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Report No: PAD2966

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 29.1 MILLION  
(US\$40 MILLION EQUIVALENT)

TO THE

INDEPENDENT STATE OF PAPUA NEW GUINEA

FOR A

PNG AGRICULTURE COMMERCIALIZATION AND DIVERSIFICATION PROJECT

APRIL 1, 2020

Agriculture and Food Global Practice  
East Asia and Pacific Region

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**CURRENCY EQUIVALENTS**  
(Exchange Rate Effective January 31, 2020)

Currency Unit = PNG Kina (PGK)

PGK 2.39 = US\$1

US\$1.37695 = SDR 1

**FISCAL YEAR**  
January 1 – December 31

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## ABBREVIATIONS AND ACRONYMS

|          |   |
|----------|---|
| ACIAR    | Australian Centre for International Agricultural Research         |
| AMTDP    | Agriculture Medium-Term Development Plan 2020 AMTDP–2022          |
| AROB     | Autonomous Region of Bougainville                                 |
| CB       | Cocoa Board   |
| CERC     | Contingency Emergency Response Component                          |
| CFP      | Country Financing Parameter                                       |
| CIC      | Coffee Industry Corporation                                       |
| CMB      | Copra Marketing Board   |
| CPF      | Country Partnership Framework                                     |
| DA       | Designated Account  |
| DAL      | Department of Agriculture and Livestock                           |
| DFIL     | Disbursement and Financial Information Letter                     |
| DNPM     | Department of National Planning and Monitoring                    |
| DoT      | Department of Treasury  |
| DoW      | Department of Works   |
| DPI      | Department of Primary Industry                                    |
| DPO      | Development Policy Operation                                      |
| EFA      | Economic and Financial Analysis                                   |
| ENB      | East New Britain  |
| ESMF     | Environmental and Social Management Framework                     |
| EU       | European Union  |
| FAO      | Food and Agriculture Organization (of the United Nations)         |
| FER      | Functional Expenditure Review                                     |
| FM       | Financial Management  |
| FMM      | Financial Management Manual                                       |
| FGB      | Food and Grains Board   |
| GAP      | Good Agricultural Practices                                       |
| GBV      | Gender-based Violence   |
| GDP      | Gross Domestic Product  |
| GHG      | Greenhouse Gas  |
| GIS      | Geographic Information System                                     |
| GoPNG    | Government of Papua New Guinea                                    |
| GRM      | Grievance Redress Mechanism                                       |
| GRS      | Grievance Redress Service   |
| HACCP    | Hazard Analysis Critical Control Point                            |
| HIV-AIDS | Human Immunodeficiency Virus – Acquired Immunodeficiency Syndrome |
| ICC      | Industry Coordination Committee                                   |
| ICT      | Information and Communication Technology                          |
| IDA      | International Development Association                             |
| IEC      | Information, Education, Communication                             |
| IFAD     | International Fund for Agricultural Development                   |
| IFC      | International Finance Corporation                                 |
| IFMIS    | Integrated Financial Management Information System                |
| IFR      | Interim Financial Report  |

|          |   |
|----------|---|
| IPCC     | Intergovernmental Panel on Climate Change                     |
| IPF      | Investment Project Financing                                  |
| IPMP     | Integrated Pest Management Plan                               |
| IRR      | Internal Rate of Return                                       |
| KIK      | Kokonas Industri Koporesen                                    |
| LDC      | Livestock Development Corporation                             |
| LP       | Lead Partner  |
| M&E      | Monitoring and Evaluation                                     |
| MFD      | Maximizing Finance for Development                            |
| MG       | Matching Grant  |
| MIS      | Management Information System                                 |
| MoU      | Memorandum of Understanding                                   |
| MSMEs    | Micro, Small, and Medium Enterprises                          |
| MTDP III | Medium-Term Development Plan III                              |
| NARI     | National Agriculture Research Institute                       |
| NPV      | Net Present Value   |
| PACD     | PNG Agriculture Commercialization and Diversification Project |
| PCU      | Project Coordination Unit                                     |
| PDO      | Project Development Objective                                 |
| PFMA     | Public Finances Management Act                                |
| PGK      | Papua New Guinean kina  |
| PGMGG    | Partnerships Grants and Matching Grants Guidelines            |
| PHAMA    | Pacific Horticultural Agriculture Market Access               |
| PIM      | Project Implementation Manual                                 |
| PIP      | Public Investment Program                                     |
| PMU      | Project Management Unit                                       |
| PNG      | Papua New Guinea  |
| PO       | Producer Organization   |
| PPAP     | Productive Partnerships in Agriculture Project                |
| PPSD     | Project Procurement Strategy for Development                  |
| PSC      | Project Steering Committee                                    |
| R&D      | Research and Development                                      |
| SCD      | Systematic Country Diagnostic                                 |
| SDG      | Sustainable Development Goal                                  |
| SMEs     | Small and Medium Enterprises                                  |
| STEP     | Systematic Tracking of Exchanges in Procurement               |
| TAC      | Technical Appraisal Committee                                 |
| ToC      | Theory of Change  |
| WiP      | With Project  |
| WoP      | Without Project   |



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## DATASHEET

## BASIC INFORMATION

|                  |   |                                   |
|------------------|---|-----------------------------------|
| Country(ies)     | Project Name  |                                   |
| Papua New Guinea | PNG Agriculture Commercialization and Diversification Project |                                   |
| Project ID       | Financing Instrument  | Environmental Assessment Category |
| P166222          | Investment Project Financing                                  | B-Partial Assessment              |

## Financing &amp; Implementation Modalities

|   |  |
|---|--|
| <input type="checkbox"/> Multiphase Programmatic Approach (MPA)   | <input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC) |
| <input type="checkbox"/> Series of Projects (SOP)                 | <input checked="" type="checkbox"/> Fragile State(s)                               |
| <input type="checkbox"/> Disbursement-linked Indicators (DLIs)    | <input type="checkbox"/> Small State(s)  |
| <input type="checkbox"/> Financial Intermediaries (FI)            | <input type="checkbox"/> Fragile within a non-fragile Country                      |
| <input type="checkbox"/> Project-Based Guarantee                  | <input type="checkbox"/> Conflict  |
| <input type="checkbox"/> Deferred Drawdown                        | <input type="checkbox"/> Responding to Natural or Man-made Disaster                |
| <input type="checkbox"/> Alternate Procurement Arrangements (APA) |  |

|                        |                       |
|------------------------|-----------------------|
| Expected Approval Date | Expected Closing Date |
| 22-Apr-2020            | 31-Dec-2025           |

Bank/IFC Collaboration

No

## Proposed Development Objective(s)

To facilitate the development of competitive and diversified agriculture value chains for selected commodities in targeted provinces.

## Components

| Component Name | Cost (US\$, millions) |
|----------------|-----------------------|
|----------------|-----------------------|



|  |       |
|--|-------|
| Institutional Capacity Building                  | 5.10  |
| Agriculture Feeder Roads                         | 13.40 |
| Productive Partnerships                          | 12.30 |
| Project Management and Monitoring and Evaluation | 9.20  |
| Contingency Emergency Response Component         | 0.00  |

## Organizations

|                      |   |
|----------------------|---|
| Borrower:            | Independent State of Papua New Guinea   |
| Implementing Agency: | Department of Agriculture and Livestock<br>Coffee Industry Corporation<br>Cocoa Board |
|                      |   |

## PROJECT FINANCING DATA (US\$, Millions)

### SUMMARY

|                    |       |
|--------------------|-------|
| Total Project Cost | 40.00 |
| Total Financing    | 40.00 |
| of which IBRD/IDA  | 40.00 |
| Financing Gap      | 0.00  |

### DETAILS

#### World Bank Group Financing

|   |       |
|---|-------|
| International Development Association (IDA) | 40.00 |
| IDA Credit                                  | 40.00 |

#### IDA Resources (in US\$, Millions)

|                  | Credit Amount | Grant Amount | Guarantee Amount | Total Amount |
|------------------|---------------|--------------|------------------|--------------|
| Papua New Guinea | 40.00         | 0.00         | 0.00             | 40.00        |
| National PBA     | 40.00         | 0.00         | 0.00             | 40.00        |
| <b>Total</b>     | <b>40.00</b>  | <b>0.00</b>  | <b>0.00</b>      | <b>40.00</b> |

**Expected Disbursements (in US\$, Millions)**

| WB Fiscal Year | 2020 | 2021 | 2022 | 2023 | 2024  | 2025  | 2026  |
|----------------|------|------|------|------|-------|-------|-------|
| Annual         | 0.05 | 2.05 | 2.93 | 4.76 | 8.68  | 11.68 | 9.85  |
| Cumulative     | 0.05 | 2.10 | 5.03 | 9.79 | 18.46 | 30.15 | 40.00 |

**INSTITUTIONAL DATA****Practice Area (Lead)**

Agriculture and Food

**Contributing Practice Areas****Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

**SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)**

| Risk Category   | Rating        |
|---|---------------|
| 1. Political and Governance                                     | ● Substantial |
| 2. Macroeconomic  | ● Substantial |
| 3. Sector Strategies and Policies                               | ● Substantial |
| 4. Technical Design of Project or Program                       | ● Substantial |
| 5. Institutional Capacity for Implementation and Sustainability | ● Substantial |
| 6. Fiduciary  | ● Substantial |
| 7. Environment and Social                                       | ● Moderate    |
| 8. Stakeholders   | ● Substantial |
| 9. Other  | ● Substantial |
| 10. Overall   | ● Substantial |



## COMPLIANCE

### Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

| Safeguard Policies Triggered by the Project                    | Yes | No |
|--|-----|----|
| Environmental Assessment OP/BP 4.01                            | ✓   |    |
| Performance Standards for Private Sector Activities OP/BP 4.03 | ✓   |    |
| Natural Habitats OP/BP 4.04                                    | ✓   |    |
| Forests OP/BP 4.36   | ✓   |    |
| Pest Management OP 4.09  | ✓   |    |
| Physical Cultural Resources OP/BP 4.11                         | ✓   |    |
| Indigenous Peoples OP/BP 4.10                                  | ✓   |    |
| Involuntary Resettlement OP/BP 4.12                            | ✓   |    |
| Safety of Dams OP/BP 4.37                                      | ✓   |    |
| Projects on International Waterways OP/BP 7.50                 | ✓   |    |
| Projects in Disputed Areas OP/BP 7.60                          | ✓   |    |

### Legal Covenants

#### Sections and Description

The Recipient shall maintain, throughout the Project implementation period, a Project Steering Committee, with terms of reference, composition and resources satisfactory to the Association, which shall be: (a) responsible for, inter alia, providing overall policy guidance and strategic direction for the Project; and (b) composed of representatives from DAL, the Project Implementing Entities and the Diversified Commodity Boards, and other representatives set forth in the Project Implementation Manual. (Section I.A.1 of Schedule 2 to the Financing Agreement).

#### Sections and Description

The Recipient shall maintain, throughout the Project implementation period, Project Coordination Unit within DAL, with terms of reference, composition and resources satisfactory to the Association, which shall be responsible for, inter alia, carrying out overall Project coordination, monitoring and evaluation. (Section I.A.2 of Schedule 2 to the



Financing Agreement).

#### Sections and Description

By not later than six months after the Effective Date, the Recipient shall appoint and thereafter maintain, throughout the Project implementation period, the following positions within the Project Coordination Unit: (i) a Project coordinator; (ii) a financial management specialist; (iii) a monitoring and evaluation specialist; (iv) procurement specialist; and (v) a safeguards specialist, each with terms of reference, qualifications and experience satisfactory to the Association. (Section I.A.2 of Schedule 2 to the Financing Agreement).

#### Sections and Description

The Recipient shall cause the Project Implementing Entities to, and Project Implementing Entities shall each, maintain throughout the Project implementation period, their respective Industry Coordination Committee, with terms of reference, composition and resources satisfactory to the Association, which shall be: (a) responsible, inter alia, for: (i) providing commodity-specific oversight and strategic guidance to the respective Project Management Units; and (ii) approving the Partnership Grants and Matching Grants to be provided by the respective Project Implementing Entity; and (b) composed of representatives set forth in the Project Implementation Manual. (Section I.A.3 of Schedule 2 to the Financing Agreement; and Section I.A.3 of the Schedule to the Project Agreements).

#### Sections and Description

The Project Implementing Entities shall each maintain, throughout the Project implementation period, its respective Project Management Units with terms of reference, composition and resources satisfactory to the Association, which shall be responsible for, inter alia, carrying out day-to-day implementation of its Respective Part of the Project. (Section I.A.1 of the Schedule to the Project Agreements).

#### Sections and Description

By not later than six months after the Effective Date, the Project Implementing Entities shall appoint and thereafter maintain, throughout the Project Implementation Period, the following positions within their respective Project Management Unit: (i) a Project manager; (ii) an accountant; (iii) a safeguards officer; (iv) a procurement officer; (v) a monitoring and evaluation officer; (vi) a civil engineer; and (vii) a manager for overseeing the implementation of Part 3 of the Project, each with terms of reference, qualifications and experience satisfactory to the Association. (Section I.A.2 of the Schedule to the Project Agreements).

#### Sections and Description

Each Project Implementing Entity shall make Partnership Grants to each Partnership and Matching Grants to each Beneficiary under a Partnership Grant Agreement and Matching Grant Agreement, respectively, in accordance with eligibility criteria and procedures acceptable to the Association and set forth in the PGMGG. (Sections I.D.4 to I.D.7 of the Schedule to the Project Agreements).

#### Sections and Description

For the implementation of Parts 1.2, 2 and 3 of the Project as they relate to Diversified Commodities' subsectors, by not later than six months after the Effective Date, the Recipient shall ensure that an MOU or MOUs described in Section I.A.4 of Schedule 2 to the Financing Agreement, in form and substance satisfactory to the Association, setting forth, inter alia, the objectives, scope and details of the cooperation, authority pursuant to the Recipient's law, roles and responsibilities and expected achievements of each respective party with respect to Project implementation, are entered into; and each Project Implementing Entity shall enter into such an MOU or MOUs. (Section I.A.4(a) of Schedule 2 to the Financing Agreement; and Section I.A.4(a) of the Schedule to the Project



Agreements).

#### Sections and Description

To facilitate the carrying out of each Project Implementing Entity's Respective Part of the Project, the Recipient and each Project Implementing Entity shall enter into a Subsidiary Agreement, under terms and conditions approved by the Association. (Section I.B of Schedule 2 to the Financing Agreement; and Section I.B of the Schedule to the Project Agreements).

#### Sections and Description

By not later than six months after the Effective Date, the Recipient shall prepare (based on the information from the Project Implementing Entities with respect to their Respective Part of the Project, which shall be furnished to the Recipient in a timely manner) and adopt a Project Implementation Manual as accepted by the Association, and thereafter ensure that the Project is carried out in accordance with the Project Implementation Manual. (Section I.C of Schedule 2 to the Financing Agreement; and Section I.E of the Schedule to the Project Agreements).

#### Sections and Description

The Project Implementing Entities shall prepare and adopt the PGMGG as accepted by the Association, and thereafter ensure that Partnership Grants and Matching Grants are provided in accordance with the PGMGG. (Sections I.D.1 to I.D.3 of the Schedule to the Project Agreements).

#### Sections and Description

Each Project Implementing Entity shall, by not later than July 15 of each year, prepare and furnish to the Recipient, information on the Annual Work Plan and Budget with respect to its Respective Part of the Project, and the Recipient shall, by not later than August 15 of each year, prepare and furnish to the Association for its review and no-objection, an Annual Work Plan and Budget, and ensure that the Project is implemented in accordance with the Annual Work Plans and Budgets accepted by the Association for the Recipient's respective fiscal year. (Section I.D of Schedule 2 to the Financing Agreement; and Section I.F of the Schedule to the Project Agreements).

#### Sections and Description

The Recipient shall carry out, jointly with the Association and the Project Implementing Entities, not later than three years after the Effective Date, or such other period as may be agreed with the Association, a Mid-Term Review for the Project. (Section II.2 of Schedule 2 to the Financing Agreement; and Section II.B of the Schedule to the Project Agreements).

#### Sections and Description

The Recipient shall ensure, or cause the Project Implementing Entities to ensure; and the Project Implementing Entities shall ensure, that no Project activities in relation to the Diversified Commodities are carried out prior to the execution of the MOU(s). (Section I.A.4(b) of Schedule 2 to the Financing Agreement; and Section I.A.4(b) of the Schedule to the Project Agreements).

#### Sections and Description

Following the approval of a Feeder Road for implementation under Part 2 of the Project, the Project Implementing Entity shall, in a timely manner, make arrangements satisfactory to the Association for the maintenance of such Feeder Road, and cause the parties to such arrangements to maintain it in accordance with the approved maintenance arrangements. (Section I.C.1 of the Schedule to the Project Agreements)

**Conditions**

| Type         | Description  |
|--------------|--|
| Disbursement | No withdrawal shall be made for Partnership Grants or Matching Grants under Categories (2) or (3), respectively, unless and until the Association is satisfied that the Project Implementing Entities have adopted the PGMGG in accordance with the provisions of Section I.D.1 of the Schedule to the Project Agreements (Section III.B.1(b) of Schedule 2 to the Financing Agreement). |
| Disbursement | No withdrawal shall be made for Emergency Expenditures under Category (4), unless and until the Association is satisfied that all of the conditions listed in Section I.F.2 of Schedule 2 to the Financing Agreement have been met in respect of said expenditures. (Section III.B.1(c) of Schedule 2 to the Financing Agreement).   |



## I. STRATEGIC CONTEXT

### A. Country Context

1. The Independent State of Papua New Guinea (PNG) is one of the most culturally diverse countries in the world, with over 800 languages and 1,000 ethnic groups.<sup>1</sup> Its total land area of approximately 460,000 km<sup>2</sup> comprises 600 islands of various sizes and hosts a remarkably varied number of species and ecosystems. The country is separated into four regions—Highlands, Islands, Momase, and Southern—and 22 provinces. In 2019, its population was estimated at 8.9 million people,<sup>2</sup> over 80 percent of whom live in rural areas.
2. PNG averaged 6.85 percent growth in gross domestic product (GDP) between 2005 and 2010, but like other resource-dependent countries, it is feeling the impacts of the fall in global commodity prices. Real GDP growth dropped gradually from 13.5 percent in 2014 to a contraction of 0.5 percent in 2018, following the end of the liquefied natural gas-led construction boom by 2014, the commodity price shock and a negative El Niño impact in 2014–16, and a 7.5 magnitude earthquake that led to a temporary production shutdown in the extractive sector in the first half of 2018. Real GDP growth is forecast to jump to about 5.6 percent in 2019, following a recovery in extractive sector production, and hover between 3.1 and 3.5 percent in 2020–21, supported by proposed investments in several large resource projects.<sup>3</sup> The country is dominated by two main sectors: the formal, capital-intensive extractive sector, which relies heavily on the country's rich natural resources and accounts for most of the export earnings and the agriculture sector, which—while largely informal—employs an estimated 80 percent of the population and accounts for approximately 27 percent of GDP.<sup>4</sup>
3. Despite considerable natural wealth and reasonable economic performance, PNG's rural population continues to face significant challenges. The disparity between rural and urban living conditions is exacerbated by the country's difficult terrain which increases hardship, poverty, and isolation in rural areas and limits access to basic services, infrastructure, and economic markets. Less than 20 percent of rural households have access to electricity, 60 percent lack access to safe drinking water, and an estimated 80 percent lack access to improved sanitation<sup>2</sup>.
4. According to the latest Household Income and Expenditure Survey, conducted in 2010, approximately 38 percent of the population lived below the extreme poverty line of US\$1.90 per day, about the same proportion as in 1996. PNG's Human Development Index ranking was 154 out of 188 countries in 2015, the second lowest in the Pacific.<sup>2</sup> It has the fourth highest child stunting rate in the world. An estimated 28 percent of children are underweight and 5–15 percent are wasted. The Highlands region has the highest rates of stunting, at 61.5 percent, and the Island region has the highest wasting and underweight rates, at 19 percent and 29.2 percent, respectively. The economic cost of undernutrition is high, at an estimated 2.81 percent of annual GDP (equivalent to US\$508 million) in 2015–16.<sup>5</sup>

<sup>1</sup> [www.worldbank.org](http://www.worldbank.org).

<sup>2</sup> World Bank. 2019. PNG Economic Update July 2019.

<sup>3</sup> World Bank. 2019. PNG Economic Update July 2019.

<sup>4</sup> World Bank. 2017. PNG Economic Update (November).

<sup>5</sup> World Bank. PNG Nutrition Study (P165595).



5. The country's service delivery challenges have led to underinvestment in human capital. PNG was an early adopter of the World Bank's Human Capital Project and is ranked 136 of 157 countries on the Human Capital Index, which finds that a child born in PNG today will be 38 percent as productive when s/he grows up as s/he could be if s/he enjoyed complete education and full health. PNG ranks 159 out of 160 countries in the 2017 Gender Inequality Index. Gender-based violence (GBV) is widespread, with over two-thirds of women having experienced some kind of violence in their lifetime.<sup>6</sup> GBV—both within the home and in public spaces—severely affects women's ability to contribute to the economy, participate in business activities, and support family livelihoods.

6. Although PNG is a relatively stable democracy, its risk and resilience profile is dominated by local ethnic relations, gender relations, and rising populations of underemployed youth, all of which potentially provide a basis for endemic, daily violence. These factors have contributed to significant conflict around resources in specific areas of the country that have drawn in national security forces and posed serious national implications and they could easily do so again. Resources and their geographic dispersion are a mixed blessing in PNG. Like similar economies and societies, PNG suffers from much weaker institutions because of—not despite—its resource dependence. Resource enclaves can become sources of grievance and conflict, as in the case of events in Bougainville in the 1990s. In 2019, Bougainville overwhelmingly voted 98 percent for independence which will be formally ratified by the Government of Papua New Guinea (GoPNG). An emerging area of risk is the Southern Highlands, a region that, in February 2018, experienced one of the worst earthquakes in the country's history and has seen an upsurge in violent conflict. The impetus is multidimensional and includes a lack of clarity over property rights and incomplete landowner identification, tensions related to the nonpayment of royalties related to extractive industry activities, the proliferation of arms, electoral manipulation and allegations of fraud, complex interclan dynamics, and a breakdown in state-society relations and traditional conflict mitigation mechanisms, amid thin state presence and reach.

7. The country is subject to both El Niño and La Niña events, which can both have significant impacts such as severe droughts, landslides, and flooding from increased rainfall.<sup>7</sup> The World Risk Report 2016 ranks PNG 10 out of 170 countries due to the country's high exposure to natural disasters and its high social and economic vulnerability to these events.<sup>8</sup> The Climate and Disaster Risk Screening Report for this project highlighted drought as the highest risk given the potential impact and exposure both now and in the future, while extreme temperature and sea level rise were also considered high risks for the future. The February 2018 7.5 magnitude earthquake and its aftershocks affected 544,368 people across five provinces. In the Southern Highlands and Hela provinces alone, it is estimated to have killed over 100 people, displaced 18,200, and left 270,442 in need of immediate humanitarian assistance. Nearly one-third of health facilities in the region remain closed.<sup>9</sup>

<sup>6</sup> Nationally representative data on GBV prevalence are not available for PNG; however, several robust, smaller-scale studies indicate high prevalence.

<sup>7</sup> Papua New Guinea El Niño Country Brief, 2015-2016. World Food Program.

<sup>8</sup> El Niño and UNU-EHS. 2016. *World Risk Report 2016*.

<sup>9</sup> NDC, UNDAC OCHA 2018.



## B. Sectoral and Institutional Context

### Sectoral Context

8. PNG is characterized by its diverse agroecological environments (highlands, lowlands, and islands/atolls), favorable climate, and fertile soils, which allow for many different agricultural products, including the cultivation of both cash and staple food crops as well as livestock production. While PNG's export economy is dominated by minerals (gold and copper), oil, and liquified natural gas, agricultural exports in the renewable resources sector make a significant contribution, at around 23.1 percent. The country's main agricultural exports include cocoa, coffee, coconuts, palm oil, rubber, and tea. The predominant mode of farming is in smallholder farms of less than 5 ha. Village agriculture, which supports over 80 percent of the population, remains dominated by subsistence food production. It generates little cash income and is characterized by low productivity.

9. Coffee and cocoa are key cash crops. PNG is considered a small coffee and cocoa producer in the international market, but the high quality of its coffee and fine flavored cocoa is recognized and sought after. Of the total labor force, nearly 30 percent is engaged in coffee and 20 percent in cocoa. Smallholders produce 95 percent of the coffee in PNG, and the industry has seen a general increase in the value of coffee exports over the past decade. PNG coffee production averaged 995,000 bags (59,700 tons) valued at PGK 500 million<sup>10</sup> per year over the last decade, although this can be heavily affected by factors such as diseases, climate, and even election cycles.

10. A robust internal fresh food and livestock products market exists, but value chains are not well developed. Livestock production, except for pigs and poultry, has been static or on the decline since the 1970s. Meat consumption in PNG, on the other hand, has increased steadily over the last two decades and is predicted to increase at a conservative rate of 5 percent per year. This increased demand is currently met by meat imports.

11. Agriculture has underperformed. Key factors for this underperformance include low productivity and a lack of competitiveness in the face of key constraints that limit the development of coffee and cocoa production as an agribusiness for many smallholder farmers and hold back the expansion of other commodities. These constraints include high transaction costs due to diseconomies of scale, a lack of access to information technologies due to poor extension services, poor rural infrastructure, insecurity of land ownership and tenure, and a lack of access to rural finance. Private sector entities involved in agriculture consist of a few multinationals that are engaged mostly in coffee and cocoa, a few larger national agribusinesses, and various small and medium enterprises (SMEs). Microenterprises are also important, mostly as aggregators and transporters that link logically isolated smallholders to other agribusinesses. The private sector is better organized for value chains with a well-identified market for export-oriented commodities such as coffee, cocoa, oil palm, and, to a lesser extent, vanilla and coconut. For nascent or rebuilding value chains, such as livestock or spices, the private sector is weak and sometimes characterized by monopoly entities (in poultry and spices, for example) that are struggling to obtain the needed supply of good-quality raw materials to support production.

12. PNG's road network plays an important role in smallholder farmers' ability to earn a profit from their produce. The road network is highly fragmented and poorly maintained, with only about 35 percent

<sup>10</sup> Coffee Industry Corporation - <http://www.cic.org.pg/2017/03/22/png-coffee-production-export-statistics/>.



of national roads sealed and no roads connecting most provinces and ports. PNG's vulnerability to climate risks and hazards exacerbates these problems, causing an estimated 75 percent or more of the road network to become impassable at some point during the year<sup>11</sup>. These factors force farmers to walk long distances to meet transport and pay high prices to move goods, reducing most of their profit and increasing the risk of lost produce due to weather and time.

13. Finally, important gender inequalities contribute to the underperformance of the agriculture sector. A 2014 World Bank study on the role of women in PNG's agriculture sector<sup>12</sup>—which focused in particular on coffee, cocoa, and fresh produce supply chains—found that gender-specific barriers to accessing key services (such as extension and finance) and insecurity affect the quality of the final product. The report noted that strengthening women's economic opportunity in agriculture requires more than improving access to land, finance, markets, and transport, however, or simply 'adding' activities to women's already busy lives. A failure to consider the changes needed for both women and men in household responsibilities and local norms and values can lead to pushback or, even worse, backlash.

14. However, these challenges can be overcome. For instance, the Productive Partnerships in Agriculture Project (PPAP)—co-financed by the World Bank, International Fund for Agricultural Development (IFAD), and European Union (EU)—is demonstrating, in the coffee and cocoa sectors, that a productive partnership model can help overcome some of these bottlenecks and facilitate the integration of smallholder farmers into effective supply and value chains and link them to markets, which remains a priority for the GoPNG. In the PPAP model, farmers join a partnership coordinated by a lead partner (LP) (the private sector in 70 percent of cases) through a small fee. The LP accesses a grant from the project to purchase tools and seedlings (including innovative cocoa clones) for distribution to farmers, to renovate processing facilities, or to organize training on a broad range of topics such as technical processes, gender dimensions, HIV-AIDS prevention, and nutrition. This increased proximity between LPs and smallholder farmers has greatly benefited participating farmers, who have almost doubled their annual yield, doubled their incomes, and begun using improved coffee management practices on more than 16,000 ha.<sup>13</sup> The PPAP has seen commendable success:

- At the institutional and governance level, the legal framework for cocoa and coffee has been reviewed and reformed and corresponding boards strengthened to better fulfill their mandates. This work must now be extended to other commodities, and in cocoa and coffee, deeper involvement is now required from the Coffee Industry Corporation (CIC), the Cocoa Board (CB), and the other governing bodies to strengthen quality, set standards, and determine licensing and fee leveraging mechanisms to maximize sustainability.
- At the farm level, the innovative PPAP delivery model has supported notable increases in the productivity of those households involved in partnerships and initial improvements in the quality of processed products (such as dry cocoa beans and green coffee beans) through training and equipment (including modern fermentaries, pulper machines, and sun dryers) have also been recorded. It is estimated that the PPAP has reached about 10 percent of coffee and cocoa smallholder farmers. To have a durable impact on national production quantity and quality, this work must now be expanded, including to new provinces, to reach

<sup>11</sup> World Bank. 2019. PNG Economic Update July 2019.

<sup>12</sup> World Bank. 2014. *The Fruit of Her Labor: Promoting Gender-Equitable Agribusiness in Papua New Guinea*.

<sup>13</sup> April 2018 PPAP Aide Memoire.



about 30 percent of these smallholder farmers. It would also represent a natural evolution of the approach to assess whether PNG can climb the value chain ladder and export more sophisticated processed or industrialized products that provide higher incomes rather than exporting mainly raw commodities. In other diversified value chains, basic work to increase on-farm productivity and improve local access to markets for raw or low-processed products must begin using the PPAP model.

15. Under the PPAP, farmers have realized that being organized in associations confers essential benefits in collectively addressing bottlenecks to production and market access. There is now an opportunity to build the capacities of cooperatives and farmer groups and to introduce new, sector-wide initiatives to further support their development and enable meaningful collaboration with the private sector.

### **Institutional Context**

16. PNG's agricultural sector has evolved through political, administrative, and institutional reforms over the last 50 years into a shared responsibility among the three tiers of government, as well as statutory commodity boards. Despite the institutional complexity of service providers, the extension service is industry specific, supply driven, and highly dependent on public funding. As budgetary support has declined over the years, the quality of services has also deteriorated, and coverage is limited nationwide. The decentralization policy outcome paved the way for the establishment of provincial governments and the transfer of some development functions and financial powers from the national government. Although the agriculture service was decentralized as part of this process, it has since been performed as a concurrent function among provincial and national agencies. In 1990, the Government adopted a corporatization policy under which key commodity organizations for coffee, oil palm, cocoa, and coconuts were created as separate legal entities. This change entailed further devolution of research and development (R&D), extension, and marketing functions from the national Department of Agriculture and Livestock (DAL) to those newly created boards. In 2013, the National Executive Council commissioned a functional expenditure review (FER) of commodity boards to address what it considered to be the most pressing issues affecting performance. This review found that the sector was uncoordinated, unaccountable, and in many cases ineffective in delivering improved technologies, extension, and other services to farmers and agribusinesses.<sup>14</sup>

17. These governance systems and institutional fragility remain major challenges affecting the agriculture sector. Despite good intentions, the three tiers of government, commodity boards, and agencies have provided village farmers with little help to raise their productivity and participate more effectively in commercial activities. Translation of new knowledge into business and commercial opportunities has been lacking for many years. Major crops have historically been marketed by statutory marketing boards, including under past stabilization funds for coffee, cocoa, palm oil, and coconuts, which may have impeded agricultural development through inefficiency and overregulation.

18. The GoPNG's previous National Agriculture Development Plan for 2007–2016 (currently being updated) and the Small and Medium Enterprise Policy and Master Plan recognized the importance of the agricultural sector in developing the country's economic potential, sustaining the basic livelihoods of its

<sup>14</sup> Functional Expenditure Review of Agriculture for Commodity Boards and Agencies. 2014. "Towards Agriculture Transformation and a New Direction for Enhancing Productivity in Agriculture."



population, increasing social well-being, and providing food security for all. Implementation has faced several challenges, however, including the limited capacity of DAL at all levels, poor governance, and lack of monitoring of sector outcomes.

19. The GoPNG's Loloata Caucus outcomes outlines the Government's priority list for achieving its Vision 2050 and operationalizes the National Strategy for Responsible and Sustainable Development through the Third Medium-Term Development Plan (MTDP III). The draft Agriculture Medium-Term Development Plan 2020–2022 (AMTDP) is an important initiative of DAL with the support from the Food and Agriculture Organization (FAO). AMTDP is DAL's efforts to realign its development needs and that of all the key agriculture subsectors to those defined by the higher national plans and MTDP III, 2018–2022. Agriculture is listed as a priority, particularly with regard to the revival of the coffee, cocoa, and coconut sectors, as well as increase in access to funding support for small-scale farmers, as demonstrated by its greater prominence in the 2018 budget allocation. To emphasize this commitment, the Government held the first-ever National Agriculture Summit in November 2017 to exchange experiences with successful models. The key priorities identified during this summit were to (a) grow the economy, (b) promote import substitution, (c) promote more accessible and affordable credit, and (d) place greater focus on institutional strengthening. The PNG Agriculture Commercialization and Diversification Project (PACD) will contribute directly to achieving these objectives by expanding the work done under the PPAP to include more coffee and cocoa farmers, as well as those producing other commodities, and thereby increase farmers' access to extension services, finance, and markets.

### C. Relevance to Higher Level Objectives

20. While most of PNG's GDP comes from the resource sector, the majority of its people<sup>15</sup> work in agriculture and, as outlined earlier, there are large inequalities between rural and urban communities. The PACD will contribute to the World Bank Group's twin goals of ending extreme poverty and promoting shared prosperity by working directly with farmers and micro, small, and medium enterprises (MSMEs) in rural areas. In supporting smallholder farmers to improve their productivity and access to markets—and therefore their livelihoods—in a sustainable way, the project will contribute to the Sustainable Development Goals (SDGs), particularly SDG 1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health and well-being), SDG 5 (gender equality), SDG 8 (decent work and economic growth), SDG 10 (reduced inequalities), and SDG 15 (life on land). The PNG Systematic Country Diagnostic (SCD - Report No. 127800) notes that "given that the agriculture and fisheries sectors are an important part of the PNG economy and with the majority of Papua New Guineans engaged in these sectors to earn their livelihood, improving the productivity of these sectors will have far reaching consequences for reducing poverty and boosting shared prosperity, particularly for women and youth."

21. The World Bank Group Country Partnership Framework for PNG for FY19–23 (CPF - Report No. 128471-PG), discussed in May 2019, includes agriculture as a key focus area in supporting private sector growth and job creation, and the International Finance Corporation (IFC) is currently reviewing its strategy to support agribusiness in PNG. The CPF aims to improve the competitiveness and productivity of the agriculture sector through capacity building and support for innovative technologies. IFC will focus on advisory assistance to review and reform major policies to enable the investment environment in the agriculture sector and promote possible investments, notably in Gulf province, that could complement

<sup>15</sup> Data suggest that 67–80 percent of the working-age population work in agriculture (World Bank data and Department of Agriculture and Livestock).



PACD support by facilitating the storage and transport of agricultural products to the main markets, including in Port Moresby.

22. PNG's vision for 2050 is that "Papua New Guinea will develop and grow the manufacturing, services, agriculture, forestry, fisheries and eco-tourism sectors from 2010-2050." Vision 2050 acknowledges the importance of subsistence agriculture to the rural economy and to the cultural lives of many, as well as the significant challenges faced by the sector, including limited markets, poor infrastructure, ineffective extension services, and security and safety concerns. The GoPNG's vision is to develop the agriculture sector into a climate-smart, export-oriented economic activity that provides rural development, wealth creation, and food security for the country's citizens. This vision is reflected in the GoPNG's Intended Nationally Determined Contribution under the United Nations Framework Convention on Climate Change, which includes adaptation measures around inland flooding and food insecurity caused by crop failures due to droughts and inland frosts and mitigation activities focused on reducing deforestation and promoting forest conservation. The PACD will contribute to these areas by promoting climate-resilient farming and agroforestry practices and investments as well as training in both business and farming best practices.

## II. PROJECT DESCRIPTION

### A. Project Development Objective

#### PDO Statement

23. To facilitate the development of competitive and diversified agriculture value chains for selected commodities in targeted provinces.

#### PDO Level Indicators

24. In the PACD, competitive value chains will be measured by their increased productivity and higher quantities sold to markets by both smallholder producers and their organizations and intermediate MSMEs.

25. The PACD aims at consolidating the work done by the PPAP in the main coffee and cocoa producing areas. This implies some diversification from only cocoa and coffee to be promoted at both household (risk management against crisis and disasters) and community levels to facilitate the emergence of diversified value chains (spices, coconut, and small livestock<sup>16</sup>) in targeted provinces<sup>17</sup> and the synergistic integration into existing farming systems, such as apiculture for coffee and shade trees (including galip nuts) for cocoa.

26. The PDO-level Indicators include the following:

<sup>16</sup> See 'selected commodities' in paragraphs 48 and 49.

<sup>17</sup> See 'targeted provinces' in paragraph 50.



- (a) Competitive value chain, including increased productivity for cocoa, coffee and diversified value chains, measured by (i) increased yields of selected crops (cocoa wet beans, coffee parchment, fresh ginger) and (ii) increased piglets weaned per sow and per year.
- (b) Competitive value chain, including increased access to markets for cocoa, coffee and diversified value chains, measured by increase in the annual volumes of gross sales of MSMEs and producer organizations benefiting from subprojects.
- (c) Diversified value chains measured by the number of agribusiness partnerships that assist farmers from coffee and cocoa producing areas diversifying to new commodities (spices, small livestock, coconut)
- (d) Total number of beneficiaries - disaggregated by gender

## B. Project Components

27. The PACD will look at what is needed to reach competitive and diversified value chains. First, a conducive enabling environment is needed. The PACD will strengthen institutions (DAL and commodities boards) to play their role as enabler and facilitator and to review policies and regulations. It will also improve the condition of feeder roads, critical infrastructure to facilitate access to markets. Second, an increase in human capital is needed. The PACD will strengthen the skills at several levels of the value chains, providing vocational and business development training to staff in the related institutions, farmers, producer organizations<sup>18</sup> (POs), and MSMEs that are involved in aggregating, processing, and marketing the smallholder produce. Third, it looks at markets for products and whether there is fair market competition. The PACD will facilitate the coordination between value chain stakeholders to increase the market access for smallholders and make production more demand and market driven. It will also strengthen POs and link them to markets. It will also help buyers access raw material on time in the quantities and qualities requested. The PACD will also incentivize financial actors to co-finance investments at farm, PO, and MSME levels. And fourth, as a strong innovation ecosystem is needed, the PACD will promote an entrepreneurial culture among MSMEs and POs, incentivize applied R&D in partnerships, and promote the transmission of new technologies to farmers to increase their productivity and the sustainable use of their resources. The PACD's interventions will be delivered through five components.

28. **Component 1: Institutional Capacity Building (IDA US\$5.10 million).** The specific objective would be to improve the performance of sector institutions and to enhance industry coordination in cocoa, coffee, spices, coconuts, and small livestock. Recommendations from the 2013 FER will lay the foundations for such strengthening of institutional capacity in the different commodities. On the model of coffee and cocoa during the PPAP, existing stakeholder platforms for coconuts, spices, and small livestock would be consolidated to address short- and long-term issues such as sector governance, skills development in the industry, improvement in extension services, industry strategy on threats to quality and quality promotion, information within the industry, market development, and crop diversification. The support will address institutional capacity gaps at two levels:

<sup>18</sup> In the PACD, PO refers to any legally constituted group of farmers or growers, including but not limited to cooperatives, associations, and marketing groups.



- (a) **Subcomponent 1.1: Department of Agriculture and Livestock - DAL (IDA US\$3.0 million).** The subcomponent will provide technical assistance and carry out capacity-building activities to (i) strengthen the capacity of DAL (at central and regional levels and policy and technical divisions) and the provincial Department of Primary Industry (DPI) in planning, coordination, and monitoring and evaluation (M&E) capacity; (ii) review their policy and regulatory framework where necessary, notably on climate-smart agriculture, extension, and veterinary services, promoting a multisectoral approach to nutrition, quality standards, and food safety; (iii) support the transition of the Livestock Development Corporation (LDC) and Spices Industry Board currently under the umbrella of DAL, to independent statutory bodies including reviewing the related legal framework; (iv) strengthen the provincial and district capacity to deliver services: climate-smart extension, advisory and veterinary services, and access to inputs; this will include implementing a Structured Outreach Program together with CB and CIC where funding will be allocated for technical assistance that would continue supporting PPAP farmers with technical and financial management (FM) advice and monitor their progress under the PACD; (v) design and implement a sector-wide and project-specific communication and public awareness strategy; and (vi) pilot programs on nutrition, gender education, and behavior change, as outlined in paragraphs 42 and 55.
- (b) **Subcomponent 1.2: Commodity Boards (IDA US\$2.10 million),** notably CB, CIC, and Kokonas Indastri Koporesen (KIK - Coconut Industry Corporation) under the coordination of the two Project Management Units (PMUs) hosted by CB and CIC. This subcomponent will provide technical assistance and carry out capacity-building activities, to:
- (i) Strengthen the capacity of the two industry coordination committees (ICCs) to support sector dialogue and policy development in the cocoa, coffee, livestock, spices, and coconut subsectors, including and covering operating and meetings costs. Their composition will be modified to include representatives from the livestock, spices, and coconuts subsectors.
  - (ii) In coffee and cocoa, consolidate the PPAP work of strengthening the capacity and governance arrangements of CB and CIC and launch similar efforts to strengthen KIK, including institutionalizing and expanding the Management Information System (MIS) necessary to inform policy development and stakeholders' decisions and reviewing the financial sustainability of the respective boards.
  - (iii) Support the evolution of these commodity boards toward promotion and/or enforcement of quality and food safety standards developed under Subcomponent 1.1. Where appropriate, the adoption of certified sustainability practices, including climate-related (such as organic, fair trade, rainforest alliance) and quality certification schemes (Hazard Analysis Critical Control Point [HACCP] in coconut processing) will be promoted. Parallel technical assistance from the IFC will be explored to increase the efficiency and impact of this activity.
  - (iv) In collaboration with the National Agriculture Research Institute (NARI), strengthen the platform for sustainable production and multiplication of plant and animal germplasm and the genetic base (nurseries) through R&D and extension capacity building, with a focus on climate-smart agriculture practices.



- (v) Design and implement commodity-specific communication and public awareness strategies and campaigns.

This subcomponent will also rehabilitate offices, including the CB office in Kokopo.

29. **Component 2: Agriculture Feeder Roads (IDA US\$13.40 million).** The objective of this component is to improve access to value chains and markets for farmers through rehabilitation and maintenance of priority agricultural feeder roads, paths, or other small transport infrastructure that provides access to the PACD and the PPAP partnership smallholder farmers/out-growers. Together with the productive investments under Component 3, the feeder roads will improve access to markets for farmers by cutting time and cost of transport and increasing the quality of the transported products besides having many other positive externalities for the communities. The subprojects' prioritization (detailed in the Project Implementation Manual [PIM]) will be based on a transparent comparative socioeconomic benefit/cost ranking of all identified candidate roads as well as free, prior, and informed consultation with representatives of the partnership, impacted people, and local authorities. A sustainable long-term maintenance framework for each selected road will be established in advance of construction through a memorandum of understanding (MoU) between these private and public parties, setting out the roles and responsibilities of the respective parties, who will also receive hands-on maintenance training under the project.

30. As per the PPAP model, feeder roads will be designed and constructed to be more climate resilient through increased resistance to heavy rains occurring during wet seasons: they will be well cambered to shed runoff quickly from the road surface, and all longitudinal drainage (lined and unlined side drains) and cross drainage (pipe/box culverts and log bridges) will be designed to accommodate anticipated increases in frequency, duration, and intensity of rainfall due to climate change.

31. Difficulties navigating between domestic, local farm, and market spaces can be particularly burdensome for people combining market activity with care responsibilities, who generally are women. Attention will thus be paid to the web of secondary feeder roads, footbridges, footpaths, and tracks women use for accessing markets, taking care of domestic chores, and also for accessing health and administrative services. Improving women's access to services through road improvements will positively affect the amount of time women can use on economically productive activities.

32. **Component 3: Productive Partnerships (IDA US\$12.30 million).** The objective of this component is to increase the integration of smallholder producers, POs, and MSMEs into performing, remunerative, and diversified value chains. The first subcomponent will directly benefit smallholder producers as well as develop and implement PPAP-like productive partnerships between smallholders and the private sector aimed at improving market links in the project areas. The focus will be to increase on-farm and post-harvest productivity and quality. The second subcomponent will benefit POs and MSMEs that are working directly with farmers in the same commodities to increase their competitiveness with focus on aggregation, logistics, processing, and marketing. This will ensure that aggregators and processors of smallholder produce can increase their absorption capacity and quality and therefore increase the competitiveness of the value chains. The two subcomponents complement each other to ensure that value chains and their stakeholders become more competitive across all segments.

- (a) **Subcomponent 3.1: On Farm and Post-Harvest Productivity, and Formation of Producer Organizations (IDA US\$10.70 million).** This subcomponent will address the following two



main binding constraints: first, the limited aggregation of smallholder produce and lack of planning and coordination among stakeholders along the selected value chains leading to limited market integration of smallholders and second, the low productivity and quality of the smallholder produce. The subcomponent will channel project funding by providing partnership grants to legal entities in the private sector and civil society (LPs), which are already engaged with smallholders and are interested in consolidating, scaling up, or diversifying those activities by forming partnership with them. The partnership grants will co-finance activities aimed to increase selected commodities' output, productivity, quality and sustainability; promote good agricultural practices (GAPs) including climate-smart agriculture; and improve farming systems and post-harvest handling. The subcomponent will also finance awareness raising campaigns on the partnership grants and provide support to LPs and associated farmers for the preparation of their partnership proposals and plans. It will step up its effort to facilitate the formation of POs and the management of common services, including marketing and initial processing. The conversion of abandoned/poorly managed land into perennial tree crops will also contribute to net carbon reductions, as measured through the Greenhouse Gas Accounting Tool. The subcomponent will co-finance productive investments for competitively selected partnerships, such as farming equipment, infrastructure, and other related inputs, including improved climate-resilient planting material (nurseries), support for rotational replanting and garden rejuvenation, and more efficient and environmentally friendly post-harvest and processing technology. Innovative technologies, notably on climate-smart agriculture practices (agroforestry, water collection and micro-irrigation, drought- and pest-resistant varieties, and intensification of small livestock production and bio-digesters), that have the potential for positive impacts on the environment will be promoted. Finally, the subcomponent will finance technical assistance to accompany the productive investments in areas such as on GAPs; modern, environment friendly and improved technologies; post-harvest handling; financial literacy; livelihood training; and PO formation and management.

- (b) **Subcomponent 3.2: Aggregation, Value-Addition and Marketing (IDA US\$1.60 million).** This subcomponent will directly address the following two main constraints: first, the lack of knowledge and access to finance of POs and MSMEs needed to become competitive players and second, the lack of value addition that is undertaken in the country to ensure higher incomes to rural households and the local economy in general. This subcomponent will provide matching grants (MGs) to competitively selected POs and MSMEs to co-finance technically feasible and financially viable business plans. The project will provide MGs for POs of up to 80 percent of each viable business plan and for MSMEs of up to 60 percent of each viable business plan up to a maximum of US\$100,000 per MSME/PO as further detailed in the Partnership Grant and Matching Grants Guidelines (PGMGG). These MG activities will be aimed at increasing their competitiveness, with a focus on aggregation, logistics, processing, and marketing. Eligibility would be limited to legally established MSMEs and POs that procure their raw material from local producers and are active in the selected commodities and are based in the project provinces. The subcomponent will also finance awareness raising campaigns and support POs and MSMEs with the preparation of their business proposals and plans. Criteria will also be developed to strengthen the ability of women entrepreneurs and farmers to compete for and win MGs. Competitively selected business plans will co-finance productive investments, such as equipment (transport, office



rental, information and communication technology [ICT] tools, storage, product processing, and so on); infrastructure (storage, warehouse, fermentation facilities, and so on); and other related inputs. While investments will be demand driven, priority will be given to investments that contribute to climate change adaptation and/or mitigation and have clear benefits for smallholder producers. Investments will be accompanied by technical assistance in aspects such as logistics, storage, marketing, agronomy, accounting, financial literacy, food processing, good manufacturing practices, packaging, labelling, traceability, quality control, food safety and hygiene, legal, and improved climate and environmental aspects. A specific focus will be placed on developing business and technical skills of women entrepreneurs.

33. **Component 4: Project Management and Monitoring and Evaluation (IDA US\$9.20 million).** This component will provide technical and operational assistance, including carrying out of training, to support the project management, implementation, M&E, FM, environmental and social safeguards, and communications functions of the Project Coordination Unit (PCU) and two PMUs. It will support all PCU and two PMUs' activities required to manage IDA funds, procure IDA-funded goods and services, conduct project M&E, and comply with safeguard mitigation measures. It will finance the required consultant staff for the length of the project to ensure efficient management of the PACD, as described in the implementation arrangements section.

34. It would provide training and equipment to modernize DAL operations (computer hardware and software, office furniture, vehicles) at the central level and in the field as needed for project activities. It would also support the development and implementation of a communications strategy, as well as general awareness and sensitization campaigns about project activities. While the PCU will keep the coordination role it had under the PPAP—notably to help harmonizing and reporting on implementation of Component 1 and also safeguards, M&E, and FM of the entire project—Components 2 and 3 will be mainly implemented by the two PMUs hosted by CB and CIC. If Component 5 is activated, the PCU will also coordinate the interventions, while on-the-ground activities will be facilitated by the PMUs.

35. **Component 5: Contingency Emergency Response Component (Total Cost: US\$0).** This component will only be used in the event that an emergency response is required. Experience from the past, and notably the recent earthquake in Southern Highlands, has demonstrated how natural disasters can have devastating impacts on agriculture production and other sectors in PNG.

36. Following an eligible crisis or emergency, the recipient may request the Association to reallocate project funds to support emergency response and reconstruction. This component would draw from the uncommitted credit resources under the project from other project components to cover emergency response. A Contingency Emergency Response Component (CERC) Operations Manual, acceptable to the Association, for the implementation of the Contingency Emergency Response Plan, will be prepared and constitute a disbursement condition for this subcomponent.

### **Strategic Alignment**

37. **Citizen engagement.** Considering beneficiary needs and feedback will be an important part of the PACD. For feeder roads rehabilitation, the prioritization process will be strongly based on stakeholders' empowerment using a bottom-up approach. Prefeasibility studies will include extensive consultations with potential beneficiaries through focus group discussions and potentially participatory training for



sections of Component 3. The project's communication and outreach strategy tools will also support effective citizen engagement. The Environmental and Social Management Framework (ESMF) includes consultation with key project stakeholders to provide information on the proposed project, the potential social and environmental risks, and their contribution to overall project design. The PACD will ensure that citizen engagement during project implementation is effective and will monitor whether beneficiary feedback is indeed considered. The Results Framework includes two intermediate indicators (a) Beneficiaries that feel project investments reflect their needs (disaggregated by gender) and (b) Grievances registered related to delivery of project benefits that are addressed.

38. **Climate change and climate co-benefits.** The PNG Multi-Sectoral National Nutrition Policy 2018 notes that PNG experiences frequent episodes of natural and human-induced disasters ranging from weather events such as droughts, floods, and landslides to tribal disputes resulting in violence and displacement. The impact of changing climate— influencing phenomena such as weather patterns, rainfall, and sea level rise—is also being increasingly reported among many communities and agriculture experts. Discussions with the agricultural sector indicate that the impact of this is potentially significant in terms of agricultural production, availability and access to foods, and consequently on the health and nutrition of many communities.<sup>19</sup>

39. The project will promote the use of climate-smart technologies and techniques to minimize the potential impacts. Under Component 3, the project will positively weigh MG applications that are climate resilient. As the Climate and Disaster Risk Screening Report found drought to be high risk, water-conserving designs will also be prioritized. Component 2 (Agriculture Feeder Roads) will also integrate climate-informed designs such as curved roads for rainfall runoff and investigate climate and adaptation opportunities for other investments under this component. Component 1 will address capacity gaps at the sector level within DAL and at the industry level to ensure policies are climate smart and agriculture sensitive and to strengthen the platform for sustainable production through R&D and extension efforts with a focus on climate-smart agriculture practices.

40. The PACD's proposed interventions are by nature (agroforestry - perennial tree crops) designed to maximize mitigation potential. Greenhouse gas (GHG) accounting (see annex 6) demonstrates that the project can constitute a sizeable net carbon sink of -415,673 tCO<sub>2</sub>eq per year over 20 years, thus -8,313,459 tCO<sub>2</sub>eq in total, mainly due to sustainable land use change from abandoned/ill-managed blocks to tree crops systems. The risk of deforestation will be closely supervised and totally avoided through the productive partnership model. The introduction of improved management practices in existing perennial systems and agricultural management practices such as water conservation techniques will contribute to the sustainability of existing gardens. On the contrary, limited sources of GHG emission are (a) the increase small livestock herd size (pigs and poultry), despite better productivity and (b) the minor increase in insecticide use, notably to fight against coffee and cocoa pests.

41. **Nutrition.** The 2015 and 2016 El Niño brought extreme drought and frost to PNG which led to widespread crop damage. Over 40 percent of the population were affected, with nearly half a million people experiencing severe food shortages resulting in increased mortality and food and nutrition insecurity. Climate change is expected to increase the severity and frequency of extreme weather events. Building food system resilience through the diversification of production systems and the inclusion of

<sup>19</sup> PNG Multi-Sectoral National Nutrition Policy 2018.



climate-smart species and varieties is key to improving a reliable supply of nutritious food and income to households throughout the year.

42. Malnutrition is a serious issue in PNG which has negative implications for human development and the economy. Agriculture can improve nutrition outcomes through multiple pathways, including as a source of food, income, and women's empowerment. Increasing income is alone insufficient to achieve nutrition impacts. Evidence from a recent study by the International Food Policy Research Institute (IFPRI 2018) demonstrated that while calorie intake increased within non-poor households, diet quality remained insufficient: predominately based on starchy staple foods with little-to-no consumption of micronutrient rich foods such as animals source foods, fruits, and vegetables. As such, the PACD will create an enabling environment in which income generated by the project can be used to improve diet quality—a direct contributor to nutrition. Continuing from the nutrition interventions piloted in the PPAP, targeting and delivery mechanisms will be improved. Activities will support the implementation of the PNG Multi-Sectoral National Nutrition Policy, specifically by contributing to achieving objectives 1, 2, 3, and 4, through financing the following (see details in annex 3):

- Undertake a rapid situation analysis and barrier analysis to better target PACD nutrition activities.
- Finance nutrition education and behavior change modules that create incentives to allocate income generated through the PACD toward nutrition.
- Promote activities that improve the access to diversified nutritious and local foods all year.
- Strengthen the evidence base of nutrition-sensitive agriculture interventions which improve food and nutrition security as well as food system resilience.

43. These activities will be implemented in coordination with gender interventions, within specific pilot areas<sup>20</sup> across the project. The second activity on nutrition education will be mainstreamed across all PACD sites.

44. **Maximizing Finance for Development (MFD).** Throughout the world, agriculture is often seen as a 'high risk' investment, and this is no different in PNG, where many market failures hinder the development of a competitive sector and the attraction of private sector investments. The sector has long, disjointed, and inefficient supply chains with many different stakeholders and logistical challenges given its geographical nature and poor infrastructure. Stakeholders along value chains are uncoordinated and there is a disconnect between demand and supply, leading, on the supply side, to poor access to markets for smallholders and, on the demand side, to inefficient raw material procurement and supply network for aggregators and processors, which are struggling to get the quantity and quality of the raw material needed to profitably run their businesses. To tackle these market failures and to support smallholder farmers taking part in commercially demanding value chains, experience has shown that the aggregation schemes aimed at linking farmers to markets require initial public support to offset part of the start-up costs and lower risk for private financiers. Both types of public support—that is, to aggregation entities

<sup>20</sup> Pilot areas to be determined according to criteria outlined in the PIM.



and smallholder farmers—are usually justified based on market failure arguments related to information asymmetries and economies of scale.

45. Following the cascade approach for MFD in the agriculture and food sector, the subsequent areas were identified for project interventions across the value chain that can support private sector solutions:

- **Actions to ensure responsible agriculture investments.** In cases where the private sector, including multinationals and national companies, is already buying from smallholders, the PACD will support farmers to adopt GAPs, including climate-smart ones and new technologies.
- **Actions to increase space for private sector investment.** Established under the PPAP, the project will continue to support industry bodies (ICCs) which raise the voices of the private sector and facilitate dialogue with all levels of government. Through the productive partnership model, private actors will also be involved in seed multiplication and nurseries, increasing space for private sector investments into the input market.
- **Actions to improve the policy and regulatory environment for private sector investments.** The PACD will strengthen quality and sustainability management by promoting quality standards and food safety, MIS, and ICC to support sector dialogue and policy development in the cocoa, coffee, livestock, spices, and coconut subsectors.
- **Public investments that will induce more private sector investments.** The project will address market failures by using an inclusive business model to improve links among smallholders and firms of all sizes, where producers and off-takers maximize mutual gains. The GoPNG will have a facilitation and coordination role to bring together farmers, aggregators, processors, and other actors along the value chains and support them in preparing and implementing profitable partnership and business plans and will ensure that contracts and agreements between parties are fair, transparent, and market driven as well as support the capacity of smaller actors to engage gainfully and pragmatically in commercial agricultural value chains. To reduce private sector risks, the project will use the MG risk sharing instrument. It will improve incentives and reduce private sector transaction costs and risks by investing in feeder roads based on clear private sector needs and improving coordination among value chain actors. There is a strong rationale for public sector financial support of ‘private investments’ to facilitate quick adaptations, reduce risks for involved stakeholders, and stimulate additional private investments in line with the MFD principles.

### C. Project Beneficiaries

46. **Direct beneficiaries.** The primary beneficiaries of the PACD will be the smallholder farmers (and their families), their groups and cooperatives (POs), and MSMEs<sup>21</sup> engaged in crops (cocoa, coffee, coconut, spices) and small livestock production, collection, processing, and marketing. MSMEs targeted under the project will include not only farmers but also the private sector along the value chain.

<sup>21</sup> Definition from the PwC Commentary on PNG Government’s SME Policy 2016.



'Smallholder farmers' refers to farmers who cultivate tree crops in individual gardens of less than 5 ha or in collective 'blocks' of 5 to 20 ha involving several households.

47. Given the GoPNG's emphasis on agriculture to accelerate economic growth and generate revenues, the project may require a targeted approach toward farmers willing to move from subsistence to semi-commercial or commercial farming (therefore being more selective than in the case of the PPAP). However, the smallholder farmers remain the primary direct beneficiaries of the new project, together with the POs formed by those better-off and willing to address common issues collectively. While building on the PPAP, the PACD will incorporate a complementary window targeting the more progressive farmers and those who are ready to take risks and organize into more commercial alliances. Additional direct beneficiaries will be MSMEs (mainly micro and small private enterprises) involved in agribusiness activities (storage, processing, marketing, and inputs supply). DAL and the commodities board staff will also benefit from capacity-building interventions.

48. **Commodity selection.** Through the experiences of the PPAP and other agricultural projects in PNG, it has been found that many commodities do not have the strong entities, LPs, and extension services required to provide expertise to farmers. For this reason, the PACD restricts commodities to coffee, cocoa, and three additional commodities. Coffee and cocoa remain within the PACD scope because of the sector-wide initiatives (for example, new tree planting and pest control) that are still important for their development and the need to consolidate achievements started under the PPAP and expand to new provinces. For more remote communities where access to markets can be a challenge, a focus on low-volume, high-value commodities (such as nonperishable spices) may be a plus.

49. The selection of commodities has been done through commodity analysis during project preparation, using seven criteria for selection<sup>22</sup>—in addition to their synergistic integration into cocoa or coffee farming systems such as apiculture for coffee and shade trees (galip nuts notably) for cocoa—and include diversified commodities, traditionally associated with cocoa and coffee production systems: spices (ginger, chili, turmeric, nutmeg, and so on), coconut, and small livestock (pigs and poultry). This review has factored in, as much as possible, the multiple priorities outlined including climate change, nutrition, gender, market access, private sector potential, and value chain viability.

50. Regarding the geographical scope, MTDP III identifies 10 'economic corridors' for priority services delivery, defining zones for development of public transport and utilities network, social services, and integration of economic plans including agriculture. The PACD will align its geographical scope to this GoPNG strategy by selecting provinces that are included or connected to some of these corridors, based on transparent selection criteria, notably (a) consolidating achievements of the PPAP while expanding to new provinces that should benefit from the PPAP delivery model, (b) converging with the GoPNG's priorities for roads infrastructure network enhancement, and (c) harmonizing and complementing with other donor-funded projects (notably the IFAD and EU new projects). Accordingly, targeted provinces are for (a) consolidation, diversification, and stronger focus on quality, markets, and POs: Eastern Highlands, Enga, Jiwaka, Simbu, Southern Highlands, and Western Highlands as well as the Autonomous Region of

<sup>22</sup> Agreed criteria comprise (a) competitiveness and existence of a market justifying good return on investments; (b) availability of technical advisory and extension services for these specific commodities, whether of public or private origin; (c) tradition of integrating the selected commodities in cocoa and coffee farming system, as a diversification strategy; (d) importance of women's participation in specific commodities; (e) share of the value chains' income remaining with the smallholder producers; (f) size of the population involved or benefiting from the selected commodities; and (g) commitment of different levels of government (including provincial and district) to it.



Bougainville (AROB), East New Britain (ENB), Madang, and Morobe and (b) productive partnership model expansion on cocoa: New Ireland and West New Britain.

51. **Gender.** The SCD for PNG identified two key impediments to reducing poverty and boosting shared prosperity: (a) gender inequity and GBV and (b) limited opportunities for youth. Subsistence agriculture and local trading in rural contexts are key sustaining elements for women in the economy, who have limited access to formal economic opportunities and services and limited control over land and household resources. The Guidelines for integrating gender into World Bank Agribusiness projects<sup>23</sup> noted the importance of activities promoting women's economic activity targeting not only women but also men, to be sustainable. This was also noted in the Do No Harm Research in PNG which found that the improvement of women's economic situation often comes with a compromise to their safety and well-being; that increased economic activity did not mean a reduction in household duties, leaving them time-poor and tired; and that a lack of time to complete household chores such as carrying water, cooking, cleaning, and subsistence farming often lead to conflicts with their spouses. Without a parallel effort to reduce the domestic burden and shift household gender-based power dynamics, initiatives that seek to directly engage women in higher-value agricultural activities may only result in a greater overall workload for women.

52. In early 2018, a specific gender time-use study among PPAP farmers<sup>24</sup> found an imbalance between male and female time use in domestic and productive work and a related gap between men and women in the control and management of money. The average number of hours spent in cocoa production by men is almost triple that of women in the cocoa growing areas and double in the coffee growing areas. On the other hand, women work on average 2.8 hours more in domestic activities than men in the coffee growing areas and 4.1 hours more in cocoa growing areas. The study found that household awareness and training on gender dynamics and increased responsibilities of women could improve welfare outcomes for all household members. The domestic workload may be reduced by technological interventions to reduce labor inputs or by a more equal sharing of domestic tasks between household members through training and awareness raising.

53. **Gap.** Women's need for flexibility to accommodate the demands of home and family, as well as their marginalization from systems of authority, has resulted in their overrepresentation in the micro and informal economy. Women make up approximately 85 percent of informal market vendors. Among formal SMEs in the farming sector, just 7 percent are all or majority women owned, whereas 59 percent of farming SMEs are all or majority men owned (see table 3.2).

54. UN Women's Melanesian research<sup>25</sup> found that women vendors in markets generally lacked access to capital and formal financial services and this was a major impediment to their well-being and productivity. Similarly, the PNG National Audit found that lack of access to financial services is a key constraint to business expansion. Fewer women workers than male workers were able to use formal banking. This has implications for their capacity to borrow money or to safely make savings. At the same

<sup>23</sup> <http://documents.worldbank.org/curated/en/898711526020334478/Guidelines-for-integrating-gender-into-World-Bank-Group-Agribusiness-projects>.

<sup>24</sup> World Bank. 2018. *Household Allocation of Time and Efficiency in PNG*.

<sup>25</sup> UN Women. 2017. *Consolidated Report, Summary of Findings from Work Carried Out in Fiji, Vanuatu and the Solomon Islands 2008-14, as a Foundation for the Markets for Change Program, Pacific Office*; UN Women. 2017. *Survey Report on Financial Literacy Training: Delivered to Market Vendors in Port Moresby, PNG Office*.



time, a range of informal financial services (lending, saving, and investing) have come into existence, many of which are exploitative and insecure for vendors untrained on financial literacy.

55. **Action.** In response, the PACD will strengthen women's access to finance (MGs) and support the transition of women's informal businesses to become registered, well-run small businesses (technical assistance). In particular, the project will direct MGs, entrepreneurial training, information, and infrastructure to improve market access and thereby increase women ownership and management of farming MSMEs. Actions will include the following:

- Assessment of expression of interest and applications for partnership funding will include evaluation criteria<sup>26</sup> related to inclusion of women farmers, by weighting for selection and criterion for allocation of grants to ensure at least 15 percent of grants flow to women farmers.
- Family-based approach will establish the principles of inclusive household-level action plans, where the whole family is involved in decision making, around project investments and partnership implementation, that is, (a) extension/technical inputs and training delivered through/in line with the family teams-based approach<sup>27</sup> and financial literacy and business development services for households; (b) business development services to maximize partnership arrangements and support identification of practices that support women and men working together in business; and (c) community-level support for inclusive business partnerships and identification of capacities, priorities, and participant households. Rapid rural appraisal to ensure that social dynamics (wantok, land issues, and so on) enable inclusive business partnerships.

56. **Indicator.** To monitor this gap, the project will include the below intermediate level indicator in the Results Framework. This equates to 15 percent of the MSMEs and POs implementing subprojects that are women owned or led (3 out of a total of 20), which is higher than the national average of 7 percent in the farming sector. An additional indicator will be monitored against the number of women-owned MSMEs or women-led POs receiving technical assistance, which also equates to 15 percent of the total target.

- Number of women owned MSMEs or women-led producer organizations supported through the project (Baseline: 0, Target: 3)

57. As noted previously, GBV is an important barrier in women's successful participation in agricultural and other economically productive activities; addressing GBV prevention and response can therefore contribute to the overall success of the project. It is also important that the project follows a 'Do No Harm' approach, that is, the project does not create any increased risk of GBV for participants. To achieve these objectives, the following actions will be implemented as part of the Subcomponent 1.1 by the PCU:

<sup>26</sup> Specific criteria to be developed in the operating manual.

<sup>27</sup> Based on the 'Family Teams Approach' developed by the Australian Centre for International Agricultural Research (ACIAR) and CARE's 'Family Business Management Training', the PNG 'Family Farm Teams' Research Report, and (c) the recently launched IFAD program "Markets for Village Farmers Project - Maket Bilong Vilis Fama."



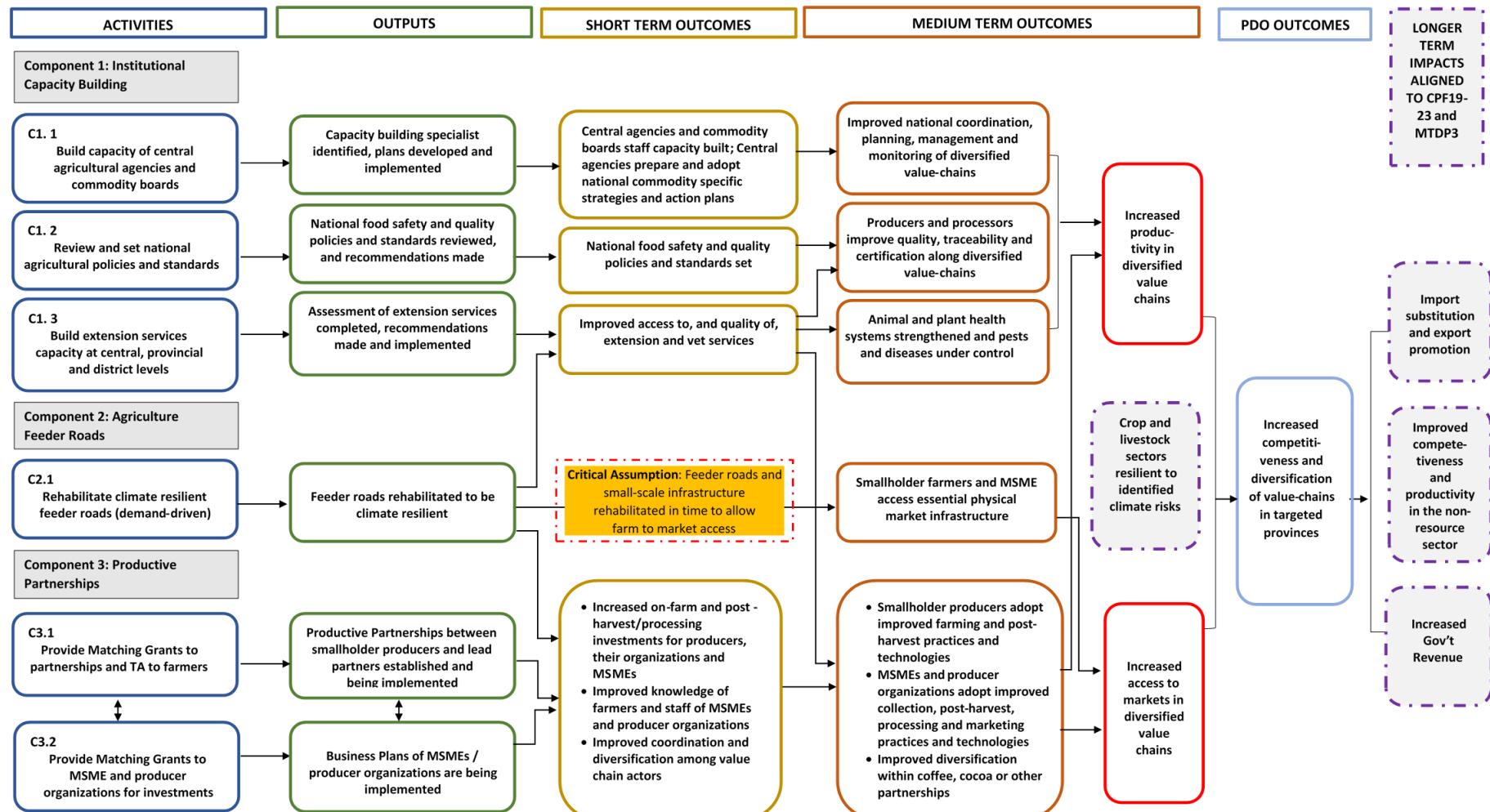
- Address potential GBV cases and provide appropriate support by (a) mapping existing GBV-related services in project areas; (b) developing information, education, communication (IEC) materials on these services; (c) conducting regular awareness raising sessions on GBV, consequences, and available services in project areas, and (d) training project staff on GBV and responding to any disclosures of violence.

#### D. Results Chain

58. The project's Theory of Change (ToC) responds to the following problem statement: "Weak extension services and lack of access to inputs, infrastructure and markets prevent smallholder farmers and MSMEs from increasing productivity and competitiveness." The PACD's activities address the problem statement by focusing on three areas of change: (a) strengthening the institutional capacity of agricultural agencies, commodity boards, and extension services; increasing human capital at several levels of the value chain; and reviewing and reforming key agricultural policies; (b) rehabilitating rural feeder roads; and (c) providing finance and technical assistance to smallholder farmers and MSMEs. Expected medium-term outcomes include better coordination, planning, management, and monitoring of the agriculture sector; animal and plant pests and diseases under control; improved access to essential infrastructure networks and logistics; and improved farming and post-harvest practices and better integration into diversified value chains. The expected PDO-level outcomes of increased competitiveness through improved productivity and access to market and diversification of the value chain beyond coffee and cocoa align with the GoPNG's MTDP III long-term goal of improved export promotion and import substitution.



Figure 1. Theory of Change





## E. Rationale for Bank Involvement and Role of Partners

59. The GoPNG has placed high priority on increased agriculture production in MTDP III 2018–2022 to broaden its economic growth. The modern extractive sector draws on substantial reserves of metal ores and hydrocarbons; however, it generates only a small number of employment. The majority of the population (86 percent) resides in rural areas and is dependent on semi-subsistence agriculture. The pattern of growth based mainly on the extractive industries sector has not led to improvements in living standards in rural areas. At the other end of the scale, investments in agriculture (such as coffee, cocoa, and vanilla) are labor intensive creating more jobs per kina invested.<sup>28</sup>

60. Fostering the enabling environment for private investments in agriculture is a crucial task for the GoPNG, justifying public sector financing in areas where the market and status of infrastructure are not appealing to the private sector. In addition, some investments that provide improved food safety, mitigate impacts of agriculture on climate change, or ensure food security and nutrition to the population are of public good nature and can generate long-term positive impact on the economy and social welfare of PNG people.

61. The World Bank's experience and lessons learned in supporting the agriculture sector in PNG through the PPAP have helped inform the design and development of the PACD. PNG is slowly moving to the productive alliance model implemented successfully in Latin America for several years.<sup>29</sup> Some ongoing World Bank-funded projects in the Pacific region such as in Samoa and the Solomon Islands also promote and support similar approach of agribusiness partnerships. The World Bank has, therefore, the relevant experience, has comparative technical advantage, and is well equipped to help PNG evolve its productive partnerships model into more efficient productive alliances and engage the private sector with smallholder producers to integrate them into the value chains. Donor coordination is a high priority for the GoPNG and the World Bank will be able to support the Government in ensuring this. To this end, close dialogue will be maintained with development partners working in the agriculture space in PNG to build on each partner's comparative advantages and harmonize complementarities. Of notable importance are the following donors with active or pipeline projects in the agriculture sector: (a) the IFAD, which has recently launched the fresh produce sector Markets for Village Farmers based on the PPAP model and covering the same geographical areas; (b) the EU, and (c) several bilateral donors, notably the Government of Australia through the Australian Department of Foreign Affairs and Trade, Pacific Horticultural Agriculture Market Access, and ACIAR.

## F. Lessons Learned and Reflected in the Project Design

62. The preparation of the PACD is building on the experience of current and previous World Bank projects in PNG and the Solomon Islands (particularly on feeder roads and agribusiness partnerships for a wide range of value chains) and other agriculture projects in PNG. The design of the project also considered lessons learned in other countries with the implementation of public-private partnerships (or productive alliances) in the agriculture sector.

<sup>28</sup> PNG SCD.

<sup>29</sup> World Bank Group. 2016. *Linking Farmers to Markets through Productive Alliances – An Assessment of the World Bank Experience in Latin America*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/25752>



63. **Project management.** The most important lesson from development projects in a fragile environment like PNG, particularly in the agricultural sector, is that the capacity and integrity of the institutions involved in implementation is a critical factor in the ability of the project to achieve the desired impacts on a sustainable basis. The weak performance of public sector institutions, the Government's limited budgets for operational costs other than salaries in sector institutions, and the Government's inability to make timely and adequate appropriation of counterpart funding have been recurrent issues.

- **Decentralized project management.** The current PPAP has demonstrated a successful model with project management functions devolved to the commodity boards and at the provincial level, closer to field level, and the use of output contracts with clear definitions of tasks and deliverables for contractors and service providers.
- **Use of PMUs at the implementing agency** and PCU at the national DAL level is widely recognized as an effective project implementing structure. In the agriculture sector, this experience points to the merits of contractual systems to outsource management functions or the delivery of key services given the severe constraints affecting public institutions.
- **M&E.** There is a need to have systems for data collection available from the outset and to implement strong management procedures that include appropriate incentives and penalties, so that accurate information is collected and processed as part of regular work and because of the difficulties in collecting accurate yield and sales data from farmers due to poor record-keeping.

64. **Productive partnerships.** Recent reviews of projects involving public-private partnerships in the agriculture sector provided a number of relevant lessons for the PACD, including the following:

- Governance structures are important for the approval of specific partnerships, to avoid political interference and other conflicts of interest (such as two-tier appraisal and approval processes)
- There is a need for clear sector priorities and alignment of the proposed partnerships with the objectives of the sector and the use of specific terms of references for calls for proposals. Policy dialogue with the industry has been conducted during the PPAP and will be supported under the PACD
- Fostering improved relations between the public and private sector is critical and this is being acknowledged. The public sector cannot perform the role of the private sector but should create the necessary conditions for the private sector to engage with smallholders because of the risks and high transaction costs involved. Funding for partnerships also needs to avoid long and protracted project processes, use simple processes for preparation but close supervision of implementation, and respect confidentiality as needed
- Partnerships need to be both market and demand driven and allow for diversification of farming systems and value chains

65. **Productive alliance.** The project builds on the experience from World Bank-supported 'productive alliance' projects, including lessons from the successfully implemented Vietnam Agriculture



Competitiveness Project. The Vietnam project focused on giving the rural poor access to technology and innovation, financing, and markets, complemented by the upgrading of rural infrastructure. Lessons after completion included the following: (a) transformative impacts are increased if technology, partnership, and infrastructure interventions are more strategic and geographically clustered and (b) promoting complex relationships between the POs and agribusinesses is better done in stages. For newly formed groups, the initial focus should be on developing core management skills and effective governance arrangements and undertaking a few basic functions.

66. A major conclusion emerging from a recently published study 'Linking Farmers to Markets through Productive Alliances: An Assessment of the WBG Experience in Latin America' (World Bank Group 2016)<sup>30</sup> is that the approach can be a cost-efficient way to boost productivity, expand production, improve competitiveness, and link farmers to markets. The completed productive alliance projects have shown satisfactory financial rates of return and largely achieved their objectives. The productive alliance approach is flexible and can be adapted to many different target groups, value chains, and production environments. The productive alliance has been an effective tool not only for targeting established producer groups and value chains but also for fostering the inclusion of disadvantaged groups in markets. Main lessons include competitive subproject selection based on clearly defined technical evaluation criteria, financial and technical support provided to stakeholders during the implementation of their subprojects, the identification and prioritization of promising value chains during project preparation based on a realistic assessment of the local/regional comparative advantage in specific value chains, beneficiary targeting and selection considering producers' existing endowments and assessing their ability to comply with market requirements, or requiring cash contributions or commercial bank loans as co-financing from producers ensures stronger buy-in.

67. **Infrastructure works.** Sustainability of road maintenance is always a concern when investing in roads through a project. Although several approaches have been attempted in PNG, it is not clear if one model stands out as best practice. The PPAP piloted a model where the project financed the road rehabilitation work on the agreement that the provincial government would ensure continuous maintenance. A public sector approach has also noted some success in remote areas where there is limited private sector interest or prohibitively high costs. Lessons learned from these approaches will inform the model used; however, experience suggests challenges will remain.

68. **Complementarity and coordination.** It is vital for a project's components and subcomponents to be implemented effectively in a coordinated manner for optimal complementarity. The success and effectiveness of each component depends on the success and effectiveness of other component's implementation. This has also been a lesson learned from other similar operations. Given the high degree of mutual dependence of project components/subcomponents, project coordination will be essential.

69. **Stakeholder consultation.** It is critical that a deeper and broader consultation and communication process upstream with communities is ensured for people to understand their roles and responsibilities: (a) including other relevant departments, provincial governments, churches, and civil society is vital for matters that affect land and environment in the discussions and (b) a stricter review of the land use rights through the Clan Land Uses Agreement and Incorporated Land Groups.

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<sup>30</sup> World Bank Group 2016



### III. IMPLEMENTATION ARRANGEMENTS

#### A. Institutional and Implementation Arrangements

70. The project will be implemented by DAL, CIC, and CB. In relation to DAL, the project will build on the momentum of the PPAP where DAL will host a PCU that will coordinate the implementation of the overall project and will hire advisers in key areas that have proven to be challenging under the PPAP (financial management, M&E, procurement and safeguards). The PCU will provide support to DAL for the implementation of Subcomponent 1.1, Component 4, and Component 5. Under the PACD, the PCU will have a greater role of building capacity within DAL, KIK, Spices Commodity Board, and the LDC and continue to support the two current PMUs (coffee and cocoa) which will remain in place.

71. The regional DAL offices based in Goroka (for the Highlands), Lae (Momase and Madang), and Kokopo (ENB), as well as the DPI in AROB, will play an important role in ensuring that PACD interventions are well aligned with national and regional priorities. These offices will help coordinate interventions in their respective geographical areas while receiving direct support from the project to build their internal capacity to deliver services to producers. They will also be trained to continue supporting PPAP farmers and monitor their progress (consolidating POs, increased productivity of pruned or replanted trees [notably clones in cocoa]), through the specific outreach program under Component 1.

72. As in the PPAP, CIC will continue to host a Coffee PMU and CB will continue to host a Cocoa PMU. Under the PACD, the two PMUs will provide support to CB and CIC for the implementation of Subcomponent 1.2 and Components 2, 3, and 4 as they relate respectively to the cocoa and coffee subsectors and any other selected commodity subsectors in the province that they cover<sup>31</sup> or as may be specified in the MoU. The two PMUs will look at facilitating diversification toward coconut, spices, and small livestock and will hire subject matter specialists for this. To formalize the collaboration between DAL, CIC, CB, and the commodity boards for each of coconut, livestock, and spices, MoUs will be signed between DAL, CIC, CB, and these three boards. CIC and CB, as project implementing entities, will each enter into a Project Agreement with IDA and a Subsidiary Agreement with the Department of Treasury (DoT), on behalf of PNG.

73. DAL, CB, and CIC will hire and maintain consultants as per the following:

- At the DAL PCU level in Port Moresby, at least the project coordinator, an FM specialist, an M&E specialist, a procurement specialist and a safeguards specialist. Other consultants will be recruited based on identified needs (gender, communication, and nutrition).
- In each commodity board's PMUs, the two project managers in the CB PMU (Kokopo, ENB) and CIC PMU (Goroka, Eastern Highlands), an accountant, a procurement officer, a safeguards officer, an M&E officer, a civil engineer, and a Component 3 manager. In collaboration with other commodities boards, the two PMUs will also recruit subject matter specialists (livestock and crops).

<sup>31</sup> CIC PMU: Simbu, Eastern Highlands, Enga, Jiwaka, Southern Highlands, and Western Highlands;  
CB PMU: AROB, ENB, Madang, Morobe, New Ireland, and West New Britain.



74. A Project Steering Committee (PSC) will be responsible for providing overall policy guidance and strategic direction to the PCU for the project. The PSC will be composed of representatives set forth in the PIM, including representatives from DAL, Department of National Planning and Monitoring (DNPM), DoT, Department of Works (DoW), the private sector, CB, CIC, and other commodity boards. Each ICC for cocoa and coffee established under the PPAP will remain at CB and CIC respectively and continue providing commodity-specific oversight and strategic guidance to the two PMUs. Their composition is made of representatives from (a) the private sector, (b) CIC or CB, (c) the provincial government, and (d) the central and regional DAL. Representatives from KIK, Spices Commodity Board, and LDC will be added to each of the ICCs as both coffee and cocoa production areas may diversify to coconut, spices, and small livestock production. Each of the ICCs will also provide final approval on the proposed partnership grants and MGs to be provided by CB and CIC, respectively, under Component 3. The appraisal of the partnership and MG proposals under Component 3 of the project would be the responsibility of a Technical Appraisal Committee (TAC).

75. Regarding Component 2 (Agriculture Feeder Roads), the implementation will remain in the hands of the two PMUs where the civil engineers will be based. During the procurement processes, national DoW clearance will be obtained by the respective Provincial Works Manager (DoW) before being submitted to the National Procurement Commission for approval. The Regional Works Managers for Mount Hagen, Lae, and Kokopo will also sit in the ICCs' meeting when feeder roads are discussed.

76. To support project implementation, the following will be prepared:

- A PIM shall be prepared and adopted by DAL. It will include institutional arrangements for day-to-day execution of the project (excluding those activities under Components 3 and 5 of the project), including procurement, safeguards, FM, and M&E.
- The PGMGG, which will contain detailed arrangements and procedures concerning partnership and MGs under Component 3, shall be prepared and adopted by CIC and CB.
- A CERC Operations Manual, to detail any special institutional arrangements for coordinating and implementing the Emergency Response Part, shall be prepared and adopted by DAL.

77. An annual work plan and budget will be prepared by DAL and submitted to the World Bank for review by August 15 of each year that the project is active.

## B. Results Monitoring and Evaluation Arrangements

78. The PACD's M&E system is designed to assess whether the expected changes described in the ToC (see figure 1 and annex 1), and translated into indicators in the Results Framework, effectively take place. It includes an MIS, internal progress reporting, and impact evaluation surveys on production and MGs. The overall M&E framework is built on the experience and lessons learned from the PPAP. While data collection and verification has remained an inherently weak point during the PPAP (details in annex 2), the system under the PACD will include mitigating measures to strengthen these processes.

79. The PCU will retain overall responsibility for the management of the M&E system, including monitoring, evaluation, and results reporting. Similarly, the Coffee and Cocoa PMUs will retain a major implementation role, notably on the Productive Partnerships component. Capacity across both units will



be strengthened and the M&E for new value chains will be enhanced with the placement of subject matter experts on spices, coconuts, and livestock.

80. The M&E system will collect data and information on project implementation and impacts to

- Ensure a high level of transparency and accountability in the delivery of project activities;
- Improve the effectiveness of day-to-day decision making through the provision of timely information to project managers and staff;
- Empower key stakeholders and project beneficiaries to provide timely feedback to project management and staff, ensuring that the project adapts to remain responsive to their needs;
- Capture and communicate lessons learned to improve performance during project implementation and to allow other similar and related projects to benefit from improved practices; and
- Verify the achievement of intended project objectives and outcomes through building a strong evidence base drawing on collection and analysis of high-quality socioeconomic and farming practice data.

81. A midterm review will be organized to assess progress toward the PDO and implementation bottlenecks. The M&E section of the PIM will describe (a) what data and information need to be collected (on which project systems, inputs, processes, results, and impacts); (b) who, how, and when it will be collected; (c) how it will be stored, processed, and delivered; and (d) who will have access to raw data, processed data, and information.

82. **Management Information System.** The MIS will be an important part of the project's M&E system, recording and presenting information on indicators in the Results Framework and supplementing the impact evaluation surveys. It will be modelled on the system developed for the PPAP and draw from its implementation. As with the PPAP, it will perform two important functions: (a) a management tool with the capability to monitor project activities effectively and efficiently and (b) a strategic information resource with a growing database of farmers, farms, yields, sales, and other key sector-wide information, designed to become the foundation of comprehensive sectoral and national information systems in the future. With the expansion of value chains, activities, and geographical coverage envisaged in the PACD, both aspects assume even greater importance. The availability of accurate and timely monitoring information will be fundamental to the project's ability to scale up its current operations. Designed as an information resource with geographic as well as statistical information on key indicators, the MIS could be an invaluable tool in better planning services and long-term strategic interventions, such as on roads and other infrastructure.

83. The PPAP MIS, successfully deployed in the cocoa sector, will be used in the PACD. Routine modifications are envisaged to accommodate new value chains and activities. The focus on partnerships and farmers data will remain in promoting record bookkeeping, building upon the current database of some 20,000 farms and farmer households. The use of free open source technologies will facilitate extensive scale-up of the system to meet the needs of the project as well as long-term sector requirements. The design supports stand-alone or web-based deployment, depending on the quality of



Internet services. The use of tablet devices for field data collection by extension officers and M&E officers has already been tested in the PPAP and will be deployed progressively in the PACD. Adequate technical capacity to deploy and operate the MIS software has been developed in the PPAP, combined with externally contracted software development expertise. This model will continue, but the PACD will include a specific focus on developing local capacity to ensure future sustainability.

### C. Sustainability

84. **Institutional sustainability.** The GoPNG maintains a strong commitment to the continued growth and development of its agriculture sector. As seen from the Government's Vision for 2050 and MTDP III, where agriculture remains a priority, particularly for small-scale farmers and the coffee and cocoa sectors, project activities will directly contribute toward government objectives. The PACD includes an Institutional Capacity Building component which will help address needs within DAL, relevant commodity boards, and extension level services. As a follow-on project from the PPAP, the PACD will continue to build institutional capacity through regular implementation support visits and dedicated training sessions.

85. **Economic sustainability.** By partnering with the private sector to engage and build LPs, the project will set the foundations for economic sustainability. Building on the successful model of the PPAP, this project will expand the coverage to allow more smallholder coffee and cocoa farmers to benefit as well as open it up into new commodities that show potential. The project will work with MSMEs along the value chain to address roadblocks that may limit sustainability, and these activities will be based on results from a value chain analysis which highlight key constraints that need to be addressed. By taking part in the project, farmers will access knowledge and training on more sustainable and effective farming practices, as well as business skills such as financial literacy and livelihood training, which will allow them to benefit after project completion.

86. **Climate, disasters, and environmental sustainability.** The selection of value chains will be done considering environmental sustainability, particularly with regard to production that does not lead to deforestation. Through training and awareness raising, farmers will be encouraged to use more climate-smart agricultural practices and the project will support investments into more efficient and environment-friendly post-harvest and processing technology. Roadworks undertaken by the project will be done using disaster and climate-resilient designs or materials such as sloped roads and by signing agreements with local communities for basic maintenance which can prevent damage during heavy rain and other extreme weather.

## IV. PROJECT APPRAISAL SUMMARY

### A. Technical, Economic and Financial Analysis

87. **Technical analysis.** The project will work toward achieving its PDO by addressing the identified constraints. A lack of subject matter experts has been identified as a government-wide constraint for project implementation and will be addressed/minimized through recruitment of consultants within the PCU and two PMUs and through capacity-building activities for DAL at both central and decentralized levels. Access to finance and specialized training and knowledge on best practices is a crucial element of the adoption of improved farming practices by farming households. This gap will be filled through the



productive partnerships platform and the LPs who will serve as the channel for grants and delivery of advisory services and inputs.

88. Studies have also been undertaken to better understand the selected value chains and market constraints and needs. These have identified further activities that the project can implement to increase access to markets for farmers. Improved quality and reliability of produce has already been identified as a constraint to accessing the higher-value markets and collectively sourcing and selling products is a potential way to overcome this. Initial success has been seen under the PPAP through initiating the cooperative/marketing groups model and this will be expanded on in the PACD. Lack of local post-harvest processing is also a key bottleneck to value addition and access to markets for those smallholder producers. Subcomponent 3.2 will address this bottleneck with the MG to MSMEs and POs.

89. Annex 5 presents the economic and financial analysis (EFA) of the project. Investments are expected to generate a number of benefits such as the increase in some selected tree crops (cocoa, coffee and coconut) and annual crops (spices), decrease in transport costs, reduction of animal mortality rates, value addition due to better processing, and therefore increase in value of sales from smallholder and MSMEs. Some of these parameters have been chosen as PDO-level indicators since project interventions should result in measurable impacts due to (a) improved access to advisory services; (b) enhanced access to innovative technologies and practices by farmers; (c) improved availability of inputs: seedlings, clones, animal feeds and breeds; and (d) strengthened feeder road networks. The project is also expected to create a number of positive externalities, such as institutional strengthening, enhanced capacities of stakeholders, improved nutrition, and higher adaptability to climate change and resilience to disasters. These benefits were not fully quantified due to the difficulty in attributing a monetary value to their contribution to the PDO.

90. The EFA uses ‘with or without project’ scenarios that look at different productivity factors—supported by cost-benefit analysis to assess the overall viability of the project, through the calculation of PACD’s internal rates of return (IRRs) and net present value (NPV). The results, detailed in annex 5, indicate that the project is economically justified. The analysis also demonstrates that the PACD is aligned with the World Bank Group’s twin goals of ending extreme poverty and boosting shared prosperity. Under the current assumptions (annex 5), the IRR is 29 percent and the NPV at PGK 112.8 million (US\$ 47 million). The project is sensitive to changes in some of the project’s variables, including increase in production costs, decrease in international prices of cocoa and coffee, or decrease productivity due to a disaster (climatic event or tree crops pest outbreak).

91. Environmental externalities were calculated by using the EX-ACT, a tool developed by the FAO to calculate the economic value from the GHG mitigated.<sup>32</sup> The result shows a project marginal carbon emission savings of 8.3 million tCO<sub>2</sub>eq over 20 years equivalent to 415,673 tCO<sub>2</sub>eq per year or if 15 years, the time frame of the economic analysis, is considered, then -5.9 million tCO<sub>2</sub>eq in total and -395,878 tCO<sub>2</sub>eq annually. If climate mitigation benefits are included in the economic analysis at a low and high shadow price of carbon, it results in an IRR of 76 percent and 127 percent, respectively and an NPV of US\$162 million and US\$270 million, respectively.

<sup>32</sup> EX-ACT. User Manual: “Estimating and Targeting Greenhouse Gas Mitigation in Agriculture,” FAO, World Bank, and Institut de Recherche pour le Développement.



## B. Fiduciary

### (i) Financial Management

92. The project's overall FM risk is rated Moderate. There are three implementing agencies for the project: DAL, CB, and CIC. The existing FM systems for DAL, CB, and CIC are assessed as adequate to meet the FM requirements as stipulated in World Bank Policy Investment Project Financing. An FM assessment was carried out in accordance with the 'Principles Based Financial Management Practice Manual' issued by the World Bank on February 4, 2015, and as further elaborated in the World Bank Guidance 'Financial Management in World Bank-Financed Investment Operations' issued by the World Bank on February 24, 2015. Under World Bank Policy Investment Project Financing with respect to projects financed by the World Bank, the borrower and the project implementing agencies are required to maintain FM arrangements—including planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing arrangements—acceptable to the World Bank to provide reasonable assurance that the proceeds are used for the purpose for which they were granted. These arrangements are deemed acceptable if they are capable of correctly and completely recording all transactions and balances relating to the project. In addition, such arrangements are acceptable if they can facilitate the preparation of regular, timely, and reliable information regarding project resources and expenditures and safeguard the projects assets and are subject to auditing arrangements acceptable to the World Bank.

### (ii) Procurement

93. Procurement for the project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (Procurement Regulations), July 2016, revised November 2017 and August 2018, as well as the provisions stipulated in the Financing Agreement. The project will finance small works contracts, goods, services, and consultant assignments (firms and individuals) for DAL. The PCU established within DAL will have primary responsibility for implementation and coordination and will be supported by the two PMUs established within CB and CIC. To avoid duplication or where logical because they are needed at multiple locations (for example, upgrade of the MIS, baseline, and impact evaluation surveys), for procurement of some goods and services, the DAL PCU will lead the procurement process. All the implementing entities will be involved in these procurement processes and related decision making. Additional procurement support will be provided by a procurement specialist hired to support implementation of key procurement activities, development of systems, and capacity building.

94. **Procurement risk assessment.** A procurement assessment of the implementing entities' existing capacity, experience, and practices for managing procurement was carried out and informs the Procurement Risk Assessment of the implementing entities. The project counterparts—DAL, CIC, and CB—through their respective PCU/PMUs, have more than eight years of experience implementing the PPAP. Procurement under the PPAP is currently Moderately Satisfactory.

95. **Procurement Plan.** A detailed Procurement Plan for the first 18 months of the project was prepared based on the information detailed in the Project Procurement Strategy for Development (PPSD).

96. **Systematic Tracking of Exchanges in Procurement.** The use of the World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system will be mandatory for use under the PACD.



## C. Safeguards

### (i) Environmental Safeguards

97. The project has been determined Category B under OP 4.01 Environmental Assessment. The proposed investments are small scale and potential adverse impacts can be readily managed. There are no potential large scale, significant, or irreversible impacts associated with the project. Management of environmental safeguards matters under the PPAP was satisfactory and this is expected to continue under this project given the common stakeholders and project management entities.

98. The project will invest in infrastructure networks to improve access to market (Component 2). This will involve the rehabilitation of rural feeder roads. As per the PPAP model, feeder roads will be designed and constructed to be more climate resilient through increased resistance to heavy rains occurring during wet seasons (see Component 2 description). These small-scale investments have the potential to cause some minor adverse environmental impacts (mainly during construction); however, these are readily managed through standard mitigation measures.

99. The project will finance small-scale collective infrastructure for partnerships (Component 3) including innovative technologies, notably on climate-smart agriculture practices (agroforestry, water collection and micro-irrigation, drought resistance varieties, intensification of small livestock production [poultry and pigs] and bio-digesters), that have the potential for positive impacts on the environment and small processing facilities (small pulpers and wet processing plants for coffee or fermenting and drying equipment for cocoa). Negative environmental and social impacts associated with these activities are expected to be minor, localized, and temporary.

100. An ESMF has been prepared as the safeguards instrument given that the specific locations of the investments are not known and will be determined during implementation through the partnership/grant process. The ESMF has incorporated the requirements of the World Bank Group's Environmental, Health, and Safety Guidelines and industry-specific guidelines for agribusiness, food production, and pesticides management. The Pest Management safeguards policy (OP 4.09) has been triggered and an Integrated Pest Management Plan (IPMP) has been included in the ESMF. The project will support the sustainable use of chemical fertilizers and pesticides within a holistic farm management model and integrated pest management approach. The IPMP is based on the fact that it was successfully used under the PPAP and will be refined during implementation to include additional crop-specific measures for crops other than cocoa and coffee. The ESMF has been disclosed on the World Bank website on May 2, 2019, and in-country on May 6, 2019.

101. The project also includes a CERC to support emergency activities that ensure continued achievement of the PDO. The ESMF will outline the approach and principles for managing potential environmental and social impacts and risks of the CERC including a screening process in accordance with the World Bank's Rapid Response to Crises and Emergencies: Procedural Guidelines.

102. The Forests safeguards policy (OP 4.36) is triggered as a precaution. The commodities proposed for development under the project—coffee, cocoa, livestock, spices, and coconuts—are often cultivated as part of agroforestry systems and have close interactions with adjacent forests. The investments will not permit further expansion of crop footprints to ensure forest integrity is maintained. It will be important therefore to ensure that the ESMF has rigorous assessment and management processes to ensure that



forest values are not affected as a result of the project investments, including rehabilitation of feeder roads to ensure minimal impacts on forest habitats.

### (ii) Social Safeguards

103. The project is expected to have a positive impact on rural communities in PNG by improving the livelihoods of smallholder farmers and MSMEs and supporting greater economic empowerment for women. However, increased incomes have the potential to lead to community health and safety issues including increased alcohol abuse, GBV, and spread of sexually transmitted diseases. Labor influx associated with feeder road rehabilitation also presents similar health and safety risks, especially in remote communities. Project interventions supporting economic empowerment for women also have the potential to compromise safety and well-being of women. Key issues include increased workloads, conflicts with spouses, and increased risk of GBV. These issues will be managed through a 'Do No Harm' approach integrated into the project design (see paragraph 57).

104. No involuntary land acquisition is expected under the project. Activities involving the siting of collective infrastructure facilities and feeder roads will be either on Government-owned land or land secured through voluntary land donation. These activities may result in the minor damage/loss of food gardens, economic assets, and small structures and in turn affect rural livelihoods. A Resettlement Policy Framework has been prepared to address these potential scenarios, disclosed on the World Bank website on May 2, 2019, and in-country on May 6, 2019.

105. **OP 4.10 - Indigenous Peoples.** The project will be implemented across a wide geographical area, targeting a diverse mix of people groups, with different governance structures, customs and language, and pre-existing tribal relationships/conflicts. This heightens the risk of community dissatisfaction regarding perceived or real inequities during project implementation including people's ability to join partnerships, access to community infrastructure, allocation of POs and MSME grants, and the prioritization of target feeder roads as well as the potential for disproportionate impacts on vulnerable groups. These impacts are expected to be readily managed through free, prior, and informed consultation and rigorous grievance redress.

### (iii) Grievance Redress Mechanisms

106. The project will establish a Grievance Redress Mechanism (GRM) to allow project-affected people/beneficiaries, project staff/volunteers, and other stakeholders to seek satisfactory resolution to grievances they may have in relation to the project. The GRM will help ensure that rights and interests of affected people/beneficiaries are protected and concerns are adequately addressed. The grievance process is based upon the premise that it imposes no cost to those raising the grievances (that is, complainants), that concerns arising from project implementation are adequately addressed on time, and that participation in the grievance process does not preclude pursuit of legal remedies under national law. The GRM will allow the potential affected people to use different channels to report their grievance. An indicator in the Results Framework 'Grievances registered related to delivery of project benefits that are addressed' will monitor the efficiency of such mechanism.



## Grievance Redress Service

107. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project-affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

## V. KEY RISKS

108. **The overall implementation risk rating is assessed as Substantial.** Boom and bust economic cycles have placed significant stress on fiscal security, service provision, and governing institutions. Therefore, to manage the vagaries of the commodity price cycle, there is a need for a sound fiscal policy framework which will enhance the Government's ability to provide quality public services and a rollback of public goods that are central to supporting the business environment. Persistent fiscal deficits, financed through increased domestic and external non-concessional borrowing, the central bank printing money, and build-ups in expenditure arrears have spillover elsewhere in the macroeconomy that further weaken the economic and business environment.

109. PNG's economic governance structure is such that even high commodity prices present economic risks, and the macroeconomic risks to the project are Substantial. In the past, increasing revenues have quickly led to both higher spending and additional borrowing, as the authorities take loans secured against future resource income. Spending booms reduce the quality of spending as government departments and agencies struggle to spend their enlarged budgets, which takes the pressure off the need to ensure effectiveness and value for money. The World Bank is currently working with the GoPNG on a programmatic Development Policy Operation (DPO) to strengthen PNG's macroeconomic framework, improve revenue mobilization, support a sustainable debt strategy, and strengthen public FM. This is the first in a series of DPOs and it is anticipated that these operations and the macroeconomic and public FM improvements they bring will ultimately support the PACD implementation.

110. PNG is politically diverse and fragmented with thousands of tribal groups represented by local and national government structures which do not fit easily with local kin or place/village affiliations. Such fragmentation has generated regular political instability and increases the political and governance risks as well as the risks associated with sector strategies and policies. More recently stability in the governing coalition has improved the situation; however, risks of changing stakeholder preferences remain which may affect the coherence and continuity of the agriculture sector's strategic and policy framework.

111. While strongly building on the PPAP, the project design deeply embeds a strong governance framework to mitigate service delivery risks in a complex country environment and in remote rural areas.



This raises the technical design of the project risk to Substantial. To mitigate this risk, the project steering committee will be established by the PCU to coordinate with other agencies (notably the DNPM, DoT, DoW, the private sector, CB, CIC and other commodity boards, and the ICC each to remain with CB and CIC made up of representatives from private sector, provincial governments, central and regional DAL, CIC or CB, KIK, Spice Board and LDC will be added to ensure soundness of interventions.

112. Institutional capacity to implement a World Bank-financed project is weak. At a portfolio-wide level, the PNG CPF (FY19–23) aims to address this by building on existing engagements, such as agriculture, and limiting the extent to which the World Bank Group engages in new sectors throughout the CPF period. Implementation support will be enhanced by scaling up on-the-ground presence in Port Moresby where feasible and undertaking more regular and intensive portfolio reviews. An integrated capacity-building program, under preparation for PNG and the Pacific, will be implemented to improve the speed and quality of project implementation. For the PACD, where capacity is weak in DAL, the PACD will continue to use the commodity-specific PMUs which were established under the PPAP and will benefit from the capacity already built, notably in procurement, FM, safeguards, and M&E. As much as possible, the project's design has been kept to a tight focus, avoiding complexity which will, in turn, create implementation challenges.

113. **Fiduciary.** Based on the experience of the PPAP, procurement related to roads can be a challenge and can delay project implementation. To mitigate this, the PACD will (a) work more closely with the DoW, including the Provincial Works Manager, to have each step of procurement process endorsed by them; (b) hire a civil engineer to support this process; and (c) host procurement staff in the PMUs as done in the PPAP.

114. **Climate change and natural disasters.** The Climate and Disaster Screening Report<sup>33</sup> looked at the exposure of the PACD's location, the impacts of identified climate and geophysical hazards, the adaptive capacity, and the risk to the outcomes of the project. It found that drought, extreme weather, and sea level rise are hazards which are highly likely, with a high impact and risk in the future. Moderate exposure, impacts, and risk were found for extreme precipitation and flooding, storm surge, strong winds, earthquakes, volcanic eruptions, and landslides. Moderate levels of exposure, impact on the physical assets, and risk to the outcomes were found for crops and land management, livestock, rural transport, and storage and processing in the future. While these risks have the potential to 'make or break' the project, the team will work with the Government, farmers, and cooperatives to mitigate these through the range of climate and disaster responsive activities listed earlier.

115. **Stakeholders.** Based on the PPAP experience, there is a substantial risk linked to the possible incursion of large oil palm companies in project areas which directly impacts project beneficiaries and value chain stakeholders. This is due to poor governance and a lack of clarity over property rights and incomplete landowner identification. Mitigation measures will be strongly applied through (a) up-front communication with communities to make sure people understand their roles and responsibilities and a deeper and broader consultation and communication process upstream, (b) inclusion of other relevant departments such as land and environment in the discussion, and (c) a stricter review of the land use rights through the Clan Land Uses Agreement and Incorporated Land Groups.

<sup>33</sup> The Climate and Disaster Risk Screening Tool provides high-level screening to help consider short- and long-term climate and disaster risks at an early stage of project design.

**VI. RESULTS FRAMEWORK AND MONITORING****Results Framework**

**COUNTRY:** Papua New Guinea  
**PNG Agriculture Commercialization and Diversification Project**

**Project Development Objectives(s)**

To facilitate the development of competitive and diversified agriculture value chains for selected commodities in targeted provinces.

**Project Development Objective Indicators**

| <b>Indicator Name</b>   | <b>DLI</b> | <b>Baseline</b> | <b>Intermediate Targets</b> |          |          |          | <b>End Target</b> |
|---|------------|-----------------|-----------------------------|----------|----------|----------|-------------------|
|   |            |                 | <b>1</b>                    | <b>2</b> | <b>3</b> | <b>4</b> |                   |
| <b>Outcome 1: Development of competitive value chains: productivity</b>     |            |                 |                             |          |          |          |                   |
| Increase in yield of selected crops (Percentage)                            |            | 0.00            | 5.00                        | 10.00    | 15.00    | 20.00    | 25.00             |
| Yield (per hectare) of cocoa wet beans (Tones/year)                         |            | 0.60            | 0.63                        | 0.66     | 0.69     | 0.73     | 0.75              |
| Yield (per hectare) of coffee parchment. (Tones/year)                       |            | 3.00            | 3.15                        | 3.31     | 3.48     | 3.65     | 3.75              |
| Yield (per hectare) of fresh ginger (Metric tons/year)                      |            | 0.20            | 0.21                        | 0.22     | 0.23     | 0.24     | 0.25              |
| Increased piglets weaned per sow and per year (Number)                      |            | 8.50            | 9.00                        | 9.50     | 10.00    | 10.50    | 11.00             |
| <b>Outcome 2: Development of competitive value-chains: access to market</b> |            |                 |                             |          |          |          |                   |
| Increase in the annual volume of gross sales of MSMEs and                   |            | 0.00            | 0.00                        | 10.00    | 15.00    | 20.00    | 30.00             |



| Indicator Name   | DLI | Baseline | Intermediate Targets |          |           |           | End Target |
|--|-----|----------|----------------------|----------|-----------|-----------|------------|
|  |     |          | 1                    | 2        | 3         | 4         |            |
| producer organizations benefiting from subprojects (Percentage)  |     |          |                      |          |           |           |            |
| <b>Outcome 3: Development of diversified value-chains</b>  |     |          |                      |          |           |           |            |
| Farmers from coffee and cocoa producing areas diversifying to other commodities (small livestock, coconuts, spices) (Percentage) |     | 0.00     | 5.00                 | 10.00    | 15.00     | 20.00     | 30.00      |
| <b>Outcome 4: Beneficiaries</b>  |     |          |                      |          |           |           |            |
| Direct project beneficiaries (Number)  |     | 0.00     | 2,000.00             | 5,000.00 | 10,000.00 | 15,000.00 | 20,000.00  |
| Direct project beneficiaries who are women (Number)  |     | 0.00     | 1,000.00             | 2,000.00 | 4,000.00  | 6,000.00  | 8,000.00   |

#### Intermediate Results Indicators by Components

| Indicator Name  | DLI | Baseline | Intermediate Targets |      |      |      | End Target |
|---|-----|----------|----------------------|------|------|------|------------|
|   |     |          | 1                    | 2    | 3    | 4    |            |
| <b>Institutional Capacity Building</b>  |     |          |                      |      |      |      |            |
| Coffee, cocoa, small livestock, coconuts and spices regulatory frameworks reviewed and updated (Number) |     | 2.00     | 2.00                 | 2.00 | 3.00 | 4.00 | 5.00       |
| Coffee, cocoa, small livestock, coconut and spices strategies and action plans developed                |     | 1.00     | 1.00                 | 2.00 | 3.00 | 4.00 | 5.00       |



| Indicator Name  | DLI  | Baseline | Intermediate Targets |          |          |          | End Target |
|---|------|----------|----------------------|----------|----------|----------|------------|
|   |      |          | 1                    | 2        | 3        | 4        |            |
| and/or updated (Number)   |      |          |                      |          |          |          |            |
| Commodity Board and DAL staff (national, regional, provincial, district) trained (Number)                 | 0.00 | 150.00   | 400.00               | 700.00   | 900.00   | 1,000.00 |            |
| <b>Agriculture Feeder Roads</b>   |      |          |                      |          |          |          |            |
| Feeder roads rehabilitated to be climate resilient (Kilometers)   | 0.00 | 10.00    | 20.00                | 30.00    | 40.00    | 50.00    |            |
| Feeder roads have Memorandum of Understanding established between private and public parties (Percentage) | 0.00 | 100.00   | 100.00               | 100.00   | 100.00   | 100.00   |            |
| Households benefiting from rural feeder road rehabilitation (Number)                                      | 0.00 | 0.00     | 400.00               | 1,000.00 | 2,000.00 | 3,000.00 |            |
| <b>Productive Partnerships</b>  |      |          |                      |          |          |          |            |
| Partnerships under implementation (Number)  | 0.00 | 5.00     | 10.00                | 15.00    | 25.00    | 35.00    |            |
| MSMEs or producer organizations implementing subprojects (Number)   | 0.00 | 2.00     | 5.00                 | 10.00    | 15.00    | 20.00    |            |
| Number of women owned MSMEs or women-led producer organizations supported through the project (Number)    | 0.00 | 0.00     | 0.00                 | 1.00     | 2.00     | 3.00     |            |
| MSMEs and producer organizations receiving Technical Assistance (Number)                                  | 0.00 | 3.00     | 12.00                | 18.00    | 24.00    | 30.00    |            |



| Indicator Name  | DLI | Baseline | Intermediate Targets |          |          |          | End Target |
|---|-----|----------|----------------------|----------|----------|----------|------------|
|   |     |          | 1                    | 2        | 3        | 4        |            |
| Number of women owned MSMEs or women-led producer organizations receiving Technical Assistance (Number) |     | 0.00     | 0.00                 | 1.00     | 2.00     | 3.00     | 5.00       |
| Farmers adopting improved technologies or agricultural practices (Number)                               |     | 0.00     | 1,000.00             | 3,000.00 | 4,000.00 | 5,000.00 | 6,000.00   |
| Partnerships' coffee tested for specialty coffee grading (Percentage)                                   |     | 10.00    | 20.00                | 40.00    | 60.00    | 80.00    | 100.00     |
| Cocoa dryers among PPAP and PACD partnerships that are made of stainless kiln pipes (Percentage)        |     | 0.00     | 20.00                | 40.00    | 60.00    | 70.00    | 75.00      |
| Coconut-processing MSMEs certified Hazard Analysis Critical Control Point (HACCP) (Number)              |     | 3.00     | 3.00                 | 5.00     | 7.00     | 9.00     | 10.00      |
| Increase in women and children reaching minimum diet diversity (Percentage)                             |     | 0.00     | 2.00                 | 5.00     | 10.00    | 15.00    | 20.00      |
| <b>Project Management and Monitoring and Evaluation</b>   |     |          |                      |          |          |          |            |
| Beneficiaries that feel project investments reflect their needs (Percentage)                            |     | 0.00     |                      |          | 75.00    |          | 75.00      |
| Grievances registered related to delivery of project benefits that are addressed (Percentage)           |     | 0.00     | 100.00               | 100.00   | 100.00   | 100.00   | 100.00     |
| Communication strategies and public awareness campaigns   |     | 0.00     | 2.00                 | 3.00     | 4.00     | 5.00     | 6.00       |



| Indicator Name                        | DLI | Baseline | Intermediate Targets |   |   |   | End Target |
|---------------------------------------|-----|----------|----------------------|---|---|---|------------|
|                                       |     |          | 1                    | 2 | 3 | 4 |            |
| developed and implemented<br>(Number) |     |          |                      |   |   |   |            |

#### Monitoring & Evaluation Plan: PDO Indicators

| Indicator Name                           | Definition/Description   | Frequency           | Datasource        | Methodology for Data Collection   | Responsibility for Data Collection  |
|--|--|---------------------|-------------------|---|---|
| Increase in yield of selected crops      | The target will be reached if all monitored commodities have achieved a 25 percent increase in yield.    | Annual              | PMU's MIS         | Data collected by Lead Partner and triangulated with surveys at mid point and end point | Lead Partner and Project Management Units, compiled by the Project Coordination Unit. |
| Yield (per hectare) of cocoa wet beans   | Yield of wet beans. For partnerships processing immediately into dry beans, standard ratio will be used. | Annual              | Cocoa PMU's MIS   | Data collected by LPs and triangulated with field surveys at mid-point and end-point    | LP & cocoa PMU, compiled by PCU   |
| Yield (per hectare) of coffee parchment. | Yield of coffee parchment. For partnerships producing cherries only, standard ratio will be used         | Annual              | CIC PMU's MIS     | Data collected by LPs and triangulated with surveys at mid point and end point          | LP & coffee PMU, compiled by the PCU.   |
| Yield (per hectare) of fresh ginger      | Fresh ginger before processing   | Annual reports from | Data collected by | Field surveys and reports   | Project Management Units, compiled by   |



|   |   |  |   |   |  |
|---|---|--|---|---|--|
|   |   | lead partners supported by mid-point and end-point field surveys | Lead Partner and triangulated with field surveys at mid-point and end-point   |   | Project Coordination Unit  |
| Increased piglets weaned per sow and per year   | Baseline calculated on the basis of 1.5 litters/year/sow - 7 piglets born/litter and 20 percent mortality prior to weaning (2 piglet dead/litter) - therefore 8.5 weaned piglets/year/sow | Annual   | On farm verification and Management Information System reporting              | Field Surveys   | Highland provinces: Coffee PMU; Lowland/coastal provinces: Cocoa PMU - Consolidated by PCU |
| Increase in the annual volume of gross sales of MSMEs and producer organizations benefiting from subprojects        | Increase measured against the baseline of annual gross volumes stated in the MG Business Plan.<br>Parchment measured for coffee and dry bean measured for cocoa                           | Annual   | Baseline: MG Business Plan prepared by the recipient MSME. Progress data: MIS | MSMEs and POs annual reports.   | PMUs and PCU   |
| Farmers from coffee and cocoa producing areas diversifying to other commodities (small livestock, coconuts, spices) | Defined as at least 30 percent of partnerships from coffee and cocoa growing areas specifying diversification to other commodities (small livestock, coconuts, spices) in their proposal. | Annual   | MIS   | LPs reports - triangulated with Mid-term and end-line farming HHs survey. | PMUs, compiled by the PCU  |



|  |  |        |     |             |                           |
|--|--|--------|-----|-------------|---------------------------|
|  | Diversification includes but is not limited to (i) changes in land use and (ii) changes in source of income.   |        |     |             |                           |
| Direct project beneficiaries               | Defined as (i) farmers member of partnerships; (ii) members of MSMEs and POs benefiting from MG and/or TA; (iii) non-project users of rehabilitated feeder roads; and (iv) recipients of capacity building and/or training | Annual | MIS | MIS reports | PMUs, compiled by the PCU |
| Direct project beneficiaries who are women |  | Annual | MIS | MIS reports | PMUs, compiled by the PCU |

**Monitoring & Evaluation Plan: Intermediate Results Indicators**

| Indicator Name   | Definition/Description | Frequency | Datasource   | Methodology for Data Collection            | Responsibility for Data Collection |
|--|------------------------|-----------|--|--|------------------------------------|
| Coffee, cocoa, small livestock, coconuts and spices regulatory frameworks reviewed and updated |                        | Annual    | DAL reports<br>Baseline: cocoa and coffee Acts reviewed during PPAP (2). | Respective commodity board through the DAL | DAL and relevant government agency |
| Coffee, cocoa, small livestock, coconut and spices strategies and action plans                 |                        | Annual    | Commodity Boards and   | Annual reports                             | DAL and relevant                   |



|   |   |        |                                       |  |
|---|---|--------|---------------------------------------|--|
| developed and/or updated  |   | DAL    |                                       | commodity board  |
| Commodity Board and DAL staff (national, regional, provincial, district) trained              |   | Annual | MIS                                   | Training numbers recorded in the MIS<br>PMUs and PCU                       |
| Feeder roads rehabilitated to be climate resilient  | Climate-resilient: as per Component 2 description   | Annual | MIS                                   | Contracts completion reports<br>PMUs and Provincial DoW                    |
| Feeder roads have Memorandum of Understanding established between private and public parties  |   | Annual | PMUs                                  | PMUs' reports<br>PMUs and Provincial DoW                                   |
| Households benefiting from rural feeder road rehabilitation                                   | Defined as any households living or working within a 2km distance of a rehabilitated feeder roads.  | Annual | Road rehabilitation scoping documents | HH survey done as part of roads scoping study<br>PMUs, compiled by the PCU |
| Partnerships under implementation   | Implementation is defined as subprojects that have received at least the first tranche of the Grant   | Annual | MIS                                   | LPs report compiled in MIS<br>PMUs   |
| MSMEs or producer organizations implementing subprojects                                      | Implementation is defined as subprojects that have received at least the first tranche of the MG  | Annual | MIS                                   | MSMEs and POs reports compiled in MIS<br>PMUs                              |
| Number of women owned MSMEs or women-led producer organizations supported through the project | The target for this indicator (3) is equivalent to 15 percent of the total number of MSMEs or producer organizations implementing subprojects, or an 8 percent increase in share of |        |                                       |  |



|  |  |         |                    |  |                           |
|--|--|---------|--------------------|--|---------------------------|
|  | women's registered businesses in the farming sector.   |         |                    |  |                           |
| MSMEs and producer organizations receiving Technical Assistance                                | Defined as any capacity building activity (including training) even if not benefited from MG.  | Annual. | MIS                | MIS training reports   | PMUs, compiled by the PCU |
| Number of women owned MSMEs or women-led producer organizations receiving Technical Assistance | The target for this indicator (5) is equivalent to 15 percent of the total number of MSMEs or producer organizations receiving Technical Assistance.   | Annual  | MIS                |  |                           |
| Farmers adopting improved technologies or agricultural practices                               | Estimate 30 percent adoption rate out of 20,000 benefiting farmers.<br>Adoption is defined as the use of at least two improved technologies or agricultural practices from a list approved in the PIM. | Annual  | MIS                | LPs reports triangulated with mid-term and endline HH surveys. | PMUs, compiled by the PCU |
| Partnerships' coffee tested for specialty coffee grading                                       | As defined internationally and by Coffee Industry Corporation: using the coffee cupping method.  | Annual  | Coffee PMU and MIS | LPs reports  | Coffee PMU                |
| Cocoa dryers among PPAP and PACD partnerships that are made of stainless kiln pipes            | Smoke generated by traditional cocoa dryers is the main quality problem encountered by cocoa farmers and processors. These stainless kiln pipes dryers do not generate                                 | Annual  | Cocoa PMU and MIS  | LPs reports  | Cocoa PMU                 |



|   |  |  |   |   |                   |
|---|--|--|---|---|-------------------|
|   | smoke.   |  |   |   |                   |
| Coconut-processing MSMEs certified Hazard Analysis Critical Control Point (HACCP) | HACCP certification for coconut-processing is defined as a management system that applies preventive measures to mitigate the “Risks” of “Hazards” in the coconut products production process.   | Annual                                   | KIK   | KIK reports to cocoa PMU  | Cocoa PMU and KIK |
| Increase in women and children reaching minimum diet diversity                    | Minimum Dietary Diversity (MDD) refers to a minimum number of food groups consumed i.e. 5 out of 10 and 4 out of 7 pre-defined food groups for women and children, respectively .<br><br>The indicator will measure the increase in the percent of women (of reproductive age) and young children (aged 6-24 months) who reach MDD in PACD targeted pilot areas. | Annual, during the same season each year | Annual household surveys, interviewing women of reproductive age with a child aged 6-24 months. | Data to be collected each year during the same season.<br>Women are interviewed and asked to recall all foods and drinks consumed by themselves and their child the previous day. | PCU               |
| Beneficiaries that feel project investments reflect their needs                   | Satisfaction surveys at mid-term and end-term. The first will inform the overall mid-term review for the project, including ongoing  | Mid-term and end-term                    | Beneficiaries' surveys  | Satisfaction surveys at mid-term and end-term. Structured consultation with project beneficiaries   | PCU               |



|   |  |        |  |                              |              |
|---|--|--------|--|------------------------------|--------------|
|   | implementation. Beneficiary feedback engagement activities will include structured consultation with project beneficiaries and will inform any adjustment required. Feedback will be used for two-way communication and will also be reflected in mission Aide Memoires. |        |  | during implementation.       |              |
| Grievances registered related to delivery of project benefits that are addressed  | "Addressed" defined as ways of handling/responding to any grievance according to a written procedure, as defined in the PIM and acceptable to the Bank.  | Annual | Bi-annual and annual reports                   | Records of Grievances        | PMUs and PCU |
| Communication strategies and public awareness campaigns developed and implemented | "Implemented" defined as at least 10 percent of estimated budget of the strategy/campaign disbursed  | Annual | PCU's and PMUs' Communications Officer/Adviser | Bi-annual and annual reports | PMUs and PCU |

**ANNEX 1: Implementation Arrangements and Support Plan****COUNTRY: Papua New Guinea**  
**PNG Agriculture Commercialization and Diversification Project**

1. The PDO of the proposed project is to facilitate the development of competitive and diversified agriculture value chains for selected commodities in targeted provinces. The PACD will promote diversification from only cocoa and coffee at the household and community level, as a risk management strategy and to facilitate the emergence of new value chains. This would be achieved through strengthening industry coordination and institutions; facilitating links between farmers and MSMEs and agribusiness partnerships for the provision of market access, technologies, and services; and providing critical agriculture feeder roads.
2. The key outcomes, as reflected in the ToC, would be that (a) smallholder farmers and MSMEs increase productivity and adopt efficient market responsive, sustainable production practices and competitiveness; (b) demand-driven productive partnerships are scaled up and sustained; and (c) key infrastructure bottlenecks in target value chains are addressed.

**Project Implementation Period**

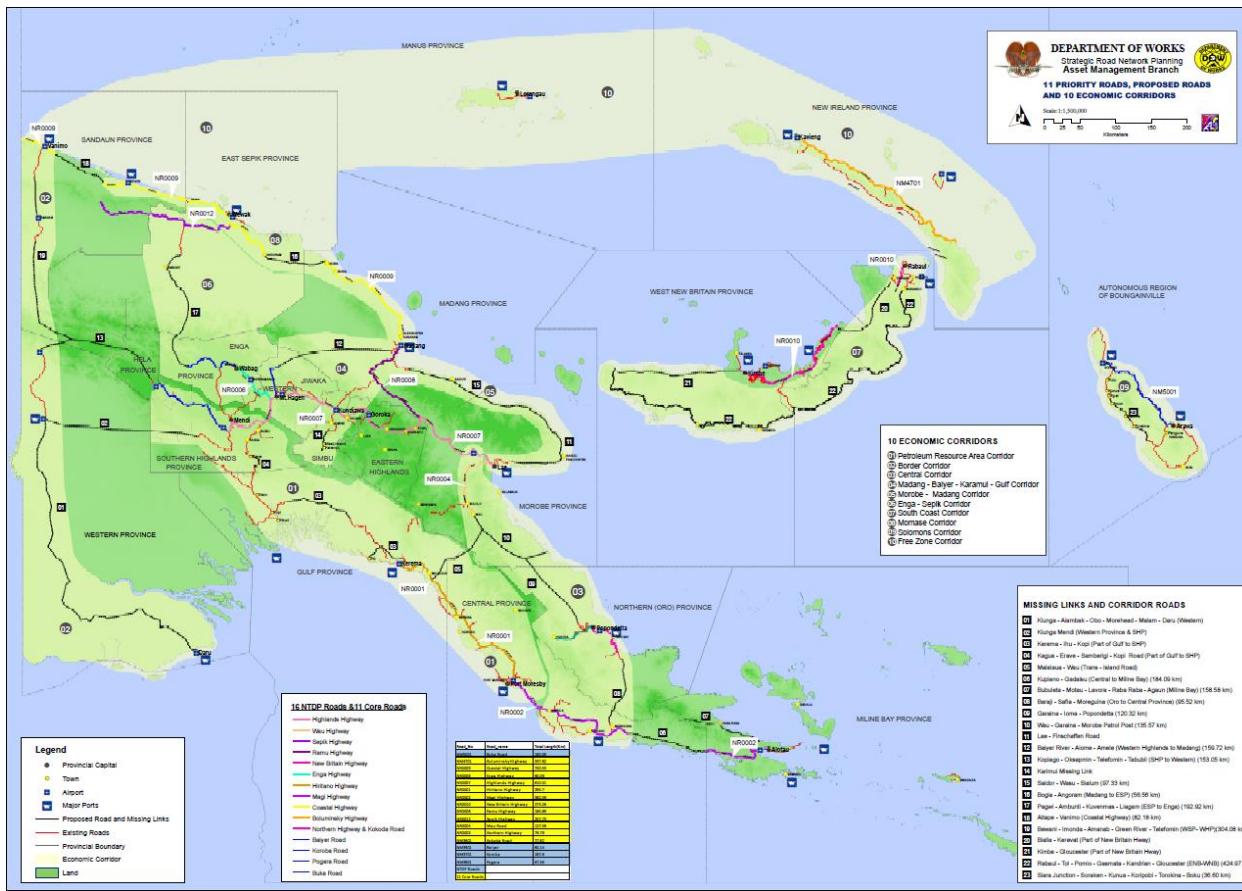
3. The project would be implemented over a five-year period. This considers the established structures in place and the momentum built under the PPAP for the coffee and cocoa growing areas. Some institutional building will be required to absorb the additional value chains supported by subject matter specialists to be based under the PCU at the national DAL.
4. A minimum of two implementation support missions will be organized by the World Bank every year. A full midterm review will take place after no more than three years of implementation to assess progress and identify implementation bottlenecks.

**Geographical Coverage**

5. The project would be implemented in provinces that are included in, or connected to, some of the 10 'economic corridors' prioritized for the GoPNG's focus on development (see figure 1.1). The key criteria for implementation in these provinces include (a) the successful implementation of PPAP activities in these project provinces and therefore consolidation of industry-wide links to build critical mass while expanding the PPAP model to new provinces, notably for cocoa production; (b) demonstrated capacity of the two implementing agencies in CIC and CB to manage a large geographical coverage of project activities; and (c) strong interest demonstrated by the private sector and smallholder farmers in these provinces. Accordingly, targeted provinces are (a) for consolidation, diversification, and stronger focus on quality, markets, and POs: Eastern Highlands, Enga, Jiwaka, Simbu, Southern Highlands, and Western Highlands as well as ENB, Madang, Morobe, and AROB and (b) for productive partnership model expansion on cocoa: New Ireland and West New Britain. These provinces are in the economic corridors 4, 5, 6, 7, and 9 described in MTDP III, and highlands provinces also connect with the future Gulf corridor promoted by the GoPNG.



**Figure 1.1. Ten Economic Corridors<sup>34</sup>**



## Institutional and Implementation Arrangements

6. The project will be implemented by DAL, CIC, and CB. In relation to DAL, the project will build on the momentum of the PPAP where DAL will host a PCU that will coordinate the implementation of the overall project and hire advisers in the key areas that have proven to be challenging under the PPAP: fiduciary, M&E, and safeguards. The PCU will provide support to DAL for the implementation of Subcomponent 1.1, Component 4, and Component 5. Under the PACD, the PCU will have a greater role of building capacity within DAL, KIK, Spices Commodity Board, and the LDC and will continue to support the two current PMUs (coffee and cocoa) which will remain in place. The PCU should hire, not later than six months after the project effectiveness date and maintain during project implementation, a project coordinator, an FM specialist, a procurement specialist, a safeguards specialist, and an M&E specialist.

7. The regional DAL offices based in Goroka (for the Highlands), Lae (Momase and Madang), and Kokopo (ENB), as well as the DPI in AROB, will play an important role in ensuring that PACD interventions are well aligned with national and regional priorities. These offices will help coordinate interventions in their respective geographical areas while receiving direct support from the project to build their internal capacity to deliver services to producers. They will also be trained to continue supporting PPAP farmers

<sup>34</sup> PNG National Road Network Strategy 2018-2037



and monitor their progress (consolidating POs, increased productivity of pruned or replanted trees [notably clones in cocoa]), through the specific outreach program under Component 1. These decentralized offices will receive support through a performance-based framework of interventions.

8. As in the PPAP, CIC will continue to host a Coffee PMU and CB will continue to host a Cocoa PMU. Under the PACD, the two PMUs will provide support to CB and CIC for the implementation of Subcomponent 1.2 and Components 2, 3, and 4 as they relate respectively to the cocoa and coffee subsector and any other selected commodity subsectors in the province that they cover<sup>35</sup> or as may be specified in the MoU. The two PMUs will look at facilitating diversification toward coconut, spices, and small livestock and subject matter specialists will be hired by the two PMUs in addition to the existing staff under the PPAP. To formalize the collaboration between DAL, CIC, CB, and each of the commodity boards for coconut, livestock, and spices and to allow the CIC and CB PMUs to implement activities on behalf of the other boards, an MoU (or MoUs) will be signed between DAL, CIC, CB, and these three boards by not later than six months after project effectiveness. Each of these two PMUs shall maintain, by not later than six months after project effectiveness, a project manager, a procurement officer, an accountant, a safeguard officer, an M&E officer, a civil engineer and a Component 3 manager.

9. Regarding Component 2 (Agriculture Feeder Roads), the implementation will remain in the hands of the two PMUs where the civil engineer will be based during the procurement processes, national DoW clearance will be obtained by the respective Provincial Works Manager (DoW) before being submitted to the National Procurement Commission for approval. The Regional Works Managers for Mount Hagen, Lae, and Kokopo will also sit in the ICCs' meeting when feeder roads are discussed.

10. CIC and CB, as project implementing entities, will each enter into a Project Agreement with IDA and a Subsidiary Agreement with the DoT, on behalf of PNG. Portions of the credit proceeds will be made available by the GoPNG to CIC and CB, each on a grant basis pursuant to the respective Subsidiary Agreements. The execution of the Project Agreements by CIC and CB and the Subsidiary Agreements between PNG and CIC and CB, would be, among others, a legal covenant.

11. A PSC will be responsible for providing overall policy guidance and strategic direction to the PCU for the project. The PSC will comprise representatives set forth in the PIM, including representatives from DAL, DNPM, DoT, DoW, the private sector, CB, CIC, and other commodity boards.

12. Each ICC for cocoa and coffee established under the PPAP will remain at CB and CIC, respectively, and will continue providing commodity-specific oversight and strategic guidance to the two PMUs. Their composition is made of representatives from (a) the private sector, (b) CIC or CB, (c) the provincial government, and (d) the central and regional DAL. Representatives from KIK, Spices Commodity Board, and LDC will be added to each of the ICCs as both coffee and cocoa production areas may diversify to coconut, spices, and small livestock production. Each of the ICCs will also provide final approval on the proposed partnership grants and MGs to be provided by CB and CIC, respectively, under Component 3.

13. The appraisal of the partnership and MG proposals under Component 3 of the project would be the responsibility of a TAC. Members of the TAC panel would be qualified experts, nominated by the ICCs

<sup>35</sup> CIC PMU: Simbu, Eastern Highlands, Enga, Jiwaka, Southern Highlands, and Western Highlands.  
CB PMU: AROB, ENB, Madang, Morobe, New Ireland, and West New Britain.



at project inception. The TAC would have three members with expertise, respectively, in the coffee industry, cocoa industry, and social sciences and ad hoc specialists on coconuts, spices, and small livestock as needed.

14. To support project implementation, the following will be prepared:

- A PIM shall be prepared and adopted by DAL, not later than six months after project effectiveness. It will include institutional arrangements for day-to-day execution of the project (excluding those activities under Components 3 and 5 of the project), including procurement, safeguards, FM, and M&E. CIC and CB will submit to DAL information, with respect to each of their respective parts of the project, necessary for DAL's preparation of this PIM.
- The PGMGG, which will contain detailed arrangements and procedures concerning partnership and MGs under Component 3, shall be prepared and adopted by CIC and CB by not later than six months after project effectiveness. The adoption of the PGMGG acceptable to the World Bank is a condition that must be fulfilled before the disbursement of the grants under Component 3 of the project.
- A CERC Operations Manual, to detail any special institutional arrangements for coordinating and implementing the Emergency Response Part, shall be prepared and adopted by DAL. The adoption of a CERC Operations Manual acceptable to the World Bank is a condition that must be fulfilled before the disbursement of funds allocated for activities under Component 5 of the project.

15. An annual work plan and budget will be prepared by DAL and submitted to the World Bank for review by August 15 of each year that the project is active. CIC and CB will submit to DAL, by July 15 of each year, information, with respect to the respective parts of the project, necessary for DAL's preparation of such annual work plan and budget. Such arrangement between DAL and CB/CIC will also be needed for DAL to submit its biannual project progress report to the World Bank as well as for the project completion report to be submitted by project closing.

16. At around project implementation midterm (that is, by not later than three years after project effectiveness), a full review will be organized with the World Bank to assess progress toward reaching the PDO and implementation bottlenecks. The M&E section of the PIM will describe (a) what data and information need to be collected (on which project systems, inputs, processes, results, and impacts); (b) who, how, and when it will be collected; (c) how it will be stored, processed, and delivered; and (d) who will have access to raw data, processed data, and information.

## **Procurement**

17. **Institutional arrangement for procurement.** The implementing agencies will be responsible for ensuring that the procurement requirements of all the subcomponents are met. They will receive procurement support from an international procurement specialist as well as the procurement officers hired for each of the PMUs. It is envisaged that a couple of key positions within the PCU/PMUs will be retained to ensure smooth transition from the PPAP to the PACD and to expedite implementation under



the new project. These positions will be identified in the Procurement Plan covering the first 18 months of implementation and the method of procurement will be Direct Selection. For any consultants retained, the remuneration rates will remain as per the existing contracts under the PPAP.

18. **Applicable procurement regulations.** Procurement for the PACD will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (Procurement Regulations), July 2016 (revised November 2017 and August 2018), and the provisions stipulated in the Financing Agreement. For international competitive procurement activities based on method thresholds, the World Bank's Standard Procurement Documents shall be used.

19. **Procurement risk assessment.** A procurement risk assessment of the implementing agencies responsible for implementing the procurement activities under the project was carried out and the overall procurement risk rating is Substantial.

20. **Procurement types.** The various types of procurements to be financed by the proposed IDA credit and indicative cost estimates are noted in table 1.1 and described below in paragraphs 21-27.

**Table 1.1. Procurement Types**

| Type of Procurement                                  |
|--|
| 1. Works (US\$12.4 million equivalent)               |
| 2. Goods (US\$0.6 million equivalent)                |
| 3. Consulting services (US\$14.8 million equivalent) |

21. **Procurement of works.** The procurement of works will include the rehabilitation of feeder roads and construction or rehabilitation of offices.

22. **Procurement of goods.** The procurement of goods will include the agricultural inputs, such as tools or seedlings, and also small machinery and equipment for products processing (coffee pulpers, cocoa dryers, and so on).

23. **Procurement of consulting services (firms and individuals).** It is anticipated that several specialist individual consultants and/or firms may need to be hired to support the PCU and the two PMUs in fulfilling their coordination and implementation mandates.

24. **Advance Contracting.** Provision for Advance Contracting will be included for the procurement process of some feeder roads already identified and scoped under the PPAP. Advance Contracting may also be used for key procurement activities to be undertaken before project effectiveness.

25. **Frequency of procurement supervision.** In addition to the prior review to be carried out by the World Bank, implementation support missions will be undertaken at least once per year. One in five procurement packages not subject to World Bank prior review will be examined ex post on an annual basis.

26. **Procurement Plan.** A project Procurement Plan has been prepared covering the planned procurement activities for the first 18 months of project implementation. The procurement arrangements for the key procurement activities under the project are detailed in the PPSD.



27. **Systematic Tracking of Exchanges in Procurement.** The use of the World Bank's STEP system will be mandatory for use under the PACD. This system is currently being used on the PPAP as well as other projects in PNG and ongoing face-to-face training is regularly conducted in-country on use of the system.

### **Financial Management**

28. **Budgeting.** All donor-funded projects are to be included in the GoPNG's public investment program (PIP) and national Budget, so as to have aid on plan and aid on budget. Currently, the PACD is not in the PIP 2019–2023 nor the 2019 national budget. A Program Formulation Document will need to be submitted—by DAL, CB, and CIC—to the DNPM as part of the 2020 budget process, to have the PACD included in future PIPs and national budgets. Annual budget submissions will need to be submitted—by DAL, CB, and CIC—to the DoT from 2020 onward.

29. A budget for respective parts of the project for each implementing agency will need to be prepared, along with a consolidated budget for the project. Each budget—individual implementing agency and consolidated project—needs to include, broken down by year, appropriate levels of detail (for example, component or category, whichever is deemed most relevant and useful).

30. **Counterpart funding.** Under PNG country financing parameters (CFPs), funding of taxes is allowed, and the project costings and budget will be prepared inclusive of taxes and IDA financing will be inclusive of taxes. The IDA funding covers all planned activities under the project to achieve the development outcomes, results, and indicators. World Bank guidelines on CFPs discourage waivers or reduction of duties and taxes of World Bank-financed projects and activities, and this approach is taken by PNG where under PNG laws, when donor funds are financing inclusive of taxes, no tax exemptions are allowed. As such, no tax exemptions will be approved by the GoPNG for the PACD. As a result, there is no counterpart funding requirements.

31. **Funds flow.** Funds will flow from the World Bank to the GoPNG, and the respective implementing agencies, through (a) advances, (b) direct payments, (c) reimbursement of GoPNG expenditure, and (d) special commitments, if required (refer Disbursements section for more details on disbursement arrangements). Designated Accounts (DAs) will be held in each of the three implementing agencies: DAL, CB, and CIC.

32. **Accounting and maintenance of accounting records.** All government funds are bound by the Public Finances Management Act (PFMA) 1995 and the PNG Financial Management Manual (FMM).

33. The GoPNG is currently implementing a new Integrated Financial Management Information System (IFMIS) (Finance One) and transitioning national departments, provincial governments, and statutory authorities over from the old Papua New Guinea Accounting System PGAS system, or whatever approved accounting systems were previously used, to the new IFMIS. At present, while DAL has been transitioned to IFMIS, neither CB nor CIC has been transitioned to IFMIS, and IFMIS rollout plans do not currently include transition of either CB or CIC by the likely effectiveness date of the project.

- DAL has been migrated to the new IFMIS on FinanceOne for its accounting system to record accounting transactions and prepare financial report and statements.



- CB currently uses Attache for its accounting system to record accounting transactions and prepare financial report and statements.
- CIC currently uses the ACCPAC Accounting Software for its accounting system to record accounting transactions and prepare financial report and statements.

34. The GoPNG, DAL, CB, and CIC operate on a cash basis of accounting. Accounting records are to be maintained by DAL, CB, and CIC and are to be made available to both auditors and the World Bank, as required.

35. **Internal controls including internal audit.** DAL, CB, and CIC are bound by the PFMA and PNG FMM for its policies and procedures manual. The GoPNG required DAL, CB, and CIC to have an internal audit division an audit committee. The project should be included in the annual internal audit plans for DAL, CB, and CIC and included in relevant reports to the audit committee.

36. **Periodic financial reporting.** Unaudited interim financial reports (IFRs) of the consolidated project and the project activities of each implementing agency will be prepared on a quarterly basis. The financial reports will include an analysis of actual expenditure for the current period, year to date, and cumulative to date plus outstanding commitments, compared against total project budget. The format will be developed and agreed by the implementing agency and the World Bank before the due date for the submission of the first IFR. The IFRs will be forwarded to the World Bank within 45 days of the end of each calendar quarter.

37. **External audit.** An annual audit of the consolidated project financial statements and the project activities of each implementing agency will be required. The Auditor General's Office of PNG is mandated to audit all Government funds.

38. The Auditor General requires annual financial statements to be prepared in accordance with International Public Sector Accounting Standards accounting standards. The audited financial statements, audit report, and management letter must be received by the World Bank within six months of the end of the fiscal year and shall be made publicly available by the recipient in a manner acceptable to the World Bank as per the General Conditions of IDA Credits and Grants.

39. **FM supervision plan.** Table 1.2 shows the plan for supervision of the FM aspects of the project.

**Table 1.2. FM Supervision Plan**

| FM Activity                  | Frequency  |
|------------------------------|--|
| Desk reviews                 |  |
| IFRs - review                | Quarterly  |
| Annual audit report - review | Annually   |
| On-site visits               |  |
| Formal supervision           | Half yearly initially, then annually based on risk and performance ratings |



| FM Activity   | Frequency  |
|---|--|
| Monitoring of actions taken on issues highlighted in review of the IFRs and audit reports, auditors' management letters, and other applicable reviews | As needed  |
| Transaction reviews (if needed)   | On an as-needed basis and in the case of any issue arising |

40. **FM action plan.** A summary of the FM action plan is shown in table 1.3.

**Table 1.3. FM Action Plan**

| No. | Action   | Date by Which Action Required                            | Responsible                                |
|-----|--|--|--|
| 1   | Prepare and agree format of unaudited IFRs that will be used for quarterly reporting | Before the due date for the submission of the first IFR. | DAL, CB, CIC, and World Bank FM specialist |

### **Disbursements**

41. **Disbursement methods and supporting documentation arrangements.** The project could use four disbursement methods: (a) advances, (b) direct payment, (c) reimbursement, and (d) special commitments. Direct payment would only be used for large payments or when payments are in currencies that the borrower may have difficulty obtaining. Reimbursement would only be used if the GoPNG funds were used for project expenses rather than expenditure through the DA. Special commitments may be needed if goods are purchased from overseas. Disbursements will be against List of Payments and Statements of Expenditure. Required supporting documentation for disbursements will be outlined in the Disbursement and Financial Information letter (DFIL).

42. **Designated Accounts.** The PFMA and FMMs allow for donor-sourced funds for projects to be held in separate trust accounts.

43. Three segregated DAs will be required, one for each implementing agency - DAL, CB, and CIC. Note that although at present a single central treasury account is not being used for donor projects, should donor projects also be moved to single central treasury account (likely after transition to IFMIS) then while there may be one physical bank account, there will be general ledger sub-codes for each implementing agency and project, to effect the segregation of funds.

44. The ceiling for each of the DAs will be specified in the DFIL and be set to enable sufficient cash flows to cover three to four months of project operations. The nature of the partnership grants, timing of tranches, and acquittal of tranches will be important factors in determining the cash flow required, that is, the ceiling may be increased once the partnership grants commence implementation to cater for this.



Table 1.4. Eligible Expenditures

| Category  | IDA Credit Amount of Credit Allocated (expressed in US\$) | IDA Credit Amount of Credit Allocated (expressed in SDR) | Percentage of Expenditures to be Financed (inclusive of Taxes) |
|---|---|--|--|
| (1) Goods, works, non-consulting services, consulting services, Operating Costs and Training and Workshops for the Project, except for Component_5 of the Project | 30,550,000  | 22,200,000   | 100 percent  |
| (2) Partnership Grants under Subcomponent_3.1 of the Project  | 7,950,000   | 5,800,000  | 100 percent of amounts disbursed                               |
| (3) Matching Grants under Sub-component_3.2 of the Project  | 1,500,000   | 1,100,000  | 100 percent of amounts disbursed                               |
| (4) Emergency Expenditures under Component 5 of the Project   | 0   | 0  | 100 percent  |
| <b>Total amount</b>   | <b>40,000,000</b>   | <b>29,100,000</b>  |  |

Table 1.5. Funding Sources

| Source                  | Amount<br>(US\$ equivalent, million ) | Share of total (%) |
|-------------------------|---------------------------------------|--------------------|
| World Bank - IDA credit | 40.0                                  | 100                |
| <b>Total</b>            | <b>40.0</b>                           | <b>100</b>         |

45. **Project preparation advance.** No project preparation advance was used.

46. **Disbursement conditions**

- (a) For partnership grants and MGs under categories 2 and 3, unless and until IDA is satisfied that the project implementing entities have adopted the PGMGG
- (b) For emergency expenditures under category 4, unless and until IDA is satisfied that the conditions relevant to the CERC specified in the Financing Agreement have been met

47. **Retroactive financing** Retroactive financing to finance payments made against eligible expenditures under category 1 between June 30, 2019, and the signature date of the Financing Agreement, for an amount up to 20 percent of the IDA credit or SDR 5.82 million (US\$8 million equivalent).

**M&E and MIS for the PACD**

48. The project's Theory of Change responds to the following problem statement: "Weak extension services and lack of access to inputs, infrastructure and markets prevent smallholder farmers and MSMEs from increasing productivity and competitiveness." The PACD's activities address the problem statement by focusing on three areas of change: (a) strengthening the institutional capacity of agricultural agencies, commodity boards, and extension services; increasing human capital at several levels of the value chain; and reviewing and reforming key agricultural policies; (b) rehabilitating rural feeder roads; and (c)



providing finance and technical assistance to smallholder farmers and MSMEs. Expected medium-term outcomes include better coordination, planning, management, and monitoring of the agriculture sector; animal and plant pests and diseases under control; improved access to essential infrastructure networks and logistics; and improved farming and post-harvest practices and better integration into diversified value chains. The expected PDO-level outcomes of increased competitiveness through improved productivity and access to market and diversification of the value chain beyond coffee and cocoa align with the GoPNG's MTDP III long-term goal of improved export promotion and import substitution.

49. PACD's M&E arrangements include a detailed M&E plan and ToC which together represent the project's overall M&E framework. PACD's M&E system is designed to assess whether the expected changes described in the ToC (see figure 1), and translated into indicators in the Results Framework, effectively take place. It includes an MIS, baseline studies and beneficiary surveys, progress reporting and impact evaluation surveys on production, and MGs under Component 3. The overall M&E framework is built on the experience and lessons learned from the PPAP.

50. The M&E plan will include the following key components:

- PDO and Results Framework
- Monitoring plan for each indicator at the PDO and intermediate level
- Arrangement for the M&E system
- Work plan and budget for M&E activities
- MIS
- Evaluation plan
- M&E communication and dissemination plan

51. **Challenges and risks.** The M&E system acknowledges a number of challenges which could pose a risk to the overall outcomes of the project, especially for Component 3 Productive Partnerships. These include the following:

- **At the country level:** remoteness, low literacy levels and over 800 languages, limited record keeping by farmers, poor connectivity, and an unreliable road network.
- **At the design level:** (a) the majority of data collection for the productive partnerships will be carried out at the lead farmer/extension officer level which is both a critical and inherently weak point in the data collection and verification process and (b) the geographical spread and production cycles of the diversified value chains—coffee, cocoa, spices, coconut, and livestock—vary greatly and increase the complexity of overall M&E arrangements.
- **At implementation level:** (a) M&E is not sufficiently integrated and used as a project management tool, (b) capacity is not built adequately or in time, and (c) a fully functioning MIS is delayed.

52. The PACD's M&E system aims to (a) be simple; (b) serve as a more dynamic project management tool fully integrated into project management processes; (c) be clear about what is to be monitored,



documented, and analyzed and by who/how/how often; (d) be recognized as a critical part in improving the effectiveness of the project; (e) be effective so that information generated by the system is used by management for planning, feedback, and course corrections as needed; (f) keep reporting arrangements simple but flexible; and (h) be managed by staff with sufficient capacity and understanding of M&E fundamentals.

53. The PACD's M&E staffing arrangements will combine the implementation arrangements and capacity built under the PPAP with a significantly strengthened M&E unit. The proposed M&E unit will comprise one international specialist at the PCU and three full-time staff including (a) an M&E specialist who will work closely with the M&E team through the first two years of project implementation and (b) one M&E officer in the PCU and each of the two PMUs. Roles and responsibilities will be clearly documented in the PIM and will be guided by the experience of the PPAP. Capacity building will be an early priority, especially on data collection and verification methods.

54. **Implementation arrangements.** The PCU will retain overall responsibility for the management of the M&E system, including monitoring, evaluation, and results reporting. The PCU will be strengthened to (a) reinforce its mandate of capacity building and (b) play a stronger role in the project's and value chains' communication and public awareness strategies. Similarly, the Coffee and Cocoa PMUs will retain a major implementation role, notably on Component 3. Their capacity will also be strengthened to include subject matter specialists on new value chains of spices, coconuts, and livestock. Collaboration with regional DAL and provincial and district extension staff will be scaled up, with a focus on the newer value chains where the private sector is at an early stage of development.

55. **Project Development Objective.** The Results Framework aligns with the objective by including PDO-level indicators on (a) productivity, measured by increase in yields of selected crops and livestock; (b) access to market, measured by increase in volume of sales of selected crops; and (c) total number of beneficiaries, disaggregated by gender.

56. **Results Framework and indicators.** The Results Framework focuses on indicators sensitive to change at key measurement points. Methods of measurement are clearly defined to avoid ambiguity and errors during data collection and reporting. A project-specific indicator handbook (handy reference guide and different from M&E section of the PIM) will be developed collaboratively by the PCU, PMUs, and provincial and district extension officers with details on exactly how each indicator should be defined and measured. It will focus exclusively on PACD indicator definitions and measurement and serve as a dynamic tool to document relevant updates and flag other relevant information from field observations to strengthen overall results reporting.

57. **Ongoing monitoring of PPAP indicators.** PPAP indicators on yield of coffee and cocoa are included in the PACD Results Framework. The aim is to measure coffee and cocoa yields from crops planted in the final two years of the PPAP (January 2017 to December 2019), noting that these tree crops will only reach full production after the close of the PPAP.

58. Intermediate-level indicators on citizen engagement, gender, new technologies and practices, capacity building, and communication have been included in the Results Framework to give a complete picture of project activities and to meet certain corporate requirements.



59. **Internal progress monitoring.** The PCU M&E specialist will coordinate data collection activities based on the requirements of the Results Framework and as set out in the PIM. The M&E specialist will be assisted by the M&E officers in the PMUs. Internal progress monitoring will include the following activities:

- **Routine monitoring:** Regular data collection and field visits to monitor project implementation and data verification
- **M&E workshops and consultations:** To discuss the project implementation, identify challenges and potential solutions
- **Evaluations:** The M&E system includes periodic evaluations and ad hoc or specially targeted studies such as baselines

### **Management Information System**

60. **Design and functionality.** The MIS will be modelled on the system developed for the PPAP and will draw from the lessons learned there. It will perform two important functions: (a) a management tool that provides the capability to monitor project implementation activities relating to partnerships, effectively and efficiently and (b) a strategic information resource that builds up a database of farmers, farms, yields, sales, and other key sector-wide information as the foundation of comprehensive sectoral and national information systems in the future. With the expansion of value chains, activities, and geographical coverage envisaged in the PACD, both aspects assume even greater importance. The availability of accurate and timely monitoring information will be fundamental to the project's ability to scale up its current operations. The strategic potential is even greater. As noted elsewhere in this document, the logistical challenges of rural PNG are among the key obstacles to development of the target value chains, both in terms of access to markets and in the provision of services to farmers. An information resource capable of providing geographic information as well as statistics on key indicators could be an invaluable tool in planning, both in the provision of services and in long-term strategic interventions, such as the prioritization of roads, other infrastructure investments, and service provision. Pilot implementation of this basic geographic information system (GIS) capability will therefore be an important addition.

61. While the development and implementation of the MIS for the PPAP was subject to significant delays, the system has been in full operation in the cocoa sector for the past year and is demonstrating clear benefits in project management and reporting. The database already covers over 20,000 farmers, which is by far the largest database of its kind in PNG. Data on farms includes GPS coordinates, which may be used to create a geographic information overlay on the basic database. The system is based on highly scalable open source technologies and is capable of being deployed as a 'cloud-based' application where there is adequate Internet service. Local technical capability for system operation and management has also been built, supported by outsourced technical support services. The same system was shown to be adaptable to the coffee sector with modest effort, and it is assessed that adaptation to other value chains is similarly feasible, provided the activities follow a broadly similar model. The core of a potentially sector-wide agricultural information system to support interventions related to smallholder farmers is therefore available and is proposed as the basis of the MIS for the PACD.



62. The MIS will have the capability to report on many of the performance indicators of the Results Framework and also to provide information that would be useful to the respective PMUs for project management. As with the PPAP, it will depend on integration within a few basic work processes:

- A set of baseline data regarding farms and farmer households within each partnership, collected at the commencement of partnership activities and subsequently verified by the PMU M&E officers
- Updates on partnership activities such as the provision of tools, training, and extension visits, based on records maintained by LPs, including a basic cashbook for partnership activities
- Information related to farm activities (rejuvenation, block preparation, and so on, configurable according to the value chain) obtained through LPs and extension visits, based on the processes developed and implemented in the PPAP
- Updates to the main MIS database using the data provided at agreed intervals, but at least monthly, by LPs and the PMU, followed by data cleansing and clarifications if needed
- Standard, periodic reports to be generated by the PMUs; some ad hoc queries and reports to be generated from the database as needed; a public interface through the Internet, providing information at various levels to stakeholders, depending on authorization
- Certain reports to be available to LPs to assist with management of partnership activities

63. **Lessons learned and mitigating risks.** The experience of implementing the MIS in the PPAP has provided a number of lessons, together with actions based on those lessons, for the PACD.

- Data sets must be complete to be useful. Due to a number of reasons, farmer baseline data were not entered in the database until the latter stages of the project and then only in the cocoa sector. This has resulted in a number of outcome reporting challenges. It also masked, from management, the fact that many partners had not properly fulfilled the terms of their agreements in respect of baseline data and regular reporting. The PACD will ensure that at least the core MIS modules are in place from the commencement of activities, to support systematic data collection, storage, and management on digital media.
- One of the main factors contributing to delays in implementation was the difficulties encountered in recruitment and management of suitably skilled software consultants. This was addressed subsequently by (a) engaging a consultant who had a track record of delivering similar systems in PNG and (b) using a modular approach to software development to manage the risk and to obtain useful results as early as possible. In the PACD, these risks will be lessened further as a working system is already available, together with software development resources that have provided satisfactory services in the past, and also internal capacity to implement and manage the system.
- The management of beneficiaries, who belong to partnerships with different levels of capacity and different approaches, is complex and implementing consistent and reliable



work procedures among them is difficult. This is due to two main factors: (a) lead farmers are at the front lines of the project; unless the lead farmer/cluster model is properly implemented and lead farmers are properly incentivized, it is hard to implement such a system and (b) certain data are hard to come by, primarily because there is little record-keeping among farmers. An example is the price obtained for cocoa or coffee.

64. **Technology.** The MIS is built on open source technology platforms which currently incur no license fees. These technologies will continue to be used as they are scalable to meet anticipated long-term needs. The software can be deployed on Windows server (current) or Linux server operating systems without modification. The development of a richer geographic information layer will initially be done on a pilot basis, using an open source GIS platform.

65. The system currently depends on a master database managed by the PMU, capable of being accessed through the Internet, based on assigned authority levels. Stand-alone databases are implemented at all LP locations that are deemed to have inadequate Internet services (currently the majority of partners). Data transfer is by direct upload of a single data file, which can be moderated and verified during the upload process, by PMU staff. An interface for field data entry based on Android tablet devices is under trial and will be implemented for the PACD. This is intended to further improve verification as well as the provision of extension services by LP staff.

66. The servers in the coffee sector are new and may be expected to function well for the next four to five years. The cocoa sector server has been longer in operation and may need to be upgraded or replaced during the PACD but will suffice for the initial requirements. All current LPs have been supplied with desktop personal computers for stand-alone implementation of the MIS. This is recommended for the PACD as well and will be built into partnership budgets.

67. **Human resources.** Management of the MIS—which includes uploading data files, verification, dealing with technical issues, and requests for enhancements by interaction with external contractors—requires a combination of ICT skills and M&E skills. This is currently done collaboratively by the ICT coordinator and M&E officer in the cocoa sector, who also have the ability to provide training and implementation support to LPs as they engage with the project. This structure will continue for the PACD and will be replicated to some degree in the coffee sector and other commodities.

68. The development and technical support arrangements for software currently depend on consulting services, including international services. While this has proved satisfactory in the first phase, sustainability demands development of local capacity. Given the popular open source technologies being used, it is assessed that developing local capacity, possibly by training a set of individual resources or by appropriate arrangements with local firm, is feasible. However, this will require a specific effort that goes beyond the basic requirements of project implementation and will need to be resourced and implemented as a joint resource that could serve at least the two largest sectors—coffee and cocoa and will be specified in the terms of reference of the software consultants engaged for software development.

**ANNEX 2: Detailed Project Description****COUNTRY: Papua New Guinea**  
**PNG Agriculture Commercialization and Diversification Project**

1. The PDO of the proposed project is to facilitate the development of competitive and diversified agriculture value chains for selected commodities in targeted provinces. The PACD will promote diversification from cocoa and coffee at the household and community level, as a risk management strategy and to facilitate the emergence of new value chains. This will be achieved through strengthening industry coordination and institutions; facilitating links between farmers and MSMEs and agribusiness partnerships for the provision of market access, technologies, and services; and providing critical agriculture feeder roads.
2. The key outcomes as reflected in the ToC would be that (a) smallholder farmers and MSMEs increase productivity and adopt efficient market responsive, sustainable production practices and competitiveness; (b) demand-driven productive partnerships are scaled up and sustained; and (c) key infrastructure bottlenecks are addressed.
3. Value chain competitiveness in PNG can be observed in both domestic and global markets. On the global markets, it measures how well PNG agricultural products can compete against the same product from other countries. It assesses if products from PNG are meeting the food safety and quality standards, and if PNG products can achieve higher than market prices. On the domestic market, it measures how well PNG products can compete against imports. Consumers usually buy the products that are the cheapest but some people from the middle- and higher-income class may be willing to pay more for a product if it is fresher and of better quality. The PACD will look at what is needed to reach competitive and diversified value chains. First, a conducive enabling environment is needed. The PACD will strengthen institutions (DAL and commodities boards) to play their role as enabler and facilitator and to review policies and regulations. It will also improve the condition of feeder roads, critical for facilitating access to markets. Second, an increase in human capital is needed. The PACD will strengthen the skills at several levels of the value chains, providing vocational and business development training to staff in the related institutions, farmers, POs, and MSMEs that are involved in aggregating, processing, and marketing the smallholder produce. Third, it looks at markets for products and if there is fair market competition. The PACD will facilitate the coordination between value chain stakeholders to increase the market access for smallholders and make production more demand and market driven. It will also strengthen POs and link them to markets, since global experience has shown that this model can have the highest gain for farmers. On the other hand, it will help buyers get the raw material on time in the quantities and qualities requested. It will also incentivize financial actors to co-finance investments at farm, PO, and MSME levels. And fourth, it needs a strong innovation ecosystem. The PACD will promote an entrepreneurial culture among MSMEs and POs, incentivize applied R&D in partnerships, and promote the transmission of new technologies to farmers to increase their productivity and the sustainable use of their resources.
4. The project will include five components: (a) Institutional Capacity Building, (b) Agriculture Feeder Roads, (c) Productive Partnerships, (d) Project Management and Monitoring and Evaluation, and (e) Contingency Emergency Response Component.



5. **Component 1: Institutional capacity building (IDA US\$5.10 million).** The specific objective would be to improve the performance of sector institutions and to enhance industry coordination in cocoa, coffee, spices, coconuts, and small livestock. The ultimate goal would be to enable the conditions for institutions to support the structural changes required in the cocoa, coffee, and related commodity bodies to respond to market demand and other major developments such as the impact of the cocoa pod borer and coffee berry borer on yields and quality. This also requires building trust between public and private stakeholders and ensuring that public agencies are more responsive to the needs of the private sector, including smallholder farmers. Recommendations from the 2013 FER will lay the foundations for such strengthening of institutional capacity in the different commodities. On the model of coffee and cocoa during the PPAP, existing stakeholder platforms for coconuts, spices, and small livestock would be consolidated to address short- and long-term issues such as sector governance, skills development in the industry, improvement in extension services, industry strategy on threats to quality and quality promotion, information within the industry, market development, and crop diversification. The support will address institutional capacity gaps at two levels.

- **Subcomponent 1.1: Department of Agriculture and Livestock - DAL (IDA US\$3.0 million).** The subcomponent will provide technical assistance and carry out capacity-building activities to (a) strengthen the capacity of DAL (at central and regional levels and policy and technical divisions) and the provincial DPI in planning, coordination, and M&E; (b) review their policy and regulatory framework where necessary, notably on climate-smart agriculture, extension, and veterinary services, promoting a multisectoral approach to nutrition, quality standards, and food safety; (c) support the transition of the LDC and Spices Industry Board currently under the umbrella of DAL to independent statutory bodies including reviewing the related legal framework; (d) strengthen the provincial and district capacity to deliver services: climate-smart extension, advisory and veterinary services, and access to inputs; this will include implementing a Structured Outreach Program together with the CB and CIC where funding will be allocated for technical assistance that would continue supporting PPAP farmers with technical and financial management (FM) advice and monitor their progress under the PACD; (e) design and implement a sector-wide and project-specific communication and public awareness strategy; and (f) pilot programs on nutrition, gender education, and behavior change as outlined in annex 3, including adopting a Do No Harm.
- **Subcomponent 1.2: Commodity Boards (IDA US\$2.10 million),** notably CB, CIC, and KIK under the coordination of the two PMUs hosted by CB and CIC. This subcomponent will provide technical assistance and carry out capacity-building activities, to:
  - (a) Strengthen the capacity of the two ICCs to support sector dialogue and policy development in the cocoa, coffee, livestock, spices, and coconut subsectors, including and covering operating and meetings costs. CIC and CB in coordination with the regional DAL offices (provincial support services) would respectively provide the secretariat for those industry-level platforms. Support for the operation of those industry platforms would be provided as well as technical assistance for key policy studies on priority topics identified by those committees. Their composition will be modified to welcome representatives from livestock, spices, and coconut subsectors.



- (b) In coffee and cocoa, consolidate the PPAP work of strengthening the capacity and governance arrangements of CB and CIC and launch similar efforts to strengthen KIK, including institutionalizing and expanding the MIS necessary to inform policy development and stakeholders' decisions and reviewing the financial sustainability of the respective boards.
- (c) Support the evolution of these commodity boards toward promotion and/or enforcement of quality and food safety standards developed under Subcomponent 1.1. Where appropriate, the adoption of certified sustainability practices (such as organic, fair trade, and rainforest alliance) and quality certification schemes (HACCP in coconut processing notably) will be promoted. This may require retraining of drying and processing facility owners, traders, and inspectors; working with the commodity boards and exporters on produce quality; and analyzing potential changes to PNG export standards and licensing regulations in response to emerging impacts related to pest and diseases. Parallel technical assistance from IFC will be explored to increase the efficiency and impact of this activity.
- (d) In collaboration with NARI, strengthen the platform for sustainable production and multiplication of plant and animal germplasm and the genetic base (nurseries) through R&D and extension capacity building, with a focus on climate-smart agriculture practices.
- (e) Design and implement commodity-specific communication and public awareness strategies and campaigns.

This subcomponent will also rehabilitate offices, including the CB office in Kokopo.

6. **Component 2: Agriculture Feeder Roads (IDA US\$13.40 million).** The specific objective of this component would be to improve smallholder market access in targeted areas under the project. High levels of poverty in the project area are directly correlated with the lack of access to markets. Deteriorated market access infrastructure significantly reduces farm gate prices. Deteriorated transport infrastructure is also associated with higher levels of law and order issues and directly affects links between smallholders and the private sector.

7. This component will finance demand-driven interventions related to the rehabilitation of critical feeder roads in the targeted provinces. High transport costs also make imports of farm inputs such as seeds, fertilizers, and pesticides unaffordable for smallholder farmers. A lack of storage facilities for agricultural produce at farm gate and high transport costs in remote production areas hinders access to output markets. While this component under the PPAP has been challenging, the protocols established under the PPAP for the scoping, design, documentation, and approval processes will be refined and this will be described in the PIM to guide implementation. The project will provide capacity building at local, district, and provincial levels to ensure the continual maintenance of all the public feeder roads infrastructure. It is envisaged that at least five roads that had been prioritized under the PPAP should commence under the PACD to maintain the momentum of coordination and clearance procedures with relevant authorities. As per the PPAP model, feeder roads will be designed and constructed to be more climate resilient through increased resistance to heavy rains occurring during wet seasons: they will be



well cambered to shed runoff quickly from the road surface, and all longitudinal drainage (lined and unlined side drains) and cross drainage (pipe/box culverts and log bridges) will be designed to accommodate anticipated increases in frequency, duration, and intensity of rainfall due to climate change.

8. In meeting the objectives of Component 3, investments under this component would be directed at the rehabilitation of existing transport links (these will generally be short—maximum length 5 km—feeder roads and access tracks/footpaths) that provide access between smallholder farming communities in the coffee, cocoa, livestock, coconut, and spice sectors and marketing or processing points located on a trafficable route, for which a sustainable maintenance regime can be introduced (or strengthened) during the project.

9. Specific investments in infrastructure under Component 2 would only be identified following the selection under Component 3 project activities. Once the scope of the Component 3 investment is established, the potential transport infrastructure interventions that will directly affect the market access of the target beneficiary smallholder communities can be identified and will undergo a rigorous selection process for prioritization for funding under the PACD. Project interventions under Component 2 would thus follow a two-stage process: preparation and implementation.

10. **Preparation of feeder roads investments.** The preparation process for each Component 2-specific feeder road investment would involve identification, consultation, screening, assessment, and ranking of all candidate routes/links that provide access to and from the targeted communities. The process would be led by the PMU civil engineer and safeguards officer. It is described in detail in the PIM and includes the following aspects:

- Preparation of a stakeholder consultation plan to include the relevant technical specialists, beneficiaries, and impacted people and authorities at all levels in both government and industry that ensure free, prior, and informed consultation
- Provision of appropriate scale mapping showing target communities and their existing access routes/links
- Size of community and current and potential production of coffee, cocoa, coconut, spices, livestock, and other crops
- Mapping of existing social welfare and/or other facilities located within the community or along the route
- Length of access route(s)/link(s) between community and market/processing point, assessment of physical condition along its length, current and future traffic (volumes and type)
- Investigation of appropriate standard of rehabilitation required to suit the future traffic needs and estimated cost to rehabilitate. The intention is to find a balance in all cases between investment cost and maintainability. Adequate drainage provision will be a critical factor in all land transport routes, whether roads or footpaths



- Initial screening and selection of routes/links that meet the primary criteria (short length, feasible rehabilitation, and maintainability)
- Undertaking of a transparent socioeconomic comparison to rank all selected links within the target area
- For the highest ranked route(s) under each partnership, assessment of future ability of, and obtaining of formal commitment from, target community, PACD partner, DoW, district, local level government, and/or other stakeholder to provide sustained maintenance of the completed route/link,
- Agreement on the extent of investment available to each partnership and the resulting scope of transport routes/links that will be rehabilitated

11. **Market access infrastructure development.** The implementation process for Component 2 investments is set out in detail in the PIM and would comprise the following activities:

- Detailed consultation with relevant beneficiaries and local authorities at the province, district, and local levels
- Detailed design and preparation of suitable bid and contract documentation (that is, small works, labor-based methods, and/or community-based works where appropriate) of the rehabilitation works
- Procurement of consultants as required for materials testing and survey, construction supervision, and community-based maintenance training activities
- Procurement and contracting of rehabilitation works on selected lengths of transport route/links through appropriate design and contract packaging
- Working with target community groups, PACD partners, district, LLGs, and/or other stakeholders to develop and introduce sustainable regimes for routine and periodic maintenance of the rehabilitated transport links

12. **Component 3: Productive Partnerships (IDA US\$12.30 million).** The objective of this component is to increase the integration of smallholder producers, POs, and MSMEs into performing, remunerative, and diversified value chains. The first subcomponent will directly benefit smallholders and will build on the PPAP model and its lessons learned. It will develop and implement productive partnerships between smallholders and the private sector aimed at improving market links in the project areas. The focus will be to increase on-farm and post-harvest productivity and quality. The second subcomponent will benefit POs and MSMEs that are working directly with farmers in the same commodities, to increase their competitiveness with focus on aggregation, logistics, processing, and marketing. This will ensure that aggregators and processors of smallholder produce can increase their absorption capacity and quality and therefore increase the competitiveness of the value chains. The two subcomponents complement each other and are linked to ensure that value chains and their stakeholders can get more competitive, considering all its segments.



13. Within the prioritized value chains (coffee, cocoa [and synergetic commodities], coconut, spices, and livestock), smallholder farmers are faced with several constraints and lack an understanding of the market, thereby limiting their ability to respond to market signals. Generally, smallholders have limited impact on prices and are often limited in their performance due to market access problems. With limited or no extension services, smallholder farmers have little access to information, new technologies, and improved planting material. Therefore, agribusiness enterprises and traders are critical for communicating market demand to producers and establishing value chains that effectively link them to the market. However, building long-term relationships with smallholder farmers involves considerable transaction costs on the part of the agribusiness. These include identifying producers, reaching them in difficult access areas, establishing farmer groups, obtaining suitable certification, and introducing GAPs.

14. Developing relationships along the supply chains by building partnerships between exporter/processors, traders, and producers will improve both the productivity and quality of smallholder production and address serious threats such as the cocoa pod or coffee berry borer. Many such partnerships already exist where processors and exporters have been effectively delivering producer support on a limited basis and so are natural partners to reach producers cost-effectively. Fostering a scaling-up of these market-oriented interventions and developing new partnerships together with strengthening MSMEs and POs that are involved in the aggregation, processing, and marketing in the partnerships are the means by which the PPAP expects to achieve its development objective.

15. The component will comprise two linked subcomponents. The first one is based on the PPAP partnership model and focused on smallholders but it also includes additional value chains and will have a stronger focus on the voice and empowerment of smallholder producers. It will also more strongly and proactively promote the formation of POs and their opportunities to climb the value chain ladder by being more involved in post-harvest, aggregation, and processing activities. The second subcomponent was added to have a more holistic value chain approach and achieve higher impact on the ground. Strengthened POs and MSMEs with improved facilities and capacities are key for producers to reach more lucrative markets.

#### **Subcomponent 3.1: On Farm and Post-Harvest Productivity, and Formation of Producer Organizations (IDA US\$10.70 million)**

16. This subcomponent will address two main binding constraints: first, the limited aggregation of smallholder produce and lack of planning and coordination among stakeholders along the selected value chains leading to limited market integration of smallholders and second, the low productivity and quality of the smallholder produce. The subcomponent will address these constraints by using the productive partnership approach used under the PPAP. As in the PPAP, the subcomponent will channel project funding through legal entities in the private sector and civil society (LPs), which have already been successfully engaged with smallholders to increase output, productivity, quality, and sustainability and which are interested in scaling up those activities by forming partnership with the smallholders. LPs can be divided into five types.<sup>36</sup> The subcomponent will step up its effort to facilitate the formation of POs and the management of common services, including marketing and initial processing. During the

<sup>36</sup> (a) multinationals, (b) consolidated larger PNG exporters, (c) SMEs that are aggregating and processing and selling products to type 1 and 2 LPs and are or have the potential to be exporting themselves; (d) microenterprises (intermediaries, which mostly are trying to aggregate and transport the products to type 1, 2, or 3 LPs); and (e) nongovernmental organization and civil society.



preparation stage of the partnership plans, the project will assist in advising how certain investments, such as small pulpers and wet processing plants for coffee or fermenting and drying equipment for cocoa, and the marketing of the product, can be managed as a group. The conversion of abandoned or poorly managed land into perennial tree crops and crops will also contribute to net carbon reductions, as measured through the GHG Accounting Tool.

17. The subcomponent will finance (a) awareness raising campaigns, (b) support to LPs and associated farmers for the preparation of their partnership proposals and plans, and (c) co-financing and technical assistance for competitively selected partnerships.

18. **Awareness raising campaigns.** This will include awareness raising through various types of communication channels as well as events and workshops in the project area. Strong farmer involvement will be promoted by having awareness raising campaigns from the start. In addition, the project will ensure that LPs undertake regular consultancies with the producers in the preparation phase so that every participating producer knows exactly what to expect from the project.

19. **Support to LPs and associated farmers for the preparation of their partnership proposals and plans.** Applicants need to be fully conversant with how projects should be prepared, following a two-stage process. In Phase 1, a call for proposals will be announced and applicants would need to submit a brief partnership proposal describing proposed partnership arrangements, activities, and anticipated outcomes. Applicants with proposals that meet the qualifying criteria and achieve the required score in Phase 1 would then be invited to submit a detailed partnership plan in Phase 2. Trainings sessions will be organized for potential LPs to increase their knowledge in preparing partnership proposal and plan. The LPs should prepare the partnership proposal and plan with the full involvement of all partner organizations and associated farmers. Eligibility criteria for LPs and co-partners will further be detailed in the PGMGG. On productive partnerships for coffee, the project will continue supporting the recent approach implemented by CIC as per PPAP modalities: priority will be given to rehabilitating blocks and plantations through long-term leasing of subdivisions to smallholder farmers organized in marketing groups and working with well-performing LPs—with an effort to focus on farmers confined within a short distance radius (about 5 km) to maximize impact.

20. **Co-financing and technical assistance for competitively selected partnerships.** The subcomponent will co-finance for competitively selected partnerships, productive investments, such as farming equipment, infrastructure, and other related inputs, including improved planting material (nurseries), support for rotational replanting and garden rejuvenation, more efficient and environmentally friendly post-harvest and processing technology. Investments will promote innovative technologies, notably on climate-smart agriculture practices (agroforestry, water collection and micro-irrigation, drought resistance varieties, and intensification of small livestock production and bio-digesters), that have the potential for positive impacts on the environment.

21. A knowledge gap analysis and detailed technical assistance plan will be part of the partnership proposal. LPs will provide technical assistance to the producers for subjects in which they have a comparative advantage, such as improvement in production, productivity, and quality, including GAPs, modern and improved technologies, or more efficient and environmentally friendly post-harvest handling. The PMUs will take a coordinating role to provide training and technical assistance to form and strengthen PO and communities, livelihood training, business management, marketing, or financial literacy. To close



gaps in women's access to ownership of farming MSMEs and the management of SMEs and POs, particular attention will be paid to increasing the number of women-lead LPs and associated POs through dedicated outreach, capacity development, and specific targets for women. The PMU may outsource some of its training to consultants or other ministries, such as the Department of Health (DoH) for HIV/AIDS awareness training. When feasible, the subcomponent will facilitate the formation of POs and strengthen them with specific training and technical assistance. All procurement of investments for the benefiting smallholder producers will be undertaken by the LPs, as previously done in the PPAP.

22. During implementation, regular information sessions by the LPs will be needed to keep the producers fully informed. Moreover, the asset ownership of all the investments made with the grants will be clearly stated in the PGMGG and the Partnership Agreements. Farmers and LPs will provide cash and in-kind contribution to co-finance the partnerships, as further detailed in the PGMGG.

23. **Fiduciary.** Project funding would be channeled through partnerships with entities that have demonstrated success in working with smallholders and are interested in scaling up these activities. Under this proposed mechanism, each LP will receive funds in a specific bank account opened by it for its exclusive use while implementing the partnerships. The LPs will be the procurement agent for the partnership, procuring all goods and equipment for the co-partners.

24. **Cost sharing and support scales.** The percentage of co-financing as well as the maximum project financing per partnership and per producer will further be described in the PGMGG. Farmers will be required to contribute a certain share of the total cost of their investment in cash, while the LPs will pay for a share in kind for operating the partnership and for its technical assistance share. Cost sharing between the project and the partners will vary depending on the relative assets of the partners. Initial amounts and percentages are listed in table 2.1.

**Table 2.1. Indicative Summary Table for Partnerships (further specified in the PGMGG)**

| Details of Partnerships   | Number of Partnerships | Support scale | Cash or in-kind contribution |
|---|------------------------|---------------|------------------------------|
| Target number of partnerships                                       | 35                     |               |                              |
| Target number of beneficiaries                                      | 15,000                 |               |                              |
| Average grant size  |                        | US\$200,000   |                              |
| Maximum grant size  |                        | US\$400,000   |                              |
| Average grant size per producer                                     |                        | US\$500       |                              |
| Maximum grant size per producer                                     |                        | US\$1,000     |                              |
| Share of cash payment for benefiting farmers for the goods received |                        |               | 5 percent                    |
| In-kind contribution of LPs as share of total partnership cost      |                        |               | 25 percent                   |

### Partnership Development

25. **Call for proposals.** To ensure that the diversification objective of the project will be materialized, there will be separate call for proposals per commodity. This is to give a chance to the value chains that are still less organized than the cocoa and coffee ones.



26. **Support for partnerships preparation and implementation.** Following the awareness raising campaign and the announcement of the call for proposals, the LPs together with their associated farmers (co-partners) will prepare a simple partnership proposal, following templates from the PGMGG. The TAC will review the partnership proposals for eligibility, based on the criteria defined in the call for proposal and the PGMGG, and eliminate ineligible and weak partnership proposals. Selected partnership proposal and beneficiaries with lower capacity will receive support from the PMU, which will pre-identify a pool of qualified local service providers and train them on project procedures so that they are able to assist beneficiaries in the preparation of their full-fledged partnership plan and their implementation if needed. Specifically, this would include service providers qualified to work with disadvantaged groups or with significant outreach in more remote locations.

27. **Evaluation and selection.** Project funding would be channeled through the partnership model with legal entities in the private sector and civil society, who have already been successfully engaged with smallholders to increase output, productivity, quality, and sustainability of cocoa, coffee, coconut, spice, and livestock-based farming systems. The partners would need to have a demonstrated capacity to manage contracts and activities of the scope and nature identified in the proposed partnership. Detailed eligibility criteria and eligible activities are further described in the PGMGG. The selection and ranking criteria of partnership plans are defined in the PGMGG and include (a) the financial and management capacity of the LP; (b) relevance in responding to the call for proposals and alignment with PACD objectives; (c) technical aspects, including capacity building of those involved in the partnership and sustainability of the partnership; (d) number of households to benefit from the activities; (e) expected benefits: social, economic, and environmental; and (f) consideration given to smallholders in disadvantaged locations and to vulnerable groups (including women and young farmers). The partnership plan will be reviewed, evaluated, and selected by the TAC. Financing of selected partnership plans would be proposed by the PMU with the final endorsement provided by the ICCs.

28. **Targeting.** The design of the project includes a number of measures to ensure that the disadvantaged groups identified in the social assessment (such as smallholders in remote areas or the more vulnerable groups, such as women and young farmer) are able to benefit from project activities. These include, in addition to the selection and ranking criteria mentioned earlier, (a) information sessions for potential partners and beneficiaries to raise their awareness about the selection and ranking criteria of the PACD, (b) possible support by qualified service providers to prepare proposals as well as their continued support for implementation and monitoring of the partnership, and (c) regular monitoring by the PCU and PMUs to ensure that the project is actually reaching its objectives in terms of inclusiveness so that adjustments to the approach can be made as needed.

#### **Subcomponent 3.2: Aggregation, Value-Addition and Marketing (IDA US\$1.60 million)**

29. This subcomponent will directly address the following two main binding constraints: first, the lack of knowledge and access to finance of POs and MSMEs needed to become competitive players and second, the lack of value addition that is undertaken in the country, needed to ensure higher incomes to rural households and the local economy in general. This subcomponent will use an MG mechanism to competitively selected POs and MSMEs to co-finance technically feasible and financially viable business plans. These MG activities will be aimed at increasing their competitiveness, with a focus on aggregation, logistics, processing, and marketing. Eligibility for grants would be limited to legally established MSMEs and POs that procure their raw material from local producers and are active in the selected commodities



and are based in the selected provinces. Activities to engage women in the mechanism will include developing specific appraisal criteria, further defined in the PGMGG, to ensure at least 30 percent of grants flow to women-led MSMEs or POs. The subcomponent will also finance awareness raising campaigns and support to POs and MSMEs for the preparation of their business proposals plans. Criteria will also be developed to strengthen the ability of women entrepreneurs and farmers to compete for and win MGs. The subcomponent will finance (a) awareness raising campaigns and support to POs and MSMEs for the preparation of their business proposals and plans and (b) co-financing and technical assistance for competitively selected business plans.

30. **Awareness raising campaigns and call for proposals.** Following an awareness raising campaign in all the targeted provinces, the project will organize separate calls for proposals for each of the main commodities to promote the diversification objective of the project. Furthermore, there will be separate windows for MSMEs and POs to promote the strengthening of POs, which usually have lower capacity.

31. **Support to POs and MSMEs for the preparation of their business proposals and plans.** In the first phase, the POs and MSMEs will have to prepare a short business proposal. The PMU will provide on demand technical assistance to support the POs and MSMEs in the preparation of the business proposal. In the second phase, for selected business proposal, the PMU will again provide more in-depth technical assistance for the preparation of the full-fledged business plan.

32. **Co-financing and technical assistance for competitively selected business plans.** Selected business plans will receive MGs to co-finance productive investments, such as equipment (transport, office, ICT tools, storage, product processing, and so on); infrastructure (storage, warehouse, fermentation facilities, and so on); and other related inputs. The investments will need to finally also benefit the producers. For example, a coffee processor may invest in more modern processing equipment, such as hulling machinery and grading and sorting machines, with the objective of increasing the price of the coffee sold and which could be translated upstream into an increase in income for the producers as well. While investments will be demand driven, priority will be given to investments that contribute to climate change adaptation and/or mitigation.

33. In addition to the investment, and to fill the knowledge gap identified in the business plan, the PMU will provide technical assistance, such as in procurement, accounting, financial literacy, logistics, storage, marketing, agronomy, food processing, good manufacturing practices, packaging, labelling, traceability, quality control, food safety and hygiene, legal, and improved climate and environmental aspects as well as overall support to the POs and MSMEs to make sure that the business plan is implemented correctly and timely.

34. **Fiduciary.** The selected MSMEs and POs will procure works, goods, and individual consulting services and non-consulting services, while the procurement procedures, contract forms, and thresholds to be followed will be included in the PGMGG. Under this proposed mechanism, each MSME or PO will receive funds in a specific bank account opened by it for its exclusive use while implementing the subproject. The counterpart funds from the MSME or PO are expected to be deposited in the same specific account as a precondition for disbursing project funds for the same purpose, which will be sequenced in line with physical progress in accordance with the Subproject Agreement and the related schedule in the subproject Procurement Plan.



35. **Cost sharing and support scales.** The percentage of co-financing as well as the maximum project financing per MG and per beneficiary will be further described in the PGMGG. Initial amounts and percentages are listed in table 2.2.

**Table 2.2. Indicative Summary Table for Subprojects (further specified in the PGMGG)**

| Details of Partnership              | Number of Partnerships | Support scale | Co-financing percentage |
|-------------------------------------|------------------------|---------------|-------------------------|
| Target number of subprojects        | 20–30                  |               |                         |
| Average grant size                  |                        | US\$50,000    |                         |
| Maximum grant size                  |                        | US\$100,000   |                         |
| Co-financing of subproject by MSMEs |                        |               | 40 percent              |
| Co-financing of subproject by POs   |                        |               | 20 percent              |

36. **Eligibility criteria and eligible activities.** Eligible recipients must be legally established MSMEs, further detailed in the PGMGG, or POs. Moreover, they must be active in the aggregation and/or the processing in one of the eligible commodities. Also, the partners would need to have a demonstrated capacity to manage contracts and activities of the nature identified in the proposed business plan. The PGMGG will further detail eligibility criteria and eligible activities.

37. **Selection and ranking criteria.** Proposals would be restricted to eligible activities as defined in the call for proposals and the selection will be competitive. The selection and ranking criteria are defined in the PGMGG and include (a) the financial and management capacity of the MSME or PO; (b) for POs, their experience of marketing or undertaking post-harvest activities as a group; (c) the quality of the business proposal and business plan and their technical feasibility; (d) the financial viability of the proposal/plan; and (e) the environmental and social impacts. Financing of eligible proposals would be proposed by the PMU, appraised by the TAC, and the final endorsement provided by ICCs.

38. **Component 4: Project Management and Monitoring and Evaluation (IDA US\$9.20 million).** This component would support activities of the PCU and two PMUs required to manage IDA funds, procure IDA-funded goods and services, conduct project M&E, and comply with safeguard mitigation measures. It will finance the required consultant staff for the length of the project to ensure efficient management of the PACD, including the following:

- At the DAL PCU level in Port Moresby, at least the project coordinator, a senior FM specialist, a senior M&E specialist, a procurement specialist and an environmental and social safeguards specialist. Other consultants will be recruited based on identified needs (gender, communication, and nutrition).
- In each commodity board's PMUs, the two project managers in the CB PMU (Kokopo, ENB) and CIC PMU (Goroka, Eastern Highlands), an accountant, a procurement officer, a safeguard officer, an M&E officer, a civil engineer, and a Component 3 manager. In collaboration with other commodities boards, the two PMUs will also recruit subject matter specialists (livestock and crops).



39. It would provide training and equipment to modernize DAL operations (computer hardware and software, office furniture, and vehicles) at the central level and in the field as needed for project activities. It would also support the development and implementation of a communications strategy as well as general awareness and sensitization campaigns about project activities.

40. **Component 5: Contingency Emergency Response Component (Total Cost: US\$0).** This component will only be used in the event that an emergency response is required. Experience from the past, notably the recent earthquake in Southern Highlands, has demonstrated how natural disasters can have devastating impacts on agriculture production and other sectors in PNG.

41. Following an eligible crisis or emergency, the recipient may request the Association to reallocate project funds to support emergency response and reconstruction. This component would draw from the uncommitted credit resources under the project from other project components to cover emergency response. A CERC Operations Manual, acceptable to the Association, for the implementation of the Contingency Emergency Response Plan, will be prepared and constitute a disbursement condition for this subcomponent.

**ANNEX 3: PACD Gender and Nutrition Interventions**

**COUNTRY: Papua New Guinea**  
**PNG Agriculture Commercialization and Diversification Project**

**Gender**

1. **Context.** Gender inequities and GBV are key impediments to reducing poverty and boosting shared prosperity in PNG. The United Nations Development Programme's Gender Inequality Index reflects gender-based inequalities in three dimensions: reproductive health, empowerment, and economic activity. On the 2017 Gender Inequality Index, PNG is ranked 159 out of 160 countries. PNG also suffers from high rates of GBV—for example, estimates from *Médecins Sans Frontières* suggest that 70 percent of women in PNG have experienced some degree of physical or sexual assault in their lifetime. Women's disempowerment has wide-ranging consequences; notably, economic gains are not as consistently invested in household human capital, especially nutrition and education, as in other development contexts.
2. The PNG SCD found that two key impediments to reducing poverty and boosting shared prosperity are (a) gender inequity and GBV and (b) limited opportunities for youth. Subsistence agriculture and local trading in both urban and rural contexts are key sustaining elements for women in the economy, who have limited access to formal economic opportunities, services, control over land, and household resources.
3. The World Bank Guidelines to Support Integration of Gender into World Bank Group Agribusiness Project Design and Implementation found several constraints for women to participate in agribusiness, notably access to land, finance, markets, and transport. It also noted the importance of 'gender' targeting for not only women but also men to be sustainable. A project cannot just focus on increasing female bargaining power within the market without also considering the household and if it does not consider the changes needed for both women and men, there is the potential for pushback or, even worse, backlash.
4. This was also noted in the Do No Harm research in PNG, which found that the improvement of women's economic agency often comes with a compromise to their safety and well-being. A key lesson from this research was that working with men is vital for women to achieve greater economic empowerment without also reducing their well-being. This requires taking a community-based approach to address not only economic empowerment but also GBV, household responsibilities, and local norms and values. The 2017 Household Allocation of Time and Efficiency in PNG study found that more female decision-making power and involvement in the planning about coffee production has a positive effect on self-perceived wealth today, five years ago, and what is expected in the next five years.



5. Programming methodologies and toolkits have been successfully piloted in PNG to promote joint household planning, budgeting, and management to help shift unequal household gender dynamics.<sup>37</sup> Lessons from these approaches and programs are incorporated in the following paragraphs.

6. **Identifying project-specific gaps and activities.** Project preparation indicated the need for two parallel processes to support women and their families in their transition from semi-subsistence farming to equitable and effective business-oriented farming: family building and farm building. Capacity development of women and farming families can be further enhanced through reduction of GBV.

**Table 3.1. Results Chain for Closing Gender Gap Material to PDO**

| Analysis  | Activities to Close the Gap   | Monitoring  |
|---|---|---|
| Gap: Representation of women in ownership and management of formal farming MSMEs:<br><ul style="list-style-type: none"><li>• Gender gap in ownership and management of formal SMEs (59% of farming SMEs are all/majority male owned versus 7% of farming SMEs are all/majority female owned)</li><li>• Gender gap in access to finance and financial services</li></ul> | <ul style="list-style-type: none"><li>• Dedicated technical assistance to support women's transition from informal businesses to become registered</li><li>• Targeting eligible women-owned MSMEs and women-led POs for MGs</li></ul> | A minimum 15 percent of MSMEs or POs supported through the MG program to be led by women<br><br>A minimum 15 percent of participants in the technical support program to be women or women majority managed farms |

7. **Analysis.** The informal economy is heavily dominated by women. Women make up over 80 percent of market vendors in Melanesia and approximately 85 percent of vendors in PNG.<sup>38</sup> Women's high level of activity in the informal economy makes them vulnerable in a situation where there is significant imbalance of power between men and women and a lack of legal protection.

8. The national audit notes that only a small minority of women-led enterprises in PNG can be expected to become formalized businesses over time because of the demands of home and family as well as marginalization from systems of authority. On the other hand, it also indicates a high level of interest in making a transition from the informal into the formal economy. In most of the surveyed localities, a majority of workers indicate they would be interested in formalizing their businesses. There is a gender difference in some but not all of the survey localities, with a similar proportion of women workers compared with men showing interest in formalization in some provinces, but around 20 percent lower proportion of women compared with men are interested in the National Capital District and Gulf/Central survey localities. Discussions around this issue revealed that some workers have previously sought

<sup>37</sup> See (a) the 'Family Teams Approach' developed by ACIAR and CARE's 'Family Business Management Training', (b) the PNG 'Family Farm Teams' Research Report, and (c) the recently launched IFAD program 'Markets for Village Farmers Project – Maket Bilong Vilis Fama'.

<sup>38</sup> National Audit of the Informal Economy 2018.



information about how to become registered as a small business but had found the process impossible to follow.

9. UN Women's Melanesian research<sup>39</sup> found that women vendors in markets generally lacked access to capital and formal financial services and this was a major impediment to their well-being and productivity. Similarly, the PNG National Audit found that lack of access to financial services is a key constraint to business expansion. Fewer women workers than male workers were able to use formal banking. This has implications for their capacity to borrow money or to safely make savings. At the same time, a range of informal financial services (lending, saving, and investing) have come into existence, many of which are exploitative and insecure for vendors untrained on financial literacy.

10. **Gap.** Men dominate SME ownership in PNG. Among SMEs in the formal sector, two-thirds are wholly male owned, while just 8 percent are wholly female owned. Women's need for flexibility to accommodate the demands of home and family, as well as their marginalization from systems of authority, has resulted in their overrepresentation in the micro and informal economy. Women make up approximately 85 percent of informal market vendors. Among formal SMEs in the farming sector, just 7 percent are all or majority women owned, whereas 59 percent of farming SMEs are all or majority men owned (see table 3.2).

11. Research from the PNG Business Coalition for Women suggests that narrowing the gender gap in employment could increase household income by 14 percent and output per worker could be 7–18 percent higher if female entrepreneurs and workers were utilized to the same extent as men. Women wholly or majority-owned SMEs are concentrated in commercial fishing, manufacturing, and hospitality and are underrepresented in construction, retail, wholesale, and ICT. The highest proportion of SMEs with equal ownership by women and men is in farming (34 percent).

**Table 3.2. Gender of Owners of Formal SMEs in PNG by Sector (%)**

| Sector                | (Base sample size) | Gender composition (%) |              |                   |                |                     |                |  |
|-----------------------|--------------------|------------------------|--------------|-------------------|----------------|---------------------|----------------|--|
|                       |                    | A man/all men          | Majority men | A woman/all women | Majority women | Equal men and women | Does not apply |  |
| Total                 | (1,117)            | (67)                   | (4)          | (8)               | (1)            | (17)                | (3)            |  |
| Construction          | 124                | 77                     | 2            | 2                 | —              | 12                  | 6              |  |
| Wholesale trade       | 63                 | 70                     | 10           | 3                 | 2              | 14                  | —              |  |
| Retail trade          | 608                | 64                     | 4            | 8                 | 2              | 19                  | 3              |  |
| Retail motor vehicle  | 160                | 79                     | 4            | 3                 | —              | 13                  | 1              |  |
| Hospitality           | 241                | 65                     | 4            | 11                | 2              | 17                  | 1              |  |
| Transport             | 142                | 67                     | 4            | 7                 | 2              | 17                  | 3              |  |
| Professional services | 47                 | 72                     | 2            | 2                 | —              | 23                  | —              |  |
| Manufacturing         | 44                 | 70                     | 5            | 14                | —              | 9                   | 2              |  |
| Farming               | 41                 | 54                     | 5            | 5                 | 2              | 34                  | —              |  |
| Commercial fishing    | 33                 | 64                     | 3            | 12                | 3              | 18                  | —              |  |
| Telecoms & IT         | 30                 | 77                     | 3            | 3                 | —              | 13                  | 3              |  |
| Other                 | 199                | 67                     | 3            | 5                 | 1              | 21                  | 3              |  |

Source: Tebbutt Research (2014, p.61, Table 24).

Notes: 'Does not apply' includes ownership forms such as shareholder organisations.

<sup>39</sup> UN Women. 2017. *Consolidated Report, Summary of Findings from Work Carried Out in Fiji, Vanuatu and the Solomon Islands 2008-14, as a Foundation for the Markets for Change Program, Pacific Office*; UN Women. 2017. *Survey Report on Financial Literacy Training: Delivered to Market Vendors in Port Moresby, PNG Office*.



12. The management ranks in SMEs are also dominated by men, with 68 percent of SMEs being wholly/majority male managed. In the informal sector, there is higher female representation, but male ownership still prevails. In the informal sector, 35 percent of SMEs have at least one female owner, compared to 30 percent in the formal sector and majority female ownership of SMEs in the informal sector is 16 percent compared with 9 percent in the formal SME sector.<sup>40</sup> In terms of sectors with any female management, wholesale trade (4 percent) and farming (11 percent) had the least female managerial representation.

13. **Action.** In response, the PACD will strengthen women's access to finance (MGs) and support the transition of women's informal businesses to become registered, well-run small businesses (technical assistance). In particular, the project will direct MGs, entrepreneurial training, information, and infrastructure to improve market access and thereby increase women ownership and management of farming MSMEs. Actions will include the following:

- Assessment of expression of interest and applications for partnership funding will include evaluation criteria<sup>41</sup> related to inclusion of women farmers, by weighting for selection and criterion for allocation of grants to ensure at least 15 percent of grants flow to women farmers.
- Family-based approach will establish the principles of inclusive household-level action plans, where the whole family is involved in decision making around project investments and partnership implementation, that is, (a) extension/technical inputs and training delivered through/in line with the family teams-based approach<sup>42</sup> and financial literacy and business development services for households; (b) business development services to maximize partnership arrangements and support identification of practices that support women and men working together in business; and (c) community-level support for inclusive business partnerships and identification of capacities, priorities, and participant households. Rapid rural appraisal to ensure that social dynamics (wantok, land issues, and so on) enable inclusive business partnerships.

14. **Indicator.** To monitor this gap, the project will include the below intermediate level indicator in the Results Framework. This equates to 15 percent of the MSMEs and POs implementing subprojects being women owned or led (3 out of a total of 20), which is higher than the national average of 7 percent in the farming sector. An additional indicator will be monitored against the number of women-owned MSMEs or women-led POs receiving technical assistance, which also equates to 15 percent of the total target.

- Number of women owned MSMEs or women-led producer organizations supported through the project (Baseline: 0, Target: 3)

<sup>40</sup> Tebbutt Research 2014.

<sup>41</sup> Specific criteria to be developed in the operating manual.

<sup>42</sup> Based on the 'Family Teams Approach' developed by the Australian Centre for International Agricultural Research (ACIAR) and CARE's 'Family Business Management Training', the PNG 'Family Farm Teams' Research Report, and (c) the recently launched IFAD program "Markets for Village Farmers Project - Maket Bilong Vilis Fama."



### *Women's Safety and Security*

15. GBV is widespread in PNG, with over two-thirds of women having experienced some kind of violence in their lifetime. GBV—both within the home and in public spaces—severely affects women's ability to contribute to the economy, participate in business activities, and support family livelihoods. For example, 90 percent of PNG women and girls, in a 2014 United Nations Women study, reported experiencing some form of sexual violence while using public transport, including verbal sexual remarks, extortion, robbery, threats or intimidation, inappropriate touching, and indecent exposure. About 97 percent of female respondents in the same study reported feeling unsafe while using public transport. While these results were specific to Port Moresby, violence and crime are also high along the country's transport corridors where much of the rural population is engaged in agriculture, trade, and the transportation of goods.

16. Approaches that promote joint household planning, budgeting, and management in PNG have also demonstrated efficacy in reducing incidence of GBV.<sup>43</sup> To mitigate the risk of GBV women experience relating to safety and security, the project will complement the Family Teams modules, proposed as part of closing Gender Gap#1, to include a structured series of GBV-related training/discussions alongside other technical trainings. ACIAR has trained master trainers in-country who will be resources for this. Such an approach would help mitigate any potential backlash and violence from men's reaction to women's increased participation in, and income from, agricultural activities.

17. While the project aims to reduce the risk of violence, levels of violence remain high in PNG and incidents will still take place during the life of the project. Accordingly, the project will do the following:

- Map existing GBV-related services in all project areas, including case management, counselling, health care, policing and justice, safe shelter and material support, as well as referral between such services
- Develop IEC materials on these services, and when and how to access them and make these available to all project participants
- Conduct regular awareness raising sessions on GBV, consequences, and available services in project areas (using IEC materials) and provide referrals as necessary
- Train project staff on GBV and responding to any disclosures of violence (to be equipped to respond compassionately to any case of violence and know how to refer the survivor appropriately)
- Consider establishing women's support groups, where women project participants (and potentially other women community members) are encouraged to come together and discuss issues they face. Such support networks will contribute to the success of the project

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<sup>43</sup> International Rescue Committee. 2014. "Economic and Social Empowerment to Reduce Violence against Women: Pairing a dialogue group that engages couples on household gender dynamics with an economic empowerment program for women was more effective in reducing intimate partner violence in conflict-affected communities in Cote d'Ivoire than the economic empowerment program alone." <https://gbvresponders.org/wp-content/uploads/2014/07/EAE-Research-Brief-Jan-2014.pdf>.



by enabling women to discuss and find mutual strategies to address challenges while also serving as a support network for any survivors of violence.

## Nutrition

18. **Context.** Malnutrition is a serious issue in PNG, which has negative implications for human development and the economy. In 2016, the GoPNG enacted a six-year nutrition policy (PNG National Nutrition Policy 2016–2022) that addresses malnutrition through a multi-stakeholder framework that aims to support inclusive nutrition interventions in PNG. The national departments that participated within the framework included DAL, Community Development and Religion, Education, Health, and DNPM. The National Nutrition Policy will be launched in 2019, together with a Strategic Action Plan, both of which include nutrition-sensitive agriculture.

19. Agriculture is the most direct way to improve food security and nutrition outcomes of the rural poor who represent the majority of the malnourished population in PNG. The PACD will create an enabling environment in which income generated by the project can be utilized to improve diet quality—a direct contributor to nutrition. Continuing from the nutrition education component piloted in the PPAP, targeting and delivery mechanisms will be improved. Activities will support the implementation of the PNG Multi-Sectoral National Nutrition Policy, specifically by contributing to achieving National Nutrition Policy objectives 1, 2, 3, and 4. These activities will provide an opportunity to pilot different nutrition-sensitive agriculture implementation strategies, generate evidence to guide future application of the Strategic Action Plan, and provide insights to guide the development of provincial nutrition action plans. The five nutrition activities are outlined as follows:

- (a) A rapid situation analysis and barrier analysis to better target PACD nutrition activities. The assessment will identify (i) current diet quality gaps of women and children and intra-household allocation of food resources; (ii) barriers to production of diverse and nutritious foods including production constraints, management practices, seasonal availability, drudgery, and access to quality inputs and planting materials with climate change resilient and preferred traits; (iii) barriers to consumption of nutritious foods including knowledge, cultural beliefs and norms, attitudes, and practice capacity gaps about nutritional benefits of foods, preparation methods, and taste preferences. Mixed methods will be used including primary data collection using household surveys and focus group discussions, secondary data available from previous studies conducted in project regions, and lessons learned from the impact assessment conducted on the nutrition pilot within the PPAP. Results of this activity will be used to further target the content and delivery mechanisms of activities (b), (c), and (d).
- (b) Holistic nutrition education and behavior change modules that create incentives to allocate income generated through the PACD toward nutrition. Modules will improve nutritional knowledge, positive attitudes, and practices of both men and women and will focus on (i) nutritional properties of locally available foods; (ii) implications of malnutrition; (iii) importance of diverse diets to prevent malnutrition; (iv) participatory cooking and food processing and preservation activities; (v) infant and young child feeding practices food preparation/safety and promotion of exclusive breastfeeding; (vi) water, sanitation, and hygiene practices, especially treatment of safe drinking water; and (vii) family planning.



- (c) Institutional capacity building (including the development and handover of training documents) will be conducted with DAL and DoH workers to enable DAL (and DoH) to retrain staff and extension workers utilized in the delivery mechanism of the behavior change modules upon the completion of the project and to ensure the sustainability of approach through institutional learning. Modules will be co-developed in close consultation with other donor partners operating nutrition-sensitive agriculture projects and programs in the country (including FAO and IFAD) as well as with the steering committee of the National Nutrition Policy to ensure modules can be scaled out and reapplied (replicated) across other in-country projects.
- (d) Improve the access to diversified nutritious and local foods all year by diversifying household production and improving food system resilience by (i) promoting seasonal planning and diversification of food gardens for improved climate change and food system resilience including access to quality inputs and planting materials with climate change resilient and preferred traits; (ii) diversifying commodity production systems by intercropping nutritious crops; and (iii) improving nutritional value of food products on PACD commodities which could include improved processing and storage methods and selection of varieties or breeds with higher micronutrient content and food safety standards (for example, Codex Alimentarius Commission).
- (e) Improve evidence base on effectiveness of nutrition-sensitive agriculture interventions at improving food and nutrition security and improve food system resilience. Data generated through the M&E of project activities will provide insights to allow for participatory learning and evidence-based policy design and implementation in country. Multi-sectoral round tables will be facilitated, together with the committee responsible for the implementation of the multisectoral nutrition policy, to allow for a space for exchanging ideas and lessons learned from subnational experience of application. Evidence generated for each specific province will be used to guide the development of provincial strategic nutrition action plans. These activities will also facilitate the generation of evidence on the return on investment on the nutrition in PNG when channeled through agricultural pathways.

20. Community nutrition education will be delivered by village health volunteers or other existing community volunteers through a combination of door-to-door counselling for PACD farming households as well as through village-level group information sessions. Group information session will be delivered through a range of opportunities including leveraging community festivities and gatherings to provide generalized nutrition education to their communities. The utilization of the village health volunteer is a public health module that ensures each village has nutrition knowledge and capacity at its disposal. There is an opportunity to link up with the Improving Access to and Value from Health Services: Financing the Frontlines Project (P167184) being developed by the World Bank which utilizes a similar delivery mechanism.

21. The provincial health office will be integrated into the delivery framework to provide existing training modules already developed by the DoH on breastfeeding, WASH (hand washing, water boiling, and toilet), infant and young child feeding, deworming, and basic family planning. Coordination and training of the village health volunteers will take place at the ward level through the agriculture and health committees and officers.



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22. A nutrition/gender expert will be hired by the PCU on an as-needed basis. The expert will lead the development of training modules, training of trainers, backstopping of nutrition-sensitive agriculture activities, backstopping of collection of nutrition-related indicators within the M&E framework, and conduct of the institutional capacity building with DAL and DoH workers to ensure sustainability of the approach upon project completion. These activities will be implemented in coordination with gender interventions, within specific pilot areas across the project.



## ANNEX 4: Project's Budget

COUNTRY: Papua New Guinea  
PNG Agriculture Commercialization and Diversification Project

1. The project will be financed by an IDA credit of SDR 29.1 million (US\$40 million equivalent) to be implemented over five years. The total project cost is estimated at US\$40 million to be fully financed by the IDA credit, inclusive of taxes.

Table 4.1. Project Financing (IDA 100%)

| Project Cost Summary<br>(US\$ Million)  | Cost<br>Including<br>Contingencies | % of<br>Total | IDA<br>Financing | %<br>Financing |
|---|------------------------------------|---------------|------------------|----------------|
| <b>A. Institutional Capacity Building</b>   |                                    |               |                  |                |
| 1. Department of Agriculture and Livestock  | 3.0                                | 7.5           | 3.0              | 100.0          |
| 2. Commodity Boards   | 2.1                                | 5.3           | 2.1              | 100.0          |
| <b>Subtotal</b>   | 5.1                                | 12.8          | 5.1              | 100.0          |
| <b>B. Agriculture Feeder Roads</b>  |                                    |               |                  |                |
| 1. Infrastructure Networks and Logistics  | 13.4                               | 33.5          | 13.4             | 100.0          |
| <b>Subtotal</b>   | 13.4                               | 33.5          | 13.4             | 100.0          |
| <b>C. Productive Partnerships</b>   |                                    |               |                  |                |
| 1. On-farm and post-harvest productivity and formation<br>of producer organizations (POs) | 10.7                               | 26.8          | 10.7             | 100.0          |
| 2. Aggregation, Value Addition and Marketing  | 1.6                                | 3.9           | 1.6              | 100.0          |
| <b>Subtotal</b>   | 12.3                               | 30.7          | 12.3             | 100.0          |
| <b>D. Project Management and Monitoring and Evaluation</b>                                |                                    |               |                  |                |
| 1. Cocoa Sector Management  | 4.6                                | 11.5          | 4.6              | 100.0          |
| 2. Coffee Sector Management, Monitoring and Evaluation                                    | 4.0                                | 10.1          | 4.0              | 100.0          |
| 3. Monitoring and Evaluation  | 0.6                                | 1.5           | 0.6              | 100.0          |
| <b>Subtotal</b>   | 9.2                                | 23.0          | 9.2              | 100.0          |
| <b>Total PROJECT COSTS</b>  | 40.0                               | 100.0         | 40.0             | 100.0          |

2. **Project cost and financing (US\$40 million).** The direct investments to beneficiaries in infrastructure, MG, productive partnerships, and equipment are equivalent to 56 percent of total project costs. If training and capacity building are included, it reaches 59.2 percent of total costs.



**Table 4.2. Budget by Component**

| Components by Financiers<br>(US\$ Million)   | IDA    |       | The Government |   | Total  |       |
|--|--------|-------|----------------|---|--------|-------|
|  | Amount | %     | Amount         | % | Amount | %     |
| <b>A. Institutional Capacity Building</b>  |        |       |                |   |        |       |
| 1. Department of Agriculture and Livestock   | 3.0    | 100.0 | 0.0            | - | 3.0    | 7.5   |
| 2. Commodity Boards  | 2.1    | 100.0 | 0.0            | - | 2.1    | 5.3   |
| <b>Subtotal</b>  | 5.1    | 100.0 | 0.0            | - | 5.1    | 12.8  |
| <b>B. Agriculture Feeder Roads</b>   |        |       |                |   |        |       |
| 1. Infrastructure Networks and Logistics   | 13.4   | 100.0 | 0.0            | - | 13.4   | 33.5  |
| <b>C. Productive Partnerships</b>  |        |       |                |   |        |       |
| 1. On-farm and post-harvest productivity and formation of producer organizations (POs) | 10.7   | 100.0 | 0.0            | - | 10.7   | 26.8  |
| 2. Aggregation, Value Addition and Marketing   | 1.6    | 100.0 | 0.0            | - | 1.6    | 3.9   |
| <b>Subtotal</b>  | 12.3   | 100.0 | 0.0            | - | 12.3   | 30.7  |
| <b>D. Project Management and Monitoring and Evaluation</b>                             |        |       |                |   |        |       |
| 1. Cocoa Sector Management   | 4.6    | 100.0 | 0.0            | - | 4.6    | 11.5  |
| 2. Coffee Sector Management, Monitoring and Evaluation                                 | 4.0    | 100.0 | 0.0            | - | 4.0    | 10.1  |
| 3. Monitoring and Evaluation   | 0.6    | 100.0 | 0.0            | - | 0.6    | 1.5   |
| <b>Subtotal</b>  | 9.2    | 100.0 | 0.0            | - | 9.2    | 23.0  |
| <b>Total PROJECT COSTS</b>   | 40.0   | 100.0 | 0.0            | - | 40.0   | 100.0 |

3. Beneficiaries from the productive partnerships and MGs will contribute in cash as per the PGMGG.

**Table 4.3. PACD Budget by Category**

| Disbursement Accounts by Financiers<br>(US\$ Million) | IDA    |       | The Government |   | Total  |       |
|---|--------|-------|----------------|---|--------|-------|
|   | Amount | %     | Amount         | % | Amount | %     |
| 1. Civil Works  | 12.4   | 100.0 | 0.0            | - | 12.4   | 30.9  |
| 2. Consulting Services                                | 14.8   | 100.0 | 0.0            | - | 14.8   | 37.0  |
| 3. Training   | 1.4    | 100.0 | 0.0            | - | 1.4    | 3.6   |
| 4. Grants   | 9.4    | 100.0 | -              | - | 9.4    | 23.6  |
| 5. Goods  | 0.4    | 100.0 | 0.0            | - | 0.4    | 1.1   |
| 6. Operating Costs                                    | 1.5    | 100.0 | 0.0            | - | 1.5    | 3.8   |
| <b>Total PROJECT COSTS</b>                            | 40.0   | 100.0 | 0.0            | - | 40.0   | 100.0 |

**Table 4.4. Cost of Project Components (US\$ 40 Million, 100 % of Total IDA Financing)**

| Components Project Cost Summary   | (Kina Million) |         |       | (US\$ Million) |         |       | % Foreign Exchange | % Total Base Costs |
|---|----------------|---------|-------|----------------|---------|-------|--------------------|--------------------|
|   | Local          | Foreign | Total | Local          | Foreign | Total |                    |                    |
| <b>A. Institutional Capacity Building</b>   |                |         |       |                |         |       |                    |                    |
| 1. Department of Agriculture and Livestock  | 6.4            | 0.5     | 6.8   | 2.7            | 0.2     | 2.8   | 7                  | 8                  |
| 2. Commodity Boards   | 4.0            | 0.8     | 4.8   | 1.7            | 0.3     | 2.0   | 16                 | 5                  |
| <b>Subtotal</b>   | 10.4           | 1.2     | 11.6  | 4.3            | 0.5     | 4.9   | 10                 | 13                 |
| <b>B. Agriculture Feeder Roads</b>  |                |         |       |                |         |       |                    |                    |
| 1. Infrastructure Networks and Logistics  | 28.2           | -       | 28.2  | 11.8           | -       | 11.8  | -                  | 31                 |
| <b>Subtotal</b>   | 28.2           | -       | 28.2  | 11.8           | -       | 11.8  | -                  | 31                 |
| <b>C. Productive Partnerships</b>   |                |         |       |                |         |       |                    |                    |
| 1. On-farm and post-harvest productivity and formation<br>of producer organizations (POs) | 25.3           | -       | 25.3  | 10.6           | -       | 10.6  | -                  | 28                 |
| 2. Aggregation, Value Addition and Marketing  | 3.7            | -       | 3.7   | 1.6            | -       | 1.6   | -                  | 4                  |
| <b>Subtotal</b>   | 29.0           | -       | 29.0  | 12.1           | -       | 12.1  | -                  | 32                 |
| <b>D. Project Management and Monitoring and Evaluation</b>                                |                |         |       |                |         |       |                    |                    |
| 1. Cocoa Sector Management  | 10.0           | 0.4     | 10.4  | 4.2            | 0.2     | 4.4   | 4                  | 12                 |
| 2. Coffee Sector Management, Monitoring and Evaluation                                    | 9.1            | -       | 9.1   | 3.8            | -       | 3.8   | -                  | 10                 |
| 3. Monitoring and Evaluation  | 1.3            | -       | 1.3   | 0.6            | -       | 0.6   | -                  | 1                  |
| <b>Subtotal</b>   | 20.4           | 0.4     | 20.9  | 8.5            | 0.2     | 8.7   | 2                  | 23                 |
| <b>Total BASELINE COSTS</b>   | 88.0           | 1.7     | 89.6  | 36.8           | 0.7     | 37.5  | 2                  | 100                |
| Physical Contingencies  | 2.7            | -       | 2.7   | 1.1            | -       | 1.1   | -                  | 3                  |
| Price Contingencies   | 8.4            | 0.2     | 8.6   | 1.4            | 0.0     | 1.4   | 2                  | 4                  |
| <b>Total PROJECT COSTS</b>  | 99.2           | 1.8     | 101.0 | 39.3           | 0.7     | 40.0  | 2                  | 107                |

**ANNEX 5: PACD Economic and Financial Analysis**

**COUNTRY: Papua New Guinea**  
**PNG Agriculture Commercialization and Diversification Project**

**Introduction**

1. The PACD builds on the PPAP which demonstrated that smallholder farmers in the coffee and cocoa sectors could be effectively linked to supply/value chains and to markets. The lessons learned from the PPAP have resulted in (a) improved crop husbandry and farm management which includes intercropping, (b) some post harvest on farm processing allowing some farmers to get better prices for their coffee and cocoa as they do not sell them as wet beans and/or green bean, (c) improved clones with farmers actually planting their own nurseries and better grafting and replanting of coffee plantations, (d) market links that allow farmers to negotiate prices based on better market information, (e) better access to extension, and (f) overall increased household incomes.
2. The PACD expands the proposed crops building on the coffee and cocoa to incorporate spices, small livestock, and cocoa and focuses on nutrition and gender equity. The project goal is to increase the productivity and access to markets of target smallholder farmers and MSMEs for selected agricultural value chains in selected economic corridors. The project will also invest in improving access through investments in road infrastructure. All activities will include the use of climate-smart technology and promote climate mitigation as PNG is classified as a fragile state.
3. Other benefits that are not quantifiable in monetary values but expected to be generated by the project include improvements in the business management and market link of micro and small enterprises through mentoring, coaching, and business development service provision; improved nutrition of project beneficiaries; and an improved institutional environment that aims to create an enabling business environment.

**Methodology**

4. Using the cost-benefit analysis methodology, the financial and economic analysis examines viability of the project investments in economic activities and productive infrastructure measured through gross margins, returns to family labor, IRR, NPV of incremental benefits, and benefit-to-cost ratio. The project benefits are estimated through illustrative investment models that will represent producer groups engaged in production and/or processing of agricultural and livestock producers. The models are prepared using field-level data on crop and livestock, existing farm management practices, and labor requirements that were accumulated under the previous PPAP and also collected by the project management team.
5. Incremental benefits to investments in agricultural and livestock activities are estimated by comparing the future without project (WoP) and future with project (WiP) gross margins. The returns on the investment to farmers and MSMEs are measured through the mix of indicative investment models assumed for these farms, aggregators, and processors. The overall project impact is calculated by aggregating benefits to 30 partnerships that will serve approximately 500 farmers per partnership. The project benefits are assessed for 15 years, a period which corresponds to a potential technical life of the investments in productive infrastructure if adequately operated and maintained, at 2019 financial prices,



and using opportunity cost of capital of 10 percent, and assuming a 65 percent success rate for primary production and 70 percent for aggregators and processors of agricultural and livestock investment models.

6. Financial prices of locally traded outputs and inputs are converted into economic prices by deducting direct agricultural subsidies, taxes, and shadow exchange rate factor. Financial cost of unskilled labor is converted into economic one using a shadow wage rate conversion factor of 0.975. The official exchange rate used in the analysis is PGK 2.39 to US\$1.0.

7. Sensitivity analysis is conducted to test robustness of economic returns of the PACD investments for sensitivity variables that measure a 20 percent increase in the project cost and a 20 percent decline in the projected benefits.

### **Key Assumptions**

8. **Grants to POs and MSMEs.** Each productive partnership is assumed to provide technical, extension, and business development services to link farmers to markets. The LPs will contribute 25 percent and the average range of the grants will be US\$200,000. The MSME grants will average US\$50,000 and will also provide a 40 percent contribution.

9. **Prices.** Prices for inputs and outputs are 2019 prices collected from farmers, entrepreneurs, markets, and PPAP managers in the proposed provinces. The project interventions are expected to lead to increases in prices of outputs through either improved farm practices or post-harvest value addition or improved access to markets and market information. The project encourages processing of coffee and cacao beans and will invest in coconut processing. With the farm-level processing tools, the outputs will be dried, shelled, or fermented before marketing and will be sold for higher prices. The WoP and WiP scenarios reflect these changes to the output prices.

10. **Project cost.** The financial base cost of the project in 2019 prices, inclusive of physical contingencies, is estimated at PGK 101 million (US\$40 million). The project cost components are distributed as (a) Institutional Capacity Building (13 percent), (b) Agriculture Feeder Roads (31 percent), (c) Productive Partnerships (32 percent), and (d) Project Management and Monitoring and Evaluation (23 percent). The economic base cost of the project is estimated by removing all taxes and duties from the financial base cost.

### **Financial Analysis**

11. Results of financial analysis are described in the following order. First, the paper would describe assumptions and financial results for individual investment models that demonstrate likely investment activities and benefits to these activities. Second, it would demonstrate the returns to investments in aggregation and processing. Finally, the paper would present the financial results for the overall project.

#### *Investment Models*

12. **Spices.** The spice industry in PNG is regulated and controlled by the Spice Industry Board through the Spice Industry Act 1989. The act defines 14 different spices that can be grown and produced in PNG



including cardamom, chilies, paprika, pimento, tabasco, pepper, ginger, cloves, nutmeg (and mace), annatto, turmeric, vanilla, cinnamon, and mint. The potential for domestic and export production is high given the climate and there used to be a vibrant spice industry 20 years ago. The analysis considers pepper which is produced in PNG as part of the farm production and the results are encouraging with the net incremental benefits reaching PGK 10,405,238 (US\$4,342,191).

**Table 5.1. Pepper**

|  |        |
|--|--------|
| <b>Return to family labour*</b>                | 69.03  |
| *consider full development year f <sub>c</sub> |        |
| <b>Discount rate</b>                           | 10%    |
| <b>NPV @ 0.1</b>                               | 39,126 |
| <b>IRR</b>                                     | 100%   |
| <b>NPV<sub>b</sub></b>                         | 59,633 |
| <b>NPV<sub>c</sub></b>                         | 13,022 |
| <b>B/C ratio</b>                               | 4.58   |
| <b>Switching values Benefits</b>               | -78%   |
| <b>Switching values Costs</b>                  | 358%   |

Note: B/C = Benefit-cost ratio.

13. **Vegetables.** This model would be an example for improved vegetable production investments in higher quality and improved seeds, organic fertilizers and pest control, and improved farm management practices. Vegetables are typically grown by women and mainly for home consumption. Despite high market demands for vegetables, the production remains low. Farmers are reluctant to produce vegetables for commercial purposes for a number of reasons including poor access to seeds, pest control, market information, and access to finance. The existing model envisages the production of broccoli, cabbage, bulb onion, sweet potato, and potato. The WoP scenario assumes (a) farmers produce using traditional and low input farming practices and yields for all crops are suboptimal and (b) farmers' access to quality seeds and extension services is limited. The WiP scenario assumes improved yields for all crops due to use of improved seeds, chicken manure, and a change to cropping patterns which includes high-value shallots.

14. **Farm model for vegetable and spice production.** The cropping pattern proposed for vegetable and spice production is summarized in table 5.2. The model shows that vegetable and spice farming will provide the family regular incomes with returns to labor of PGK 98 (see table 5.3).

**Table 5.2. Cropping Pattern - 0.5 Hectare**

| Crops   | WOP (ha) | WP (ha) |
|---|----------|---------|
| Sweet Potato (0.4 ha in WOP and 0.2 ha in WP)   | 0.4      | 0.2     |
| Broccoli (0.04 ha in WOP AND 0.08 IN WP)        | 0.04     | 0.08    |
| Cabbage (0.1 ha in WP)                          |          | 0.1     |
| Bulb onions (0.05 in the WOP, 0.1 ha in the WP) | 0.05     | 0.1     |
| Pepper (0.01 in the WOP, 0.02 in the WP)        | 0.01     | 0.02    |
| Total   | 0.5      | 0.5     |

Note: B/C = Benefit-cost ratio; WOP = Without project; WP = With project.



Table 5.3. Farm Model

|  |                                  |        |
|--|----------------------------------|--------|
|  | <b>Return to family labour*</b>  | 98     |
| *consider full development year family labour requirements |                                  |        |
|  | <b>Discount rate</b>             | 10%    |
|  | <b>NPV @ 0.1</b>                 | 8,209  |
|  | <b>IRR</b>                       | 120%   |
|  | <b>NPVb</b>                      | 36,010 |
|  | <b>NPVc</b>                      | 27,631 |
|  | <b>B/C ratio</b>                 | 1.30   |
|  | <b>Switching values Benefits</b> | -23%   |
|  | <b>Switching values Costs</b>    | 30%    |

Note: B/C = Benefit-cost ratio.

15. **Cacao production and farm-level processing model.** The model illustrates an improved productivity and profitability of cacao production on 1 ha to be contributed through investments in replacement of old trees, post-harvest drying facility and equipment for value addition, and improved farm management practices. Currently, most of the cacao trees suffer from the pod borer disease. Farmers have limited knowledge about pest control, farm-level post-harvest processing, and crop care practices such as side grafting. In the PACD, the processes set up in the PPAP will be continued with established productive partners who provide technical assistance and extension. Farmers grow cocoa as their main cash crop, and through improved farm management, the returns to labor are PGK 111.

Table 5.4. Cacao

|                   |        |
|-------------------|--------|
| NPV gross margin  | 44,507 |
| NPV family labour | 402    |
| Return to labour  | 111    |

16. **Coffee production and farm-level processing model.** The model is another example for improved productivity and profitability of the crop produced on 1 ha and to be achieved through investments in replacement of old trees, farm-level shelling equipment, and improved farm management practices. Coffee is a high-value crop in PNG with untapped commercial potential. Despite its commercial value, the coffee trees were abandoned for years for many reasons including lack of access to finance, extension services, markets, and market information. In the WoP scenario, existing old trees production will be done with minimal investment in the trees, essentially harvesting whatever is in the plantation. In the WiP scenario, old trees would be replaced, and improved weed controls would be applied and on-farm processing will be encouraged. The analysis shows an IRR of 185 percent for the scenario with improved management and pruning and 31 percent for a scenario with replanting.

17. **Coconut.** Most families in the lowlands have coconuts growing wild on their farms. The key issue is marketing and if they can be linked to a coconut processor for virgin oil production, the families could consistently reinvest in improved coconut management. With a dedicated market, the family incomes can increase and provide the families regular incomes with return to family labor of PGK 43.88 (see table 5.5).



Table 5.5. Coconut

|                                  |       |
|----------------------------------|-------|
| <b>Return to family labour*</b>  | 43.88 |
| *consider full development       |       |
| <b>Discount rate</b>             | 10%   |
| <b>NPV @ 0.1</b>                 | 1,416 |
| <b>IRR</b>                       | 15%   |
| <b>NPVb</b>                      | 128   |
| <b>NPVc</b>                      | 44    |
| <b>B/C ratio</b>                 | 2.89  |
| <b>Switching values Benefits</b> | -65%  |
| <b>Switching values Costs</b>    | 189%  |

Note: B/C = Benefit-cost ratio.

18. **Chicken production model.** This model is indicative of the livestock models which will work on improved animal husbandry and demonstrates an improved chicken farming through investments in better farming practices, animal health and nutrition, and pen. The model is based on women investing in broiler production in the WiP situation. This model is actually based on an existing scenario where a woman who sells live birds in the market and was able to provide actual costs. She sells 500 birds every four weeks over six days and is not fulfilling market demand. The net income is estimated at PGK 96,648 per year.

#### *Aggregation and Processing Models*

19. **Aggregator model.** This model looks at an MSME which aggregates vegetables with a small truck and takes them from the farmers to key district or provincial markets. The model grows from 312 tons of mixed produce per year to 494 tons at peak with packaging. Table 5.6 summarizes the returns on investment.

Table 5.6. Vegetable Aggregator

|                                  |           |
|----------------------------------|-----------|
| <b>Discount rate</b>             | 10%       |
| <b>NPV @ 0.1</b>                 | 653,562   |
| <b>IRR</b>                       | 45%       |
| <b>NPVb</b>                      | 6,742,393 |
| <b>NPVc</b>                      | 6,088,831 |
| <b>B/C ratio</b>                 | 1.11      |
| <b>Switching values Benefits</b> | -10%      |
| <b>Switching values Costs</b>    | 11%       |

Note: B/C = Benefit-cost ratio.

20. **Processor.** The MSME will provide processing for coconut and spices. It will provide the primary market for the farmers and process virgin coconut oil, which may be linked to Port Moresby and eventually to the export market. The returns to labor are PGK 62.12 (see table 5.7).

**Table 5.7 Coconut and Spice Processor**

|                                  |       |
|----------------------------------|-------|
| <b>Return to family labour*</b>  | 62.12 |
| *consider full development       |       |
| <b>Discount rate</b>             | 10%   |
| <b>NPV @ 0.1</b>                 | 5,313 |
| <b>IRR</b>                       | 1%    |
| <b>NPVb</b>                      | 52    |
| <b>NPVc</b>                      | 281   |
| <b>B/C ratio</b>                 | 0.19  |
| <b>Switching values Benefits</b> | 436%  |
| <b>Switching values Costs</b>    | -81%  |

Note: B/C = Benefit-cost ratio.

### Economic Analysis

21. Economic rate of return to the project investments is estimated at 29 percent, with an economic NPV of PGK 112.86 million.

**Table 5.8. Summary Economic and Sensitivity Results**

| <b>Sensitivity Analysis</b> |             |                  |                  |
|-----------------------------|-------------|------------------|------------------|
| <b>Scenario</b>             | <b>EIRR</b> | <b>NPV (PGK)</b> | <b>NPV (USD)</b> |
| Base case                   | 29%         | 112,753,143      | \$47,177,047     |
| Costs increased by 10%      | 27%         | 106,236,388      | \$44,450,372     |
| Costs increased by 20%      | 25%         | 99,719,633       | \$41,723,696     |
| Benefits decreased by 20%   | 24%         | 77,169,005       | \$32,288,287     |

22. **Sensitivity analyses.** The project is robust and remains positive given changes in the project benefits. A 20 percent decline in benefits drops the EIRR to 24 percent and a change in 20 percent increase in costs to 25 percent.

23. In addition to sensitivity analyses presented in table 5.8, the economic indicators were also calculated for a scenario where public good benefits in the form of climate mitigation benefits are included. The project's annual net carbon balance of -395,878 tCO<sub>2</sub>eq emissions (see annex 6 for details) is multiplied by a shadow price of carbon as recommended in the recent World Bank Guidance Note (2017<sup>44</sup>). Considering a low value of the shadow price of carbon, the NPV increases to US\$162 million and EIRR to 76 percent; considering a high value of the shadow price of carbon, the NPV increases to US\$270 million and the EIRR to 127 percent. The results show that climate mitigation benefits, mainly stemming from the improvement of coffee and cocoa tree systems, constitute a sizeable share of total project benefits.

<sup>44</sup> The recent draft Guidance Note on Shadow Price of Carbon in Economic Analysis (September 2017) recommends projects' economic analysis use a low and high estimate of the carbon price starting at US\$40 and US\$80, respectively, in 2020 and increasing at an annual rate of 2.25 percent to US\$50 and US\$100 by 2030.

**ANNEX 6: Greenhouse Gas Accounting****COUNTRY: Papua New Guinea**  
PNG Agriculture Commercialization and Diversification Project

1. **Motivation.** The World Bank Environment Strategy (2012) adopted a corporate mandate to account for the GHG emissions for investment lending. The quantification of GHG emissions is an important step in managing and ultimately reducing emissions as it provides an understanding of the project's GHG mitigation potential and can support sectoral strategies toward low-carbon development.
2. **GHG accounting methodology.** The World Bank Group has adopted EX-ACT, developed by the FAO in 2010,<sup>45</sup> to estimate the impact of agricultural investment lending on the GHG emission and carbon sequestration in the project area. EX-ACT allows the assessment of a project's net carbon balance. The carbon balance is defined as the net balance across all GHGs expressed in CO<sub>2</sub> equivalents (CO<sub>2</sub>e) that will be emitted or sequestered due to project implementation (WiP) compared to a business-as-usual scenario (WoP). EX-ACT is a land-based accounting system, estimating CO<sub>2</sub>e stock changes (that is, emissions or sinks of CO<sub>2</sub>) expressed in equivalent tons of CO<sub>2</sub> per hectare and year. The tool was designed using mostly data from the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (NGGI-IPCC 2006), which furnishes EX-ACT with recognized default values for emission factors and carbon values in soils and biomass (the so-called 'Tier 1 level' of precision).
3. **Assumptions in the EX-ACT model.** The project proposes several activities that were captured with the GHG Accounting Tool EX-ACT. The assumptions for this analysis were informed by discussions during the project preparation stage and are aligned to the assumptions of the EFA presented in annex 4. The project area covers different areas of PNG, from the Highlands to the coastal (Madang) and islands (ENB and AROB) areas. The climate and moisture regime vary from one region to the other but can be considered as tropical wet everywhere, even if the average temperature is lower in the Highlands. The country's relative humidity is quite high and ranges between 70 and 90 percent. The dominant soil type is volcanic in the Highlands and high activity clay in the coastal and islands zones. Considering recommendations for GHG accounting when soil organic carbon changes are involved, the duration of accounting considers a 5-year implementation period and a capitalization period of 15 years. Dynamics of implementation are assumed to be linear over the project period. Default Tier 1 coefficients are used. The project aims to increase the productivity and access to markets of target smallholder farmers and MSMEs for selected agricultural value chains (notably cocoa, coffee, spices, and small livestock), in selected economic corridors, through investments in rural feeder roads rehabilitation (Component 2); establishment of productive partnerships between smallholder producers, POs, and MSMEs to foster the performance of diversified value chains (Component 3: water conservation; regeneration of existing cocoa, coffee, and coconut gardens; intensification of village-based pig and poultry through improved animal health, better feeding, and breeding); and improved marketing and processing capacity by investing in small facilities, equipment, and training for POs and MSMEs (Matching Grants under Component 3). It is expected that about 20,000 farming households will benefit from the project. The

<sup>45</sup> <http://www.fao.org/tc/exact/ex-act-home/en/>.



benefits would come from increased tree crops productivity and resilience to climate change due to water harvesting and management, improved varieties (clones of cocoa), better access to market, and so on.

4. The GHG calculation is based on the following elements, which are derived from the EFA: (a) conversion of abandoned/ill-managed blocks into perennial tree crops (12,000 ha) and crops (300 ha), (b) pigs and poultry herd size and productivity increased with better husbandry practices (health, use of local feeding rations, and breeding) among targeted communities and households; (c) incremental production from productivity increases (agroforestry [coffee, coconut, and cocoa] and spices), with a shift from traditional cultivation to improved agronomic practices and water conservation; and (d) a slightly increased use of insecticides and herbicides due to the increase in coffee cultivation areas.

5. The assumptions for the GHG calculation are summarized in table 6.1.

**Table 6.1. Activities and Expected GHG Emissions Reduction and Increased Carbon Sequestration for the PACD**

| Project Structure          | Activity              | WiP   | Business-as-Usual Scenario <sup>46</sup>  |
|----------------------------|-----------------------|---|---|
| Component 2<br>Component 3 | Other land use change | A total of 12,000 ha of set aside land (with a limited biomass and soil carbon stock) would be converted to 5,000 ha of cocoa plantations, together with 5,000 ha of coffee and 2,000 ha of coconut plantations (sequestering a total of -218,717 tCO <sub>2</sub> eq, -218,717 tCO <sub>2</sub> eq, and -87,487 tCO <sub>2</sub> eq respectively). Furthermore, 300 ha of set aside land would be converted to annual cropland (emitting 14,469 tCO <sub>2</sub> eq).<br><br>-510,451 tCO <sub>2</sub> eq of emissions would be avoided over 20 years.   | No land use change would occur on the 12,300 ha of set aside land.  |
| Component 3                | Livestock management  | Based on assessments using a farm model, the herd size will increase to 50,000 heads of swine for market use, 7,500 heads of swine for breeding, and 110,000 heads of poultry. It is assumed that herd management is more efficient with the project: improved health, feeding, and breeding leading to mortality decrease and fertility increase. Herd size will increase at the beginning, then stabilize as compensated by a higher destocking rate (for market and for improved nutrition: local consumption).<br><br>Despite improved livestock management practices (which cannot be accounted for in EX-ACT due to lack of emission factors of IPCC), due to the increased herd size, the project will lead to an increase of GHG emissions by 178,400 tCO <sub>2</sub> eq (as methane) over 20 years. | Herd size will remain the same for market swine (30,000 heads), breeding swine (5,000 heads), and poultry (75,000 heads) compared to the initial state constant as they are only used for local consumption and social events. No improved feeding practices will |

<sup>46</sup> Without the project scenario or baseline/business-as-usual scenario, which corresponds to a description of expected conditions in the project boundaries in the absence of project activities.



| Project Structure      | Activity   | WiP   | Business-as-Usual Scenario <sup>46</sup>  |
|------------------------|--|---|---|
|                        |  |   | occur without the project.  |
| Component 3            | Crop production  | <p>A total of 300 ha of fruits and vegetables with a yield of 2 tons/ha/year would be cultivated with improved agronomic practices, water management, manure application, and residues retained. On the 300 ha of set aside land converted to annual cropland, spices with a yield of 2 tons/ha/year will be cultivated with improved agronomic practices, water management, manure application, and residues retained.</p> <p>-29,735 tCO<sub>2</sub>eq of emissions would be avoided over 20 years from annual systems.</p> <p>A total of 20,000 ha of cocoa, coffee, and coconut tree crops would be cultivated without biomass burning and an additional 12,000 ha of set aside land converted to tree crops will be cultivated without biomass burning with an average annual yield of 0.8 t/ha.</p> <p>-7,963,224 tCO<sub>2</sub>eq of emissions would be avoided over 20 years from perennial systems.</p> | <p>A total of 300 ha of spices including black pepper, chilies, and ginger with a yield of 1.5 tons/ha/year would be cultivated without improved practices and residues exported.</p> <p>A total of 20,000 ha of tree crops would be cultivated with biomass burning.</p> |
| Component 3            | Agricultural inputs  | <p>The project will lead to an increased use of insecticides to 45 tons of active ingredient per year, generating an additional 11,454 tCO<sub>2</sub>eq per year.</p> <p>The project will lead to a 30 percent decrease of herbicide use, but this reduction will be offset by an increase in the surface of perennial crops (cocoa, coffee, and coconut) generating an additional emissions of 97 tCO<sub>2</sub>eq per year.</p> <p>Due to adjusted quantities in agricultural inputs consumed, an additional 11,551 tCO<sub>2</sub>eq would be emitted with the project over 20 years.</p>  | <p>A total of 10 tons of urea and 2 tons of glyphosate (herbicide) applied per year.</p> <p>2 tons of glyphosate (herbicide or 0.1 l/ha/year) 15 tons of insecticides applied per year.</p>   |
| Overall carbon balance | <p><b>The project activities cover about 32,600 ha of land and bear a mitigation potential of -415,673 tCO<sub>2</sub>eq per year.</b></p> <p><b>Thus, for the entire duration of the project implementation and capitalization phase, -8,313,459 tCO<sub>2</sub>eq are expected to be captured and avoided.</b></p> |   |   |

6. Results show that the project can constitute a sizeable net carbon sink of -415,673 tCO<sub>2</sub>eq per year over 20 years, thus -8,313,459 million tCO<sub>2</sub>eq in total, and -12.8 tCO<sub>2</sub>eq per hectare per year. The highest carbon sinks will result from the plantation and improved biomass management of perennials (-7,963,224 tCO<sub>2</sub>eq), followed by other land use changes (-510,451 tCO<sub>2</sub>eq), and annual crop management (-29,735 tCO<sub>2</sub>eq). On the other hand, livestock results in GHG emissions (178,400 tCO<sub>2</sub>eq)



from the increased herd size and inputs and investments results in increased GHG emissions of 11,551 tCO<sub>2</sub>eq. The GHG analysis follows the recommendation to consider an implementation period of 20 years.<sup>47</sup> Since the project's economic analysis considers project benefits for 15 years, the GHG analysis is also conducted for a period of 15 years, resulting in an annual net carbon balance of -395,878 tCO<sub>2</sub>eq emissions and over 15 years -5,938,165 tCO<sub>2</sub>eq emissions.

Table 6.2. Detailed Results - EX-ACT

| Project Name<br>Continent   | Papua New Guinea Agricultural<br>Oceania   | Dominant Regional Soil Type | Climate<br>Tropical (Wet)<br>HAC Soils  | Duration of the Project (Years) |                 |                                    | 20              |                |
|-----------------------------|--|-----------------------------|---|---------------------------------|-----------------|------------------------------------|-----------------|----------------|
|                             |  |                             |   | Total area (ha)                 |                 |                                    | 32600           |                |
| Components of the project   | Gross fluxes<br>Without<br>With<br>All GHG in tCO <sub>2</sub> eq<br>Positive = source / negative = sink | Balance                     | Share per GHG of the Balance<br>All GHG in tCO <sub>2</sub> eq<br>CO <sub>2</sub><br>Biomass<br>Soil<br>Other | N <sub>2</sub> O                | CH <sub>4</sub> | Result per year<br>Without<br>With |                 | Balance        |
| Land use changes            |  |                             |   |                                 |                 |                                    |                 |                |
| Deforestation               | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| Afforestation               | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| Other LUC                   | 0  | -510,451                    | -510,451  | -220,000                        | -290,521        | 70                                 | 0               | -25,523        |
| Agriculture                 |  |                             |   |                                 |                 |                                    |                 |                |
| Annual                      | 1,067  | -28,668                     | -29,735   | 0                               | -29,295         | 273                                | -713            | 53             |
| Perennial                   | 104,256  | -7,858,968                  | -7,963,224  | -7,480,000                      | -147,000        | -175,224                           | -161,000        | 5,213          |
| Rice                        | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| Grassland & Livestocks      |  |                             |   |                                 |                 |                                    |                 |                |
| Grassland                   | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| Livestocks                  | 326,984  | 505,383                     | 178,400   |                                 | 28,247          | 150,152                            | 16,349          | 25,269         |
| Degradation & Management    |  |                             |   |                                 |                 |                                    |                 | 8,920          |
| Coastal wetlands            | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| Inputs & Investments        | 4,664  | 16,215                      | 11,551  |                                 | 11,551          | 0                                  | 0               | 233            |
| Fishery & Aquaculture       | 0  | 0                           | 0   | 0                               | 0               | 0                                  | 0               | 0              |
| <b>Total</b>                | <b>436,970</b>   | <b>-7,876,489</b>           | <b>-8,313,459</b>   | <b>-7,700,000</b>               | <b>-466,616</b> | <b>11,551</b>                      | <b>-146,633</b> | <b>-11,561</b> |
| <b>Per hectare</b>          | <b>13</b>  | <b>-242</b>                 | <b>-255</b>   | <b>-235.8</b>                   | <b>-14.3</b>    | <b>0.4</b>                         | <b>-4.5</b>     | <b>-0.4</b>    |
| <b>Per hectare per year</b> | <b>0.7</b>   | <b>-12.1</b>                | <b>-12.8</b>  | <b>-11.8</b>                    | <b>-0.7</b>     | <b>0.0</b>                         | <b>-0.2</b>     | <b>0.0</b>     |
|                             |  |                             |   |                                 |                 | <b>0.7</b>                         | <b>-12.1</b>    | <b>-12.8</b>   |

<sup>47</sup> FAO. 2016.. « EX-ANTE CARBONBALANCE TOOL (EX-ACT). » Technical Guidelines for Version 7. Rome, Italy. When soil organic carbon changes over time (land use change or management change), it is assumed a default time period for transition between an equilibrium of 20 years.

**ANNEX 7: Additional Commodities Supported under the PACD****COUNTRY: Papua New Guinea**  
PNG Agriculture Commercialization and Diversification Project

1. **The livestock subsector** is estimated to contribute approximately 15 percent to total domestic food production and about 2.1 percent of total GDP.<sup>48</sup> The livestock subsector's development agenda is broadly in line with the overall agriculture agenda, aiming to reduce the cost of production, increase income-earning opportunities, increase women's opportunities, and ensure sustainable development. Registered under DAL, the LDC, while mandated to improve production and provide breeding stock and abattoirs, has not been adequately funded for many years and does not play a significant role in the livestock sector in PNG.
2. Livestock makes a significant contribution to the livelihoods of more than 600,000 smallholders in PNG mainly through subsistence and small-scale commercial production of pigs and poultry. In addition, small ruminants (sheep and goats) are playing an increasing role in supporting livelihoods. The productivity of these livestock systems, and therefore the income that could be generated from them, is constrained by a lack of livestock health services, poor housing and management, inadequate nutrition, poor reproduction, high mortality of young stock, and poor access to rapidly emerging urban markets. National, provincial, and local extension and veterinary services are inadequate to meet smallholder needs. The livestock sector is valued at US\$275 million, 58 percent of which comes from the smallholder pig and poultry subsectors.
3. **The spices subsector** makes a small contribution to the country's GDP; however, it forms a key part of a number of farming systems formerly categorized under minor exports cash crops. Vanilla is the most significant in recent years; in 2015, vanilla export value was US\$5 million while in 2017 exports were estimated at over US\$100 million.<sup>49</sup> Chili and cardamom were reasonably significant export crops in the 1970s and 1980s, reaching peak production of 190–260 tons, but production of both has declined to low levels. Potential export spice crops include annatto (bixa), black pepper, cinnamon, citronella grass, ginger, Japanese mint, lemongrass, nutmeg, patchouli, and turmeric that provide useful diversified income in cocoa, coffee, and coconut farming systems and also to villages, particularly in the remote areas.<sup>50</sup> The existing Spice Industry Board was established under the Spice Industry Act 1989. Recent rationalization and reforms under the 2014 FER recommended that a Food and Grains Board (FGB) be established through the merger of the Fresh Produce Development Agency and the PNG NARI and all 'minor cash crops' should be placed under the authority of FGB. Spice crops, cassava, and cashew should become commodities for further development by the proposed FGB and the current Spice Industry Board should be abolished.<sup>51</sup> Following the Alotau Accord II, the Deputy Prime Minister and Treasurer's first 100-day plan makes reference to revision or abolishment of the FER recommendations. The current Spice Industry Board is under resourced and is not able to achieve its full mandate.

<sup>48</sup> World Bank policy note on livestock sector - November 2016.

<sup>49</sup> PNG SCD 2017.

<sup>50</sup> Food and Agriculture in Papua New Guinea, edited by Bourke and Harwood, Vol 2, page 379.

<sup>51</sup> FER 2014.



4. **The coconut subsector** is estimated to contribute 1 percent to the PNG economy although it supports over 440,000 households and 2.2 million people (approximately 25 percent of the population) with a planted area covering 220,000 ha. It is estimated that more than 380 million coconuts are traded on the local markets, with an estimated value of PNK 190 million.<sup>52</sup> The industry was managed by the Copra Marketing Board (CMB) from 1948 to 2002 and was mandated to buy and market all of PNG copra; the CMB was replaced in 2002 by the KIK as the new regulatory and policy body responsible for market compliance and trade development. The Coconut Industry Strategic Plan 2016–2025 under KIK aims to improve the livelihoods of families and enterprises engaged in the coconut industry. KIK plans to deliver its objective through five thematic program areas (a) Agribusiness Development and Marketing, (b) Product Diversification, (c) Productivity Improvement, (d) Industry Capacity Building, and (e) Effective Governance (Corporate Services). The coconut R&D program was assumed by KIK in 2017 with staff and relevant functions for coconuts transferred to KIK following the FER, to separate these functions away from the, now abolished, Cocoa and Coconut Institute Limited. KIK plans to diversify product development opportunities and promote the replacement of senile coconut trees in the country.

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<sup>52</sup> KIK, 2018—total value based on an estimated PNK 0.50 per coconut.



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PNG Agriculture Commercialization and Diversification Project (P166222)

### ANNEX 8: Map of PNG with PACD Provinces

