future tenders.
- (v) **Strengthen government policy and legislation to require firms employing foreign citizens to provide training for the domestic workforce, and to ensure consistent and transparent reporting on this process.** The current work permit regulation requires that companies obtaining work permits for foreigners actively encourage the creation of jobs for, and skill transfer to, the local workforce. However, current legislation requires only a nominal degree of reporting on this process. This reporting is only required after the initial work permit (which lasts up to 3 years) has been awarded. As a result, the legislation lacks the force to ensure that skill transfer takes place from the point at which the work permit is initially issued. A policy statement and corresponding regulation are needed to strengthen the accountability of firms for providing skill transfer opportunities. Policy and legislation should ensure that skill transfer is provided in unison with initial work permit issuance, and that consistent reporting be used to uphold transparency and accountability for this process.
- (vi) **Collaborate with professional associations to encourage continued education for those who have acquired skills.** Infrastructure projects have a limited duration, and as such, are best suited to generate short- to medium-term skill transfer opportunities. Engaging professional associations in the skill transfer process to help provide other skill transfer opportunities will produce more sustainable results. Apprenticeship programs, through collaboration with industry associations, also provide options to encourage ongoing skill transfer.

Introduction

This paper presents policy makers and development partners with options to address skill gaps in Papua New Guinea's (PNG) construction industry by tapping the substantial skill formation capacity of foreign firms.¹ The report analyzes a set of case studies of different contractors implementing six contracts awarded under four Asian Development Bank-financed infrastructure projects in PNG; the projects were the Lae Port Development Project, the Highlands Region Road Improvement Investment Program, the Bridge Replacement for Improved Rural Access Sector Project, and the Civil Aviation Development Investment Program.

The study highlights challenges and corresponding recommendations for addressing the skill gaps, and concludes with a discussion of the implications of successfully implementing the recommendations and how they may be transferred to other Pacific island countries.

¹ Country economic indicators for PNG are in Appendix 3.

Understanding the Challenge— Skill Gaps and Barriers to Skill Transfer

Pacific countries lack an adequate pool of workers with construction skills and rely on large firms to import skilled workers for large infrastructure projects. Papua New Guinea (PNG), in particular, has large domestic skill shortages and skill gaps in its construction workforce, while at the same time, opportunities for formal employment are scarce. Although publicly funded infrastructure projects have the potential to increase the availability of wage jobs, current tender requirements, paired with a limited pool of skilled construction workers, lead to missed opportunities to match domestic workers with contractors.

Increasing the substitution of foreign workers with domestic workers will require more opportunities for the transfer of skills to PNG's workforce. Current work permit regulations and the lack of incentives for contractors to train workers mean adequate skill transfer does not take place, and the potential for substituting domestic for foreign workers is not realized. These inefficiencies negatively affect contractors and domestic workers, and limit the potential of publicly funded infrastructure projects to support inclusive economic growth.

Skill Gaps in Papua New Guinea —Evidence and Consequences

With the working-age population estimated to grow by 2.2 million people between 2014 and 2030, PNG faces a large and growing challenge to create sufficient work opportunities for its people.² Infrastructure projects in PNG—with their significant size and demand for labor—can provide much-needed employment opportunities for its population. However, the domestic workforce lacks the necessary skills and qualifications to secure key construction jobs, which is evidenced by the following:

- (i) **The share of professionals and technicians in the construction sector is lower compared with the formal sector as a whole—2.8% and 0.7% compared with 21.2% and 7.9%, respectively (Table 1).** This suggests that there is a smaller pool of qualified skilled workers in the construction industry than in the formal economy as a whole, and that this sector experiences greater difficulty in matching the domestic workforce with appropriate positions.

² United Nations. 2015. World Population Prospects: 2015 Revision. <https://esa.un.org/unpd/wpp/>

Table 1: Distribution of Citizen Population 15 Years and Over in Major Occupation Groups, Total Formal Sector and Construction Compared, Papua New Guinea 2011 Census (%)

Major Occupations	Formal Sector	Construction
11–13 Legislators and senior officials and managers	4.8	1.3
21–24 Professionals	21.2	2.8
31–34 Technicians and associate professionals	7.9	0.7
41–42 Office clerks	6.8	0.9
51–52 Service workers, shop and market sales workers	10.0	0.3
61–62 Agricultural animal and fishery workers	3.9	0.1
71–74 Craft and building trade workers	16.1	78.9
81–83 Plant and machine operators and assemblers	8.3	6.3
91–93 Elementary occupations	20.0	8.4
Not stated	1.0	0.3
Number	360,732	38,547

Note: Special tabulation: occupation by industry, formal sector.

Source: ADB. 2016. *Promoting Skills Formation through Public Investment Projects: Case Studies from ADB-Financed Infrastructure Projects in Papua New Guinea*. Table A2.1. Technical assistance consultant's report. Manila.

- (ii) **Of the total number of skilled jobholders in PNG's construction industry, the proportion holding a post-secondary qualification is lower than that of skilled jobholders in the formal economy as a whole—27% compared with 35% (Table 2).** The proportion of jobholders with a post-school qualification provides a useful measure of the education required for many occupations in a modern economy. The comparably smaller percentage of skilled workers with post-secondary qualifications shows there is a smaller skills pool in PNG's construction industry.
- (iii) **The 2011 census shows that mid-level skills occupations in PNG's construction industry have few domestic jobholders (Table 2).** In addition, one-half of the total number of work permits issued in 2013 and 2014 were granted for positions in the construction sector. These numbers indicate a high dependence on foreign workers to fill key construction trades.

Failure to address skill gaps in PNG's construction industry presents two ongoing sources of inefficiency. First, contractors will continue to face difficulty finding local qualified skilled workers to fill key construction roles. Second, even if more positions become available, the number of PNG citizens employed in these roles will not increase unless the pool of available skills can be enhanced to match contractor needs. A greater number of opportunities to transfer skills to the domestic workforce are needed to bridge the skill gaps and lessen these inefficiencies.

Table 2: Number and Distribution of Citizens 15 Years and Over with Post-School Qualifications, Formal Sector and Construction, Papua New Guinea 2011 Census

Type of Post-School Qualification	Formal Sector		Construction	
	No.	%	No.	%
With Qualification	124,789	35	10,420	27
Teachers college	37,138	10	107	0
University degree	19,795	5	911	2
Business and secretarial college	13,907	4	359	1
University/Public administration college	9,549	3	360	1
Other miscellaneous	9,182	3	489	1
Technical college	8,995	2	2,180	6
Vocational college	8,567	2	4,087	11
Health college	7,484	2	23	0
Tradesman/Apprenticeship	4,929	1	1,808	5
Protective qualification	3,484	1	63	0
Not stated	1,759	0	33	0
School Attendance	235,943	65	28,127	73
Attended school	193,148	54	24,007	62
Never attended school	42,795	12	4,120	11
Total Number	360,732		38,547	

Notes: Special tabulation: wage jobs by occupation (2 digits) and post-school qualifications. Percentages may not total 100% because of rounding.

Source: ADB. 2016. *Promoting Skills Formation through Public Investment Projects: Case Studies from ADB-Financed Infrastructure Projects in Papua New Guinea*. Table A2.2. Technical assistance consultant's report. Manila.

Barriers to Skill Transfer

The persistence of skill gaps in PNG's construction industry is due, in part, to a limited number of opportunities for domestic workers to develop key construction skills. Foreign construction firms are reluctant, despite skill shortages and gaps in the skills of workers, to invest in training their existing PNG workforce. This is due to the limited duration of projects, and a desire to avoid extra costs not covered in their contracts. Another common concern is the risk that other construction firms may "poach" workers if they do invest time and resources in training them.

The following four barriers to skill transfer were identified during the fieldwork carried out for this study.

- (i) **Tender requirements, and corresponding labor sourcing strategies, do not encourage skill transfer.** An ADB document noted that “the limited capacity of privately owned civil works companies jeopardizes project quality and efficiency, with the few construction contractors capable of executing large transport projects often being overcommitted and missing deadlines.”³ In response, ADB has encouraged the entry of strong foreign contractors to implement recent infrastructure projects, with the intention of building competition in the market and strengthening local civil works companies. Corresponding project bid documents have stringent requirements for contractors, but do not specify how local capacity is to be built.
- In bidding for large infrastructure projects, construction firms must show they have sufficient financial, technical, and human resources to meet the project specifications defined in each set of bid documents. With respect to human resources, tenders require construction firms to have their own core technical and supervisory workforce available for the project. However, the tender requirements do not specify the country of origin for workers by occupation, nor do they require that contractors provide opportunities for skill transfer.

The six cases prepared for this study uncovered two broad sourcing strategies used by contractors implementing large-scale projects in PNG.⁴ The first of these methods focuses on minimizing costs through the use of local workers, while the second seeks to minimize operational risks during project implementation as discussed in Boxes 1 and 2. Neither strategy encourages formal skill transfer to PNG’s workforce.

Box 1: Method 1 in Sourcing Skills—Minimizing Costs

The high cost of importing foreign labor encourages companies with an established presence in Papua New Guinea to source the majority of their skilled workforce nationally, employing only a small number of highly skilled professionals from high-income countries, and some workers from middle-income countries. Workers for positions requiring limited to no experience are normally sourced from communities near the worksite.

Contractors with a longer presence in the country (and a better-established local network) build up their own core workforce over time, and are able to employ mid- and high-level skilled workers from the domestic workforce; doing so significantly reduces costs. In this approach, skill transfer between foreign and domestic workers—if it takes place at all—is informal. Although opportunities for skill transfer are limited, this approach maximizes the number of skilled domestic workers, and provides opportunities for formalizing skill transfer arrangements in the future, particularly if professional and industry associations can be engaged in the process.

Source: Author.

³ ADB. 2015. *Asian Development Bank and Papua New Guinea Fact Sheet*. April. Manila.

⁴ Summaries of the case studies are in Appendix 1.

Box 2: Method 2 in Sourcing Skills—Minimizing Operational Risks

For companies implementing their first projects in Papua New Guinea, limiting risks to project success is their central concern. Lack of a network and familiarity with the local workforce encourages newcomers to Papua New Guinea to source the majority of mid- and high-level occupations from the contractor's country of origin, or from high-income countries. As in Method 1, low-skilled workers are sourced from communities adjacent to the construction site.

Although this method is more costly, it reduces the uncertainty of outcomes. This, in turn, mitigates long-term reputational risks to the firm, which could result from unsatisfactory implementation. For contractors that lack a local network and trusted domestic workforce, minimizing the number of skilled Papua New Guinea workers helps mitigate operational risks, as language barriers increase the likelihood of accidents on worksites.

This method, however, provides little to no opportunities for skill transfer in mid- to high-level skilled occupations, because the majority of workers are sourced from abroad. The high transaction cost for a firm to establish a presence in Papua New Guinea may provide a stimulus for contractors to develop an ongoing presence and continue bidding on local projects. This may encourage adoption of Method 1, provided the firm can establish a trusted network of workers over time.

Source: Author.

- (ii) **Current market conditions will not naturally lead to domestic skill formation opportunities for the local workforce.** Although a company's extent of experience in PNG may affect the number of local workers it employs, neither of these sourcing methods will lead to adequate levels of formal skill transfer, if left to market forces alone. This is evidenced both by the current limitations on the number of skill transfer opportunities, and by the reluctance of contractors to provide training. More incentives and regulation are needed to encourage construction companies to provide adequate skill transfer arrangements, and in turn to substitute skilled domestic workers for foreign ones.
- (iii) **Current work permit regulations lack the force to achieve the skill transfer goals outlined in the relevant legislation.** Given PNG's skill shortages, the government permits the entry of foreign workers under a work permit scheme to fill positions on a temporary basis. One-half of the total number of work permits approved in 2013 and 2014 were for positions in the construction sector, and 20% of the total number of work permits issued were for high-level skill positions in the construction industry.⁵ Evidence from the case studies suggests that some foreign workers perform work at lower skill levels than implied by the skill profile of occupations indicated in the approved work permits data.

⁵ The large percentage of work permits granted for high-level skill occupations is important to note, and may indicate future opportunities for skill transfer at this level. However, the technical assistance consultant's report and the present study focus on mid-level skill transfer in the construction industry because it is less costly and time consuming to provide skill transfer at the mid-level skill level. As a result, this is the most viable option to address in the short to medium term.

The country's *Employment of Non-Citizens Act 2007* states that one purpose of the work permit system is to contribute to the “creation of employment, training and skills-acquisition opportunities for all Papua New Guineans.”⁶ However, neither the legislation nor the supporting regulations provide clear instructions on how employers should implement and report on skill transfer arrangements, other than indirectly, when an employer seeks to renew a work permit.⁷ A review of work permit data suggests that stronger regulation is needed to ensure accountability of foreign contractors for providing the skill transfer opportunities required by the stated objectives of the work permit legislation.

The lack of a consistent reporting and monitoring protocol allows contractors to provide only a nominal degree of reporting on skill transfer arrangements. This leads to difficulty in monitoring and evaluating training arrangements. Existing legislation will require more stringent regulations to ensure that employers provide skill transfer arrangements, and that they report on them in a consistent and transparent way.

- (iv) **Development partners miss opportunities to extend the value of infrastructure projects.** In a review of its *Papua New Guinea Country Partnership Strategy 2011–2015*, ADB notes that increasing support for “social sector initiatives, which leverage the implementation structures of larger infrastructure operations, can contribute to a larger impact of ADB operations on inclusive growth...”⁸ Although foreign contractors have been successful in implementing publicly financed infrastructure projects, opportunities to transfer key construction skills have been largely missed. Skill gaps in PNG's construction industry limit the potential for publicly financed infrastructure projects to generate additional value—such as more inclusive economic growth—for the communities in which they operate.

⁶ PNG Government. 2007. *Employment of Non-Citizens Act 2007*. Part I: Purpose of Act.

⁷ PNG Government. 2007. *Employment of Non-Citizens Act 2007*. Part VII: Renewal of Work Permits.

⁸ ADB. 2015. *Country Partnership Strategy: Papua New Guinea 2016–2020*. Manila.

Recommendations

Review of work permit and census data indicates that the highest-yield opportunity for promoting skill transfer—and corresponding greater substitution of domestic for foreign workers—in the short and medium terms exists for mid-level skill occupations in the construction sector in Papua New Guinea (PNG).

Analysis of the current barriers to labor market efficiency suggest that improved collection and use of data, paired with changes to contractual and regulatory structures, are the most immediate and cost-effective ways of narrowing skill gaps in PNG's construction industry.

The following recommendations outline six steps that can be taken to reduce current inefficiencies, encourage skill transfer, and promote the sustainability of intended results. Successful implementation will require the prior feedback and ongoing participation of multiple stakeholder groups to ensure that outcomes complement and support each other.

Recommendation 1

Improve the process of workforce data collection, using reports prepared by contract supervisors and work permit documentation.

Consistent and accurate data is essential to assessing skill gaps, identifying specific training needs, and providing effective monitoring and evaluating of the outcomes of skill transfer arrangements. At present, contractors provide supervising engineers with monthly progress reports that contain valuable workforce data, such as the number of workers by occupation and nationality. However, neither the PNG government nor ADB requires that this information be submitted in a standard template. As a result, the format for presenting this information varies by project, and in some cases, within a project, over time.

To increase the consistency of data, it is suggested that the government specifies for all construction contracts a format for the monthly collection of simple workforce data. This can be instituted through the existing contract processes. Specific points of information to be collected should include the job performed, nationality, gender, and the type of employment contract. Implementing this recommendation will ensure consistent reporting, which in turn will support the assessment of skill shortages and more effective evaluation of skill transfer arrangements.

This recommendation can be implemented in the short term, and should be established as quickly as possible to ensure that the results of subsequent recommendations can be monitored effectively. Although the PNG government is the primary stakeholder for this recommendation, consultation with development partners, supervising engineers, and construction firms will be useful in establishing the specifications for the reporting template.

Recommendation 2

Identify specific skills to be transferred at each level by developing skill transfer arrangements that correspond to different skill levels.

To narrow the skill gaps between domestic and foreign workers, it is important to identify those skills that are most in demand, and least available in the domestic workforce. These skills, in turn, should be the focus of skill transfer arrangements. Different training opportunities and approaches will be relevant to different skill groups. To identify the most relevant skills for each level of the value chain, as well as methods for improving skill transfer to each group, it is suggested that research and corresponding arrangements be organized according to the following categories:

- (i) **Basic skills.** Most appropriate for casual day laborers. Opportunities for skill transfer may include short training sessions covering construction basics, such as use of battery-powered hand tools and other equipment.
- (ii) **Trade and technical skills.** Most appropriate for workers who have already received some occupation-based skills training, either formally or informally, to enable them—through on- and off-the-job learning—to reach designated standards of occupational competency. Some examples of corresponding occupations include carpenters, electricians, masons, mechanics, welders, and equipment operators.
- (iii) **Managerial and professional skills.** Most appropriate for workers with formal education in specific professions, such as graduate engineers and architects, who require on-the-job experience and training to qualify for membership in professional associations.
- (iv) **Organization-wide skills.** Most appropriate for local firms. Capacity building could focus on enhancing the firm's ability to manage complex projects while ensuring quality standards and workplace health and safety.

This recommendation can be implemented in the short term, and is of particular relevance to parties preparing tenders for infrastructure projects. Designation of skill transfer arrangements can be made using up-to-date information based on a revised and more accurate listing of occupations in approved work permits (Table 3).⁹ Successful identification of requisite skills will strengthen the value of the corresponding skill transfer opportunities for PNG's labor markets.

Recommendation 3

Design contractual obligations to promote skill transfer.

Bid documents should expressly require that contractors implementing publicly financed infrastructure projects provide opportunities for skill formation and transfer to the domestic workforce. It is proposed that such obligations be placed in contracts in one of three ways—as a project input, an output, or an outcome. Contract design should consider the following advantages and disadvantages associated with each method to determine which method is most appropriate on a case-by-case basis.

⁹ A recent review of this information is also provided in ADB. 2016. *Promoting Skills Formation through Public Investment Projects: Case Studies from ADB-Financed Infrastructure Projects in Papua New Guinea*. Technical assistance consultant's report. Manila.

Table 3: The Top 15 Construction-Related Occupations Listed in Work Permits Approved in 2013 and 2014 (Number of work permits issued)

Occupations	Number
Technicians and trade coordinators and supervisors	5,700
Specialist heavy machinery mechanic or technician	2,337
Steel fixer	1,743
Scaffolder	1,022
Structural steel erector	849
Construction rigger	722
Metal fabricator	714
Building and construction manager	604
Crane, hoist, or lift operator (Special)	418
Professional builder	345
Electrician	332
Fitter (General)	275
Occupational health and safety adviser	269
Safety inspector	258
Welder	209
Total	15,797

Note: Papua New Guinea work permits approved by occupation in 2013 and 2014.

Source: ADB. 2016. *Promoting Skills Formation through Public Investment Projects: Case Studies from ADB-Financed Infrastructure Projects in Papua New Guinea*. Table 3. Technical assistance consultant's report. Manila.

- (i) **Project input.** Including skill transfer obligations as a project input can be accomplished by requiring a contractor to provide a predetermined skill transfer activity as a component of the project. Skill transfer can be framed as a project input by determining a specific number of training opportunities based on factors such as size of the project or number of foreign workers. The number of training opportunities would then be included in the bill of quantities. For example, the specified input could be a certain number of training sessions for a given number of people.
This option requires little modification to existing contracts, and can therefore be implemented with little to no cost, in the short term. One potential disadvantage of this approach, however, is that it does not focus on the content of the training—such as the actual skills that workers develop during training—and is therefore not suitable for projects where long-term, measurable outcomes are considered important.
- (ii) **Project output.** To focus on longer-term results, skill transfer can be built into contracts as a desired output. One way of doing so is to identify a specific set of skills to be transferred to a group of workers. This method may require more time and consultation in designing the project, but may also lead to more robust results by addressing specific skill shortages in more detail.

To focus on the content of training as an output, contracts could provide for a separate skills development budget associated with the specified requirements. Provision for paying these costs can be written into contracts as “provisional sums.”¹⁰ The costs of meeting the skill transfer requirements are worked out once the details are known, after the contract has started. The advantage of this mechanism is that costs of the training arrangements are not subject to competitive tender.

- (iii) **Project outcome.** Framing a contract requirement for skill transfer as an outcome means providing training in specific skills to a recognized quality standard. One way a training outcome can be expressed is to require trainees to meet a set of international or national competency standards related to a recognized qualification. The success of the project’s outcome can subsequently be assessed by an external evaluator.

The time and costs associated with implementing this recommendation may vary, depending on the contract’s design. Specifying skill transfer as an input involves little extra effort in the preparation of a tender. However, asking a contractor to deliver either an output (in terms of specific types of training) or a performance-based outcome will require a higher level of initial specification and consultation. This extra effort is similar to that required for developing a tender for a build–maintain road contract, which requires mid- and long-term delivery of results. In addition, an outcome-focused approach will require that structures be set in place to monitor results; doing so will require additional time and resources. While the project input approach can be implemented in the short term, contracts focusing on outputs and outcomes will require a higher level of consultation, and are more appropriate for contracts with longer implementation timelines. The advantage of the former is that it is a low-cost option that can be achieved in the short term; the advantage of the latter is the likelihood of more robust results that can be tailored to domestic workforce needs and evaluated.

Recommendation 4

Develop framework agreements that provide incentives for contractors to deliver positive social and environmental impacts.

Positive incentives are needed to encourage construction firms to go beyond baseline skill transfer commitments made at the contractual level. To encourage more robust skill transfer, it is recommended that a regional framework agreement be established to highlight good corporate practice and to reward companies for delivering positive social and environmental impacts.

One major incentive for international firms to show they are good corporate citizens is the prospect of improving their chances of winning future tenders. Development partners and governments in the Pacific region represent a major client group for international construction firms. Collectively they can leverage this weight to encourage contractors to deliver greater social and environmental impacts. Measuring and publicly recognizing good performance under a framework agreement is one way for project financiers to provide nonmonetary incentives for international construction firms. An organizing principle for such an agreement could be the concept of “creating shared value.” This corporate strategy involves going beyond the practice of corporate

¹⁰ The term “provisional sum” describes a mutually agreed upon cost estimate within a contract, which can subsequently be modified. Provisional sums are used in situations where aspects of a contractor’s work are difficult to price in advance of implementation. This arrangement is made mutually, between two or more parties to the contract, prior to signing.

social responsibility, which seeks to merely minimize harm to society and the company. The creating shared value approach asks enterprises to seek opportunities to solve social problems as a means of strengthening their reputation and increasing profits.¹¹

It is proposed that development partners, national governments, and contractors collaborate to develop a regional framework agreement. This agreement would be based on a set of social and environment impact objectives, driven by the concept of encouraging enterprises to create shared value. One of the objectives should be skill transfer, based on a corporate commitment to building up the domestic skills pool of the countries in which they work; this may result in more inclusive economic growth and more competent local enterprises.

The agreement should be open to all companies wishing to tender for infrastructure projects in the Pacific, but it should not be a precondition for eligibility to submit a tender. Tender evaluation criteria should also be expanded to include evidence of corporate commitment and results in meeting specified social and environmental objectives.

Designing and implementing this framework agreement will require extensive planning and consultation with a diverse range of stakeholders. As a result, it may require a higher degree of inputs and should be established as a mid-term goal. Primary delays are likely to result from consultation between development partners and government ministries. However, consultations with private sector firms may involve limited costs and time for development partners. Preliminary actions to establish the framework agreement could involve holding a conference to discuss objectives and how best to implement the agreement with key stakeholders such as development partners and companies that have tendered for publicly financed projects in the past. Using existing multistakeholder planning and communication platforms, such as the Pacific Region Infrastructure Facility (PRIF), may streamline this process and limit the amount of resources required for successful implementation.

Recommendation 5

National policy and legislation should be strengthened to require firms employing foreign citizens to provide training for the domestic workforce and to report on the process in a consistent and transparent way.

Current work permit legislation requires that companies employing foreign workers provide opportunities to increase the skill level and number of jobs available for the domestic workforce. However, corresponding regulation lacks the force to ensure that these outcomes are delivered. A policy statement and legislative and regulatory changes are needed to ensure that employers provide skill transfer opportunities from the point at which the work permit is first issued. Accomplishing this will require that their obligations to provide and report on training opportunities be made explicit and that external verification be used to support accountability.

¹¹ Porter, M., and M. Kramer. 2011. Creating Shared Value. *Harvard Business Review*. January–February. See also Oil Search Limited. 2015. *Shared Value Overview for PNG*; and Palladium. 2015. *Positive Impact Series: The Impact Economy—Creating Shared Value for Social Impact and Financial Return*, 10 December. This seminar featured speakers from five prominent firms in Papua New Guinea and discussed ways for private sector companies to achieve positive social impacts while continuing to be profitable. One of the methods discussed was the formation of coalitions to address complex social challenges. <http://thepalladiumgroup.com/knowledge/palladium-hosts-shared-value-event-png>

Policy and legislative changes can make use of existing work permit legislation and processes to increase the accountability of firms employing foreign workers. Currently, the only time at which reporting on skill transfer arrangements is required is during the work permit renewal process.¹² Reporting obligations should be expanded to require that firms submit a planned skill transfer arrangement when initially applying for the work permit. Legislation should also require that follow-up reports be submitted to a third party to verify that skill transfer outcomes are achieved.

Strengthening work permit regulations can significantly increase the number and quality of skill transfer opportunities available to the domestic workforce. However, this recommendation is likely to face resistance from employers who may have become dependent on foreign workers. This can be addressed by the government making it clear that continued use of foreign workers in specified mid-level skill occupations may result in having their work permit applications refused. The time and costs associated with government consultations necessary for these changes make this recommendation more suitable for the medium term.

Recommendation 6

Collaborate with professional and industry associations to encourage continued education beyond the life of a project for those who have acquired skills.

Construction contracts are of limited duration, and specific opportunities for skill transfer within a contract's duration may be more restricted still. As such, they can provide only short- to mid-term skill transfer opportunities. Extending results and encouraging ongoing development of the domestic workforce falls beyond the scope of international firms alone.

Professional associations in PNG have a key role to play as intermediaries in supporting professionals and technicians in the construction industry to make the most of the skill transfer opportunities available to them. This applies particularly to engineers and other professional graduates that require post-graduation on-the-job experience and professional mentoring to meet registration requirements in their respective professional associations.

There is considerable potential for closer involvement of professional associations related to the construction industry. Relevant professional associations in PNG include the Papua New Guinea Institute of Architects, the Papua New Guinea Institute of Builders, the Institution of Engineers Papua New Guinea, the Association of Surveyors of Papua New Guinea, and the Papua New Guinea Human Resource Institute. Making use of the continuing professional development programs of relevant professional institutes can increase the longer-term potential for skills development and build the post-school qualification rates of the domestic workforce.

¹² See Appendix 2 for a sample report on training and human resource development.

The potential of these institutions to provide ongoing skill transfer opportunities is constrained by lack of financial resources. The funds to provide additional places in the continuing professional development programs could be sourced from a fee set as a proportion of the value of a construction contract above a certain threshold, and paid to professional associations and skills training providers for specific professional training programs.

This recommendation is most viable in the medium term because it will require consultations to work out the best ways of supporting skill transfer arrangements in the construction sector. Funding arrangements also need to be worked out by national governments and development partners, and consultations conducted to reach agreement on how best to source and disburse funds. Although this recommendation focuses on mid- to long-term results, consultation between professional and industry associations as well as other key stakeholders can be initiated in the short to mid term.

Conclusion— Overcoming the Skill Gap

The argument for implementing these recommendations is simple: Skill gaps in the construction industry in Papua New Guinea (PNG) result in missed opportunities for the domestic workforce, construction firms, and development partners. Successfully implementing these recommendations will narrow the skill gaps—creating added value for each stakeholder group, at minimal costs, and over a short period of time.

Although this study focuses on PNG's construction industry, the recommendations are applicable to a wide range of Pacific island countries, where shortages of formal employment opportunities, persistent skill gaps, and an increasing number of publicly funded infrastructure projects employing foreign workers produce similar labor market conditions and corresponding opportunities. Supporting the transition of domestic workers from informal to formal employment provides opportunities for them to increase wages and job security.

While some of the recommendations outlined above refer to country-specific factors, overall implementation of the changes can be strengthened by adopting a regional approach. In particular, the implementation of a regional framework agreement would have greater impact if a broader range of national governments and development partners are involved. Introducing these recommendations into regional development efforts can leverage existing funding structures to support inclusive growth, and develop a more equitable and prosperous Pacific economy.

Case Study Data Sheets

Key findings and recommendations in this study are based on information collected from six case studies covering four infrastructure projects financed by the Asian Development Bank (ADB) in Papua New Guinea (PNG), as well as work permit and census data. The six case studies covered are

- (i) Lae Port Development Project—Phase One;
- (ii–iii) Highlands Region Road Improvement Investment Program (two case studies covering Laiagam–Porgera Road and Mendi–Kandep Road);
- (iv–v) Bridge Replacement for Improved Rural Access Sector Project (two case studies covering the Central Province and West New Britain); and
- (vi) Civil Aviation Development Investment Program—New terminal building and associated works for Mount Hagen Airport.

The focus of the case studies was to understand the sourcing practices used by contractors to meet workforce needs at various skill levels. The case studies are based on quantitative data collected from on-site workforce records, and qualitative information collected is based on interviews with key management staff. The following data sheets provide brief overviews of each case study and relevant workforce information.

A. Lae Port Development Project—Phase One

This was the largest project ever supported by ADB in the Pacific. Its objective was to expand the cargo handling capacity of Lae Port—the largest port in PNG and a critical asset for the nation’s export-driven economy. The project involved construction of a range of new facilities including buildings, storage areas, and roads. Other work included dredging a tidal basin; building a multipurpose berth; building a new port terminal; and providing drainage, water, electricity, and sewerage services.



The new port was designed to increase Lae’s cargo handling capacity. A daily average of 600 workers constructed this port.
Photo credit: ADB.

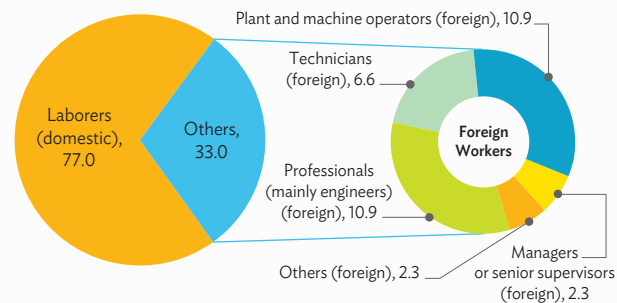
PROJECT INFORMATION:

Total financing: \$200 million

Workforce size: Daily average of 600 workers

There were 140 foreign workers, all of whom were sourced from the contractor's home country, the People's Republic of China. They worked in the following broad occupation groups: professionals, mainly engineers (33%); technicians (20%); plant and machine operators (33%); and managers or senior supervisors (7%). By contrast, nearly all (97%) of the PNG workforce were employed as laborers.

Figure A1: Total Workforce Composition in Lae Port Development Project (%)



Source: Author.

B. Road Construction and Maintenance on the Highlands Region

This project formed part of the Highlands Region Road Improvement Investment Program, which helps PNG build and manage a sustainable road system, covering approximately 1,400 kilometers (km) across the five provinces of the remote Highlands Region. The two case studies are based on projects implemented by the same construction company, covering two road improvement contracts. The workforce information for the two contracts has been combined for analysis purposes to give a better picture of the skills profile of a major road construction project. Main tasks under this project were to rehabilitate and maintain the 65 km Laiagam–Porgera Road in Enga Province and the 50 km Mendi–Kandep Road in Southern Highlands Province.



The Mendi–Kandep Road in Southern Highlands Province is one of two roads rehabilitated in the Highlands Region; the other is the Laiagam–Porgera Road in Enga Province. Almost 600 people worked on these two road projects.

Photo credit: ADB.

PROJECT INFORMATION:

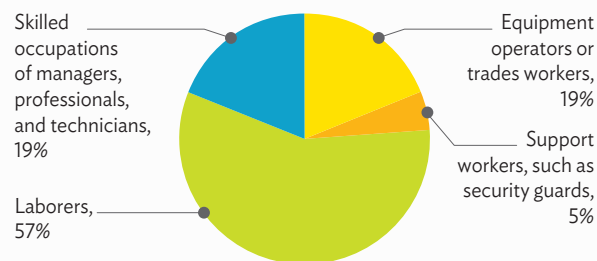
Total financing: \$109 million

Workforce size: 589 (over project life cycle)

The overall skills profile for combined road construction projects shows that 19% of workers were working in the skilled occupations of managers, professionals, and technicians; 19% were equipment operators or trades workers; 5% were support workers, such as security guards; and 57% of the workforce were laborers. This skills profile, however, differs greatly by a worker's country of origin. Three-quarters (75%) of the workforce from the contractor's country of origin, the People's Republic of China, were in the skilled occupations of managers, professionals, and technicians; 11% were trades workers; and 7% were equipment operators.

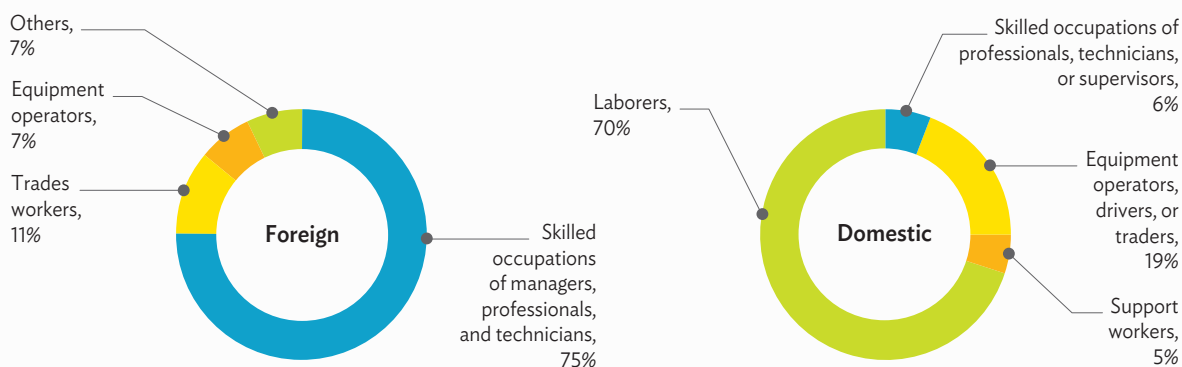
By contrast, only 6% of the PNG workers were in the skilled occupations of professionals, technicians, or supervisors; 19% were equipment operators, drivers, or trades workers; 5% were support workers, mostly security guards; and 70% of the PNG workforce were laborers.

Figure A2: Total Workforce in Highlands Region's Road Projects by Occupation (%)



Source: Author.

Figure A3: Foreign and Domestic Workers in Highlands Region's Road Projects by Occupation (%)



Source: Author.

C. Bridge Replacement for Improved Rural Access Sector Project

This project aims to improve road safety and increase connection of rural areas to basic services. The project is replacing narrow bridges with wider ones, and reassembling functional bridges to increase access to rural centers. Two prime contractors were studied under this project. One was responsible for constructing six bridges along the Magi and Hiritano highways in PNG's Central Province, and the other was responsible for building 12 bridges along the New Britain Highway in the West New Britain Province.



PROJECT INFORMATION:

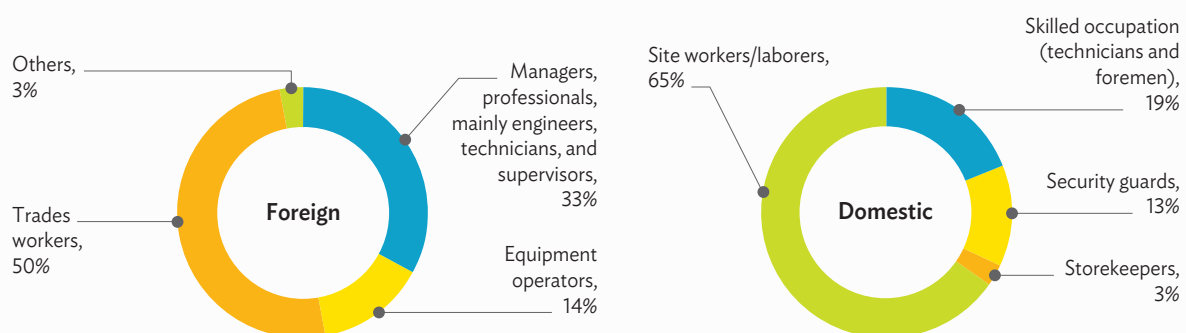
Total financing: \$28 million

1. Central Province

Workforce size: ~426

Foreign workers comprised 58% of the total workforce and 33% were managers, professionals (mainly engineers), technicians, and supervisors; 14% were equipment operators; and 50% were trades workers. The specific trades occupations of the foreign workforce are, in order of their numbers, steel fixers, mechanics, carpenters, welders, riggers, masons, and electricians. For the PNG workforce, 19% are in a skilled occupation (listed as technicians and two foremen); 13% are security guards; 3% are listed as storekeepers; and 65% are defined as site workers or workers in the campsite.

Figure A4: Foreign and Domestic Workers in Central Province's Bridge Projects by Occupation (%)



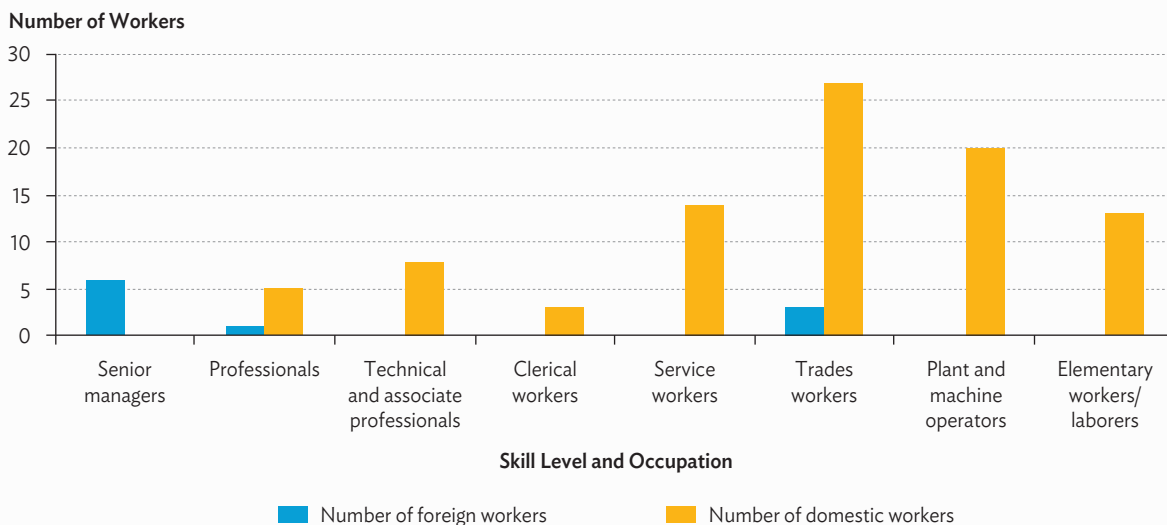
Source: Author.

2. West New Britain

Workforce size: 100 (over project life cycle); 10 foreign workers

Of the 10 foreign workers in the construction company building bridges in West New Britain, seven are senior project managers or professionals and three are trades workers (two boilermakers and a senior heavy diesel fitter). Of the PNG workforce, 16% are mostly professionals and technicians and some are supervisors; 30% of workers are in trade occupations, such as carpenters, heavy diesel fitters, riggers, welders, boilermakers, and mechanics. In addition, 22% of the workforce are equipment operators, such as truck drivers, excavator operators, open crane operators, front-end loader operators, semitrailer operator/driver, batching operator, crusher operator, and grader operator.

Figure A5: Distribution of Foreign and Domestic Workers in West New Britain's Bridge Projects by Occupation (Number)



Source: Author.

D. New Terminal Building for Mount Hagen Airport

PNG has challenging geographic conditions, which make the movement of people and goods difficult, and creates reliance on aviation for tourism and business imports and exports. This project forms part of the larger \$640 million Civil Aviation Development Investment Program (CADIP), financed by ADB over 9 years from 2009 to upgrade facilities at PNG's 22 national airports in order to improve safety and provision of aviation services. The same construction firm that implemented the two Highlands Region's road improvement contracts was also the sole contractor for the Mount Hagen Airport contract.

PROJECT INFORMATION:

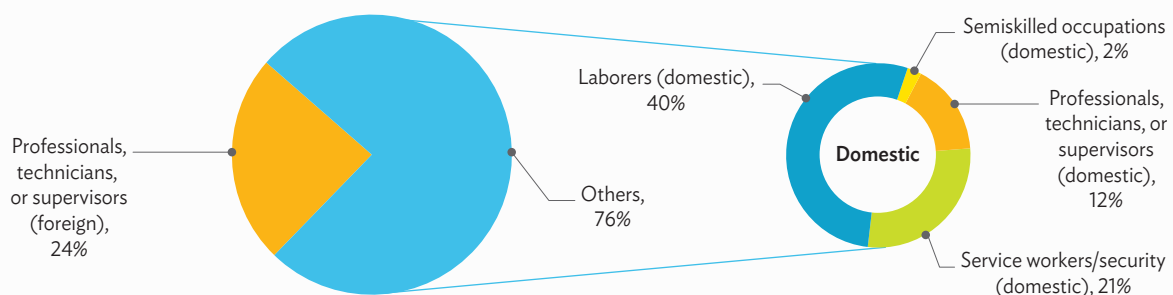
Financing for the New Terminal Building at Mt. Hagen Airport: \$22.13 million

Workforce size: Average of 66



Reflecting the much higher capital requirements of the Mount Hagen Airport project, an average of only 66 workers were required over the life of the project, ranging from 37 workers in the early stages to 76 workers at the end of the project. A sample collected toward the end of this project indicated that 24% of workers were foreigners, and that all of them were professionals, technicians, or supervisors. The PNG workforce was employed under two categories, national staff and local casual workers: 16% were employed as professionals, technicians, or supervisors; 28% as service workers, mainly security guards; 53% as laborers; and only 3% in semiskilled occupations, such as equipment operators or drivers.

Figure A6: Total Workforce Composition and Breakdown of Domestic Workers by Occupation (%)



Source: Author.

A Sample Report on Training and Human Resource Development

**Renewal of Work Permit
Report on Training and Human Resource Development
Prepared by ABC Steel Works**

As a company, we have provided the following training and development opportunities for our Papua New Guinean (PNG) staff:

- We recently sponsored training for 5 apprentices at the Pacific Vocational College. All of these apprentices graduated with a Certificate IV in Engineering which is recognized internationally;
- We conduct monthly in-house training for our PNG staff. All staff receive a “Training Book” which records their attendance. The training is conducted by our expatriate staff who use this opportunity to share their knowledge with their PNG counterparts;
- We have an informal mentoring program within our business. Under this program, our expatriates coach and mentor our younger PNG workers;
- We recently engaged the services of the National AIDS Council Secretariat (NACS) to conduct HIV/AIDS awareness training for all our staff.

We promote the training and development of our PNG staff in a number of other ways and would be happy to provide additional evidence to the Department if necessary.

Signed:
[Anonymous], CEO
July 2010

CEO = Chief Executive Officer.

Source: Adapted from Government of Papua New Guinea. Department of Labour and Industrial Relations. 2009. *Work Permit Guideline: A General Guide to the Foreign Employment System in Papua New Guinea*. Port Moresby, p. 24.

APPENDIX 3

Papua New Guinea's Basic Indicators

Indicator	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016 ^a
Total population (million), ^b as of 1 July	5.5	5.7	5.9	6.0	6.2	6.4	6.6	6.8	7.0	7.3	7.5	7.7	8.0	8.2	8.5
Population growth rate (%)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
GDP at current prices (\$ million) ^c	3,043.3	3,749.6	4,184.2	4,867.7	8,313.1	9,472.3	11,505.8	11,571.9	14,236.9	18,199.5	21,291.0	21,206.3	17,696.9	17,108.0	16,417.4
Agriculture (% of GDP)	38.6	37.4	34.9	34.0	21.2	20.6	21.1	22.6	20.3	19.8	20.1	20.2	23.9	23.3	24.0
Industry (% of GDP)	37.3	39.6	42.1	44.3	36.3	35.1	34.8	30.3	33.6	31.6	28.4	27.0	52.4	53.0	52.2
Construction (% of GDP)	8.7	8.8	9.0	8.4	5.7	5.9	6.0	7.4	9.8	9.6	10.5	9.9	17.0	16.6	16.6
Services (% of GDP)	24.1	23.0	23.0	21.7	42.5	44.3	44.1	47.2	46.0	48.7	51.6	52.8	23.7	23.6	23.8
GDP growth rate (%) at constant 1998 prices	2.0	4.4	0.6	3.9	2.3	7.2	6.6	6.1	7.7	10.7	8.1	5.0	13.3	12.0	2.0
Agriculture (% annual change)	(0.6)	7.7	(0.2)	5.6	1.0	4.2	4.3	0.7	3.2	6.9	(1.6)	1.8	3.3
Industry (% annual change)	2.3	8.3	0.8	4.1	1.5	7.3	7.0	8.1	10.8	13.0	14.6	9.3	28.6
Construction (% annual change)	34.0	5.4	3.2	4.8	12.0	16.0	15.0	19.8	17.1	26.0	24.0	11.9	(6.4)
Services (% annual change)	5.1	(1.5)	(0.7)	3.6	5.6	9.4	9.1	10.7	9.7	12.9	11.2	4.7	4.2
Per capita GDP (\$) ^c	551.6	659.1	713.4	805.0	1,333.5	1,473.7	1,736.3	1,693.7	2,021.1	2,501.5	2,838.5	2,742.2	2,219.6	2,081.2	1,937.1
Inflation rate (%)	11.8	14.7	2.2	1.7	2.3	0.9	10.8	6.9	6.0	4.4	4.6	5.0	5.2	6.0	6.5
Unemployment rate (%)	3.2	3.5	3.1	3.4	3.2	3.7	3.6	3.5	3.6	3.9	3.6	3.4	3.3	3.1	...

... = no data available, () = negative value, GDP = gross domestic product.

^a Provisional/estimate.

^b Midyear estimates are based on intercensal growth rates from 2011 census. An annual growth rate of 3.1% was applied between 2004 and 2016.

^c GDP at current prices are originally in kina; converted into US dollars using the average foreign exchange rate per year.

Source: Asian Development Bank. *Asian Development Outlook Database*.

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Promoting Skill Transfer for Human Capacity Development in Papua New Guinea

The Role of Externally Financed Infrastructure Projects

Pacific countries lack workers with construction skills and rely on large firms to import skilled workers for large infrastructure projects. In Papua New Guinea (PNG), for example, the working-age population is estimated to grow by 2.2 million people between 2014 and 2030. The country faces a growing challenge to create work opportunities for its people. This report examines the correlation between skills gaps and labor market efficiency in PNG's construction industry. Using six case studies, the report proposes actionable recommendations for policy makers, development partners, and other stakeholders. Find out how these recommendations—although based on PNG infrastructure projects funded by the Asian Development Bank—may be used by a broader range of stakeholders to address skills gaps across the Pacific.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

