



Project Identification Form (PIF) entry – Full Sized Project – GEF - 7

Integrated land management, restoration of degraded landscapes and natural capital assessment in the mountains of Papua New Guinea

Part I: Project Information

GEF ID
10580

Project Type
FSP

Type of Trust Fund
GET

CBIT/NGI
 CBIT
 NGI

Project Title

Integrated land management, restoration of degraded landscapes and natural capital assessment in the mountains of Papua New Guinea

Countries

Papua New Guinea

Agency(ies)

UNEP

Other Executing Partner(s)

Conservation and Environment Protection Authority (CEPA)

Executing Partner Type

Government

GEF Focal Area

Multi Focal Area

Taxonomy

Focal Areas, Land Degradation Neutrality, Land Degradation, Land Cover and Land cover change, Carbon stocks above or below ground, Land Productivity, Biodiversity, Mainstreaming, Extractive Industries, Forestry - Including HCVF and REDD+, Agriculture and agrobiodiversity, Financial and Accounting, Payment for Ecosystem Services, Natural Capital Assessment and Accounting, Species, Threatened Species, Influencing models, Transform policy and regulatory environments, Strengthen institutional capacity and decision-making, Demonstrate innovative approaches, Stakeholders, Private Sector, Individuals/Entrepreneurs, SMEs, Beneficiaries, Civil Society, Non-Governmental Organization, Community Based Organization, Local Communities, Communications, Awareness Raising, Education, Public Campaigns, Type of Engagement, Partnership, Information Dissemination, Consultation, Participation, Gender Equality, Gender Mainstreaming, Sex-disaggregated indicators, Gender results areas, Participation and leadership, Access to benefits and services, Access and control over natural resources, Capacity Development, Knowledge Generation and Exchange, Capacity, Knowledge and Research, Knowledge Exchange, Learning

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 1

Climate Change Adaptation

Climate Change Adaptation 0

Duration

60 In Months

Agency Fee(\$)

333,650

Submission Date

4/6/2020

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
LD-1-1	GET	822,018	4,803,939
LD-1-2	GET	822,017	4,803,939
LD-2-5	GET	548,012	3,202,626
BD-1-3	GET	1,320,053	7,714,496
	Total Project Cost (\$)	3,512,100	20,525,000

B. Indicative Project description summary

Project Objective

To achieve biodiversity conservation and land degradation neutrality in the Southern Highlands and Hela Provinces of Papua New Guinea through integrated landscape management and natural capital assessment.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
1. Enabling environment to support the flow of ecosystem goods and services and achieve land degradation neutrality (LDN)	Technical Assistance	<p>1.1. Improved policies and legal framework for integration of natural capital valuation into land use planning adopted and implemented at the national level to support the flow of ecosystem services and LDN</p> <p><i>Indicators</i></p> <p>Policies and legal frameworks integrating ecosystem services and LDN principles</p> <p>- Strategic land-use planning and development strategies applying SEA, EIA and NCA processes that integrate natural capital valuation</p>	<p>1.1.1. Review of national/sector policies, legislation and procedures to integrate natural capital values and sustainable land management principles into land use planning to reduce land and forest degradation and improve the flow of ecosystem goods and services.</p> <p>1.1.2. Multi-agency strategic environmental assessment (SEA), environmental impact assessment (EIA) and natural capital assessment (NCA) processes developed that integrate natural capital valuation, to feed into land use planning and development strategies to strengthen coordination towards LDN and biodiversity conservation.</p> <p>1.1.3. Capacity and know-how enhanced in the Conservation and Environment Protection Authority and other relevant central government agencies as well as at provincial government level, taking into account gender balance, to apply SEA, EIA and NCA, that</p>	GET	668,972	3,909,524

- Number people, disaggregated by gender, trained on SEA, EIA, and NCA.
 - Natural capital valuation reports
 - Land use plans and systems for compliance monitoring and enforcement
 - Reports on monitoring and compliance
- Indicators will be confirmed, and baseline and targets will be established during the PPG.*
- integrate natural capital valuation, to support decision-making in the processing of environmental permit applications, as well as for compliance monitoring, environmental audits and enforcement.
- 1.1.4. Natural capital valuation reports with scenario analysis produced for mountain landscapes showing the value of biodiversity and its ecosystem goods and services.
- 1.1.5. Comprehensive land-use plans integrating the results of natural capital valuation with scenario analyses for different land-use options, and SLM and SFM principles developed for mountain landscapes.
- 1.1.6. Stronger system for compliance monitoring and enforcement developed and implemented, in collaboration with relevant authorities and provincial governments, as part of multi-stakeholder land use planning and management systems to support LDN and ensure that ecosystems goods and services are sustained.

2. Natural capital valuation and implementation of sustainable land and forest management	Investment	2.1. Mountain landscapes in the Southern Highlands and Hela Provinces managed sustainably by linking valuation of natural capital, land	2.1.1. SLM practices implemented by 10,000 households of landowners and farmers in 50,000 hectares to restore soil fertility, improve income by 20% and move towards environmentally sound production.	GET	2,174,157	12,705,952
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(SLM/SFM) practices in mountain landscapes of the Southern Highlands and Hela Provinces

use planning and SLM/SFM with development policy and financial incentives to reduce degradation, move towards LDN and restore ecosystem services

2.1.2. Community-based restoration of 50,000 hectares of degraded forests through SFM and agroforestry.

2.1.3. Gender-sensitive strategies for SLM and SFM developed and implemented at project sites to improve the livelihood of women.

2.1.4. Piloting of sustainable financing mechanisms for LDN (e.g. permits fees, credits, subsidies, microloans, certification, biodiversity offsets) as a means to allow scaling-up practices and incentives to restore degraded land and ecosystem services.

Indicators

- Area under improved SLM and SFM practices

- Number, disaggregated by gender, of landowners and farmers reporting the adoption of SLM/SFM practices

- Number of men and women reporting higher income and improved livelihoods as a result of SLM and SFM

- Number of men/women accessing sustainable financial mechanisms

Indicators will be confirmed, and baseline and targets will be established during the PPG.

3. Knowledge management, monitoring and evaluation, awareness raising and training	Technical Assistance	3.1. Project results disseminated enabling scaling up and supporting land use planning, ecosystem good and services, and LDN	<p>3.1.1. Project results monitored and evaluated in a participatory manner, with input from communities, land owners and other stakeholders, and communicated to showcase the outputs and outcomes.</p> <p>3.1.2. Awareness raising and technical materials, based on best-practices identified through Component 2, developed in local languages, disseminated and used for training of landowners and communities, taking into account gender balance, to promote adoption of SLM and SFM practices.</p> <p>3.1.3. Training, using gender sensitive approaches, for small and medium-sized enterprises on how to integrate natural capital valuation and SLM principles into feasibility plans and business models.</p> <p>3.1.4. Natural capital valuations and best practices in SLM/SFM will be shared through a national database.</p>	GET	501,728	2,932,143
		<p><i>Indicators</i></p> <ul style="list-style-type: none"> - Project implementation rating, level of stakeholder engagement - Number of awareness raising and technical materials produced - Number of SME and people trained, disaggregated by gender, on natural capital valuation and SLM - Number of natural capital valuations and SLM/SFM best practices available online. <p><i>Indicators will be confirmed, and baseline and targets will be established during the PPG.</i></p>				
Sub Total (\$)					3,344,857	19,547,619

Project Management Cost (PMC)

	GET	167,243	977,381
	Sub Total(\$)	167,243	977,381
	Total Project Cost(\$)	3,512,100	20,525,000

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Government	Conservation and Environment Protection Authority (CEPA)	Grant	Investment mobilized	3,000,000
Government	Conservation and Environment Protection Authority (CEPA)	In-kind	Recurrent expenditures	500,000
Government	Climate Change Development Authority (CCDA)	Grant	Investment mobilized	250,000
Government	Papua New Guinea Forest Authority (PNGFA) / Papua New Guinea Forest Research Institute (FRI)	Grant	Investment mobilized	10,000,000
Government	Papua New Guinea Forest Authority (PNGFA) / Papua New Guinea Forest Research Institute (FRI)	In-kind	Recurrent expenditures	3,000,000
Government	Department of Agriculture and Livestock (DAL)	Grant	Investment mobilized	500,000
Government	Department of Lands and Physical Planning (DLPP)	Grant	Investment mobilized	250,000
Government	National Agriculture and Research Institute (NARI) for Research and Development Program	Grant	Investment mobilized	400,000
Government	National Agriculture Quarantine and Inspection Authority (NAQIA)	Grant	Investment mobilized	50,000
Government	PNG Cocoa Board to Establish Provincial Cocoa Nurseries	Grant	Investment mobilized	175,000
Government	Fresh Produce Development Agency (FPDA)	Grant	Investment mobilized	200,000

Government	Coffee Industry Corporation (CIC)	Grant	Investment mobilized	250,000
Donor Agency	Government of Australia	Grant	Investment mobilized	500,000
Donor Agency	Japan International Cooperation Agency (JICA)	Grant	Investment mobilized	500,000
Donor Agency	World Bank	Grant	Investment mobilized	500,000
Private Sector	Trukai Industries	Grant	Investment mobilized	250,000
CSO	Centre for Environmental Law and Community Rights (CELCOR)	Grant	Investment mobilized	50,000
CSO	Partners with Melanesia	Grant	Investment mobilized	50,000
Others	University of PNG and University of South Pacific	Grant	Investment mobilized	100,000
			Total Project Cost(\$)	20,525,000

Describe how any "Investment Mobilized" was identified

The indicative information regarding the expected amounts of co-financing for "recurrent expenditures" and "investment mobilized" from the different sources was provided by CEPA, in consultation with other government agencies, on the basis of documentation provided by the co-financiers for ongoing and approved projects/investments that support the objective of the current concept. The sub-set of co-financing identified as "investment mobilized" includes funds that are ear-marked for specific investments and exclude operational costs. The amounts, sources, types of co-financing and investment mobilized will be confirmed during the PPG phase.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Papua New Guinea	Land Degradation	LD STAR Allocation	2,192,047	208,245	2,400,292
UNEP	GET	Papua New Guinea	Biodiversity	BD STAR Allocation	1,320,053	125,405	1,445,458
Total GEF Resources(\$)					3,512,100	333,650	3,845,750

E. Project Preparation Grant (PPG)

PPG Required



PPG Amount (\$)

150,000

PPG Agency Fee (\$)

14,250

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Papua New Guinea	Land Degradation	LD STAR Allocation	99,999	9,500	109,499
UNEP	GET	Papua New Guinea	Biodiversity	BD STAR Allocation	50,001	4,750	54,751
Total Project Costs(\$)					150,000	14,250	164,250

Core Indicators

Indicator 3 Area of land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
50000.00	0.00	0.00	0.00

Indicator 3.1 Area of degraded agricultural land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
50,000.00			

Indicator 3.2 Area of Forest and Forest Land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.3 Area of natural grass and shrublands restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.4 Area of wetlands (incl. estuaries, mangroves) restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
50000.00	0.00	0.00	0.00

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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25,000.00			
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Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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25,000.00			
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Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	733333	0	0	0
Expected metric tons of CO ₂ e (indirect)	5128365	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	733,333			

Expected metric tons of CO ₂ e (indirect)	5,128,365
Anticipated start year of accounting	2022
Duration of accounting	20

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)				
Expected metric tons of CO ₂ e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)

Target Energy Saved
(MJ)

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)
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Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	25,000			
Male	25,000			
Total	50000	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

* Project's target contributions under GEF core indicators will contribute to Aichi Targets 1, 2, 7, 9, 12, 14 and 15. A minimum of 100,000 hectares will benefit from the implementation SLM and SFM practices (outputs 2.1.1 and 2.1.2) contributing to core indicators 3 and 4, respectively. Carbon emissions to be mitigated through the project over a 20-year period is estimated as 5,330,032 tCO₂e, using the FAO EX-ACT tool. Under core indicator 11, gender disaggregated data will be collected for all project activities. It is expected that at least half (25,000) of the direct beneficiaries will be women. The indicators will be refined during the PPG phase.

Part II. Project Justification

1a. Project Description

1) Physical context, background, problems and root causes

Papua New Guinea (PNG) is located on the eastern half of the island of New Guinea and includes the large islands of the Bismarck Archipelago including New Britain, New Ireland, and Bougainville further to the east. Its population of 8.6 million people is scattered throughout the 464,000 square kilometers of landmass over more than 600 small islands. Papua New Guinea is a highly culturally diverse country. The people speak over 800 different languages and belong to over ten thousand autonomous tribes with their unique social, cultural and political features.

On the one hand, PNG is a very rich country in terms of natural resources, including mineral, petroleum, gas, forestry, fisheries, land and agricultural resources. On the other hand, it scores very low in all key composite indices for measuring human development. For 2018, its Human Development Index value was 0.543 – which put the country in the low human development category – positioning it at 155 out of 189 countries and territories, while its Gender Inequality Index value was 0.740, ranking it 161 out of the 162 countries for which this index was measured.[1]

Under PNG's customary land tenure system, local people own and control up to 97 percent of the land through a clan system, including the resources on, under and above land – this means that long-term habitat protection relies on the commitment and participation of the local communities, who depend on these ecosystems and their products for their livelihoods.

PNG occupies less than 1 percent of the world landmass but is home to 6-7 percent of the total world's biodiversity. This represents some 400,000 – 700,000 species from the estimated 14 million species on Earth. Its rainforests are home to one of the richest bird populations in the world 744 bird species, among which 131 are endemic to PNG. It also hosts 4.5% of the world's known land mammals and 25,000-30,000 vascular plant species. A truly last frontier for biodiversity discovery, PNG continues to lead in new species discovery. Between 1998 and 2008, at least 1,060 new species were discovered in the island of New Guinea, including 218 plants, 580 invertebrates, 71 fishes, 132 amphibians, 43 reptiles, two birds and 12 mammals.[2] Unfortunately, many species are now threatened by habitat loss and degradation.

Private sector and small and medium enterprises (SMEs) in the Highlands

PNG remains a low-income country with a dual economy comprising a small formal, corporate-based, sector and a large non-formal sector where subsistence farming accounts for the bulk of the economic activities. The formal sector provides a narrow employment base, consisting of workers engaged in the resource sectors (mining, logging, oil and gas extraction, etc), a relatively small manufacturing sector, public sector employees and service industries including finance, construction, transportation and utilities. The relatively strong, though volatile, growth of the resource sector is not generating sufficient employment opportunities to reduce poverty. More than 90 percent of private enterprises are micro-sized and informal, with their main economic activity being subsistence and small agriculture production.

Considerable potential exists in the PNG Highlands for inclusive, private sector led growth in non-resource sectors such as agriculture and tourism. Given that the vast majority of PNG Highlanders engage in traditional subsistence and semi-subsistence agriculture activities, this sector can play a significant role in providing broad-based income and employment opportunities across the region, including among women and young people. However, without access to the land, credit, skilled workers, and policy predictability they need to operate and expand, PNG's businesses will not be able to harness this potential.[3]

Whilst the SME sector plays a significant role in other economies, it has not been the case in PNG. Formally registered firms account for less than 300,000 employments and contribute with only 10 percent of the country's GDP. Women and youth are not active players in economic activity – only 8 percent of all the SMEs in PNG are owned by women – while these two segments account for more than 70 percent of the population. The number of SMEs vary among the provinces in the Highlands region. In 2004, while 16 percent of the SMEs were registered in the Southern Highlands province, Hela province did not have a single registered SME.[4]

Not much incentives have been given to SMEs to stimulate participation and growth. Evidence suggests that SMEs prefer to remain informal due to a lack of information on registration processes, absence of nearby government offices, and high costs of registration. Access to financial services is a key constraint for the private sector and 94 percent of the registered SMEs have never obtained any form of loan.

Due to business development challenges, there are few medium-sized businesses, and even fewer large businesses in PNG. Large commercial activities in the Southern and Hela provinces are practically inexistent. An exception being the LNG Project operated by ExxonMobil PNG Limited (EMPNG), which alone accounts for about 10 percent of the national GDP and over 30 percent of exports. Despite accounting for a major share of both output and exports, PNG's resource sector constitutes only about 1 percent of employment given its capital-intensive, enclave-based orientation. The LNG Project traverses a number of areas of high biodiversity significance and conservation value, including several KBAs. In its commitment to safeguarding the biodiversity values, EMPNG has developed a Biodiversity Strategy[5] covering about half of the area of the Southern Highlands and Hela Provinces along the Kikori river basin and upstream area of the LNG Project (Figure 1 and Annex C).



Figure 1. LNG Project operated by ExxonMobil PNG Limited in Southern Highlands and Hela Provinces. The “Upstream area” of the project along the Kikori river basin is delineated by a purple line.

Subsistence and commercial agriculture in PNG's Highlands

Subsistence agriculture is still the largest single economic activity undertaken in PNG. It remains the backbone of the nation's economy. Over 80 percent of the population reside in rural areas, where a vast majority of people are wholly or partially reliant on subsistence agriculture for their livelihood. The predominant mode of farming in PNG is in smallholder farms of less than 5 hectares. Village agriculture remains dominated by subsistence food production rather than commercial level agriculture. It generates little cash income and is characterized by low productivity.

Traditional agriculture in PNG is based on a rotational bush-fallow system, which is sustainable provided that population pressure does not force the use of too short a rotation period. In areas of the Highlands, agriculture has been practiced continually for over 8,000 years defining an anthropogenic landscape whilst many coastal areas have been inhabited for 3,000 years or less.

PNG's mountainous areas, especially in those areas with relatively good transport infrastructure, subsistence farmers are increasingly entering the cash economy through the sale of surplus produce, and by combining subsistence food production with cash cropping. In the Highlands region, this is achieved, for example, by using the same piece of land to plant bananas for temporary shade for coffee or peanuts as nitrogen fixing legumes.

Coffee is a very important cash crop for the rural economy of PNG relying primarily on small household growers. The Highlands region accounts for 97% of the national coffee production. Coffee income for villagers is particularly obvious in the growing provinces of Western Highlands, Eastern Highlands, Simbu and Jiwaka. Government intervention to ensure the sustainability of the Highlands' coffee industry is vital.

Fresh food, such as sweet potato and vegetables, are also important crops. Sweet potato assures food security in more diverse mountain environments where coffee, vegetables and small livestock provide a cash income. Fresh food selling is important particularly for the lower coffee production areas of Southern Highlands, Hela and Enga provinces.[6]

Cocoa, as a cash crop, was typically planted in the coastal areas of PNG, but it is now planted also in the Highlands where it is claimed to be the best cocoa of the country. Since 2015, the production of cocoa has grown to become an important source of income for farmers in the Simbu Province.

Highlands biodiversity

Mountain biodiversity is of high importance for a number of ecological functions. The integrity of soils is the prime capital for the mountains' ecosystem services. Tropical mountain chains, known as the Tropical Montane Cloud Forests, are characterized by very rich biodiversity and differ significantly from rainforests in tropical lowlands.[7]

Several montane ecosystems in PNG have incredible biodiversity richness, and are part of the largest intact forest ecosystem in the Pacific and the world. Among the diverse habitats of PNG's mountain landscapes rating as globally significant on a number of biodiversity indices, many face imminent threats from land use change, fire, climate change, direct exploitation and biotic exchange.

The Central Range crosses almost the entire island of New Guinea and includes most of PNG's Highlands region separating the adjoining lowland on each side of the island. The Central Range is made of a series of ranges divided by large fertile valleys at altitudes between 1,500 and 1,800 m. The largely forested Central Range is dominated by two types of forests – lower montane forest (above 1,000 m) and montane forest (above 3,000 m). Its biodiversity, with more than 100 known endemic species of vertebrates, is still little studied. Several of its constituent mountain ranges are isolated such that an extraordinary level of speciation has occurred within the Central Range.[8]

Several biodiversity assessments have been done in the Southern Highlands and Hela Provinces during the last two decades but much of their biodiversity value and richness remain to be discovered. As a result, the region's actual biodiversity is probably far greater than what is known today.

The biodiversity value of the Southern Highlands and Hela provinces include extensive intact forests; between 6,000 and 12,000 species of plants; over 700 species of terrestrial vertebrates with high level of endemism (at least 75 percent of non-volant mammals, 40 percent of birds and over 90 percent of frogs found in this region are endemic to the Island of New Guinea); high diversity of birds-of-paradise and amphibians. [9]

Six Key Biodiversity Areas (KBAs) totalling 374,500 hectares are located in the Southern Highlands and Hela Provinces. The KBAs are: Mount Bosavi (25,000 ha), Lake Kutubu (24,000 ha), Mount Sisa (90,000 ha), NeTai Waranubu (30,000 ha), Hagen-Giluwe (200,000 ha) and Tamide (5,500 ha).

These sites have been identified as KBA based on the presence of significant populations of (i) globally threatened species; (ii) species known only to be found in a particular biome and/or significant regional/sub-regional populations of trigger species; and/or (iii) endemic species known only to be found in a limited area.

Species at risk found in these KBAs include several mammals: Bulmer's Fruit Bat (*Aproteles bulmerae*, IUCN Red List Category: CR), Goodfellow's Tree Kangaroo (*Dendrolagus goodfellowi*, EN), Western Long-beaked Echidna (*Zaglossus bruijnii*, CR) and Calaby's Pademelon (*Thylogale calabyi*, EN) and at least one plant species: *Nothofagus womersleyi* (EN).[10]

Several priority areas that merit conservation action were identified in the Southern Highlands and Hela Provinces through the different studies are identified in section "1b. Project Map and Coordinates" below.

Deforestation and land degradation in PNG's mountain landscapes

Despite being a mega-diverse country, PNG faces a growing threat to its status due to a rapidly growing demand for land and its resources for socio-economic development. The direct and indirect impacts of unsustainable land and natural resource use continue to cause significant erosion to its biodiversity wealth. Deforestation and habitat degradation are the main causes of biodiversity loss across PNG. Over the past few decades, land use has changed considerably in PNG as more land is cleared.

PNG is the second country in the world, after Brazil, with the greatest loss of primary forest area between 1990 and 2015. During this period, PNG lost 13.7 million hectares of primary forest lost or 43.8% of its total area. As of 2015, the total area degraded was estimated at approx. 94,000 km² or 20% of the country.[11]

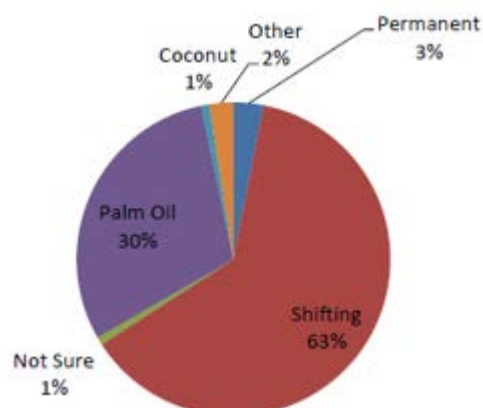


Figure 2. Drivers of conversion from forest land to cropland in 2000-2015. Among the Forest converted to Cropland, the main driver of deforestation is shifting cultivation (63%) and Oil Palm plantation (30%). While oil palm plantation is mostly operated by private companies in commercial scale, shifting cultivation is the subsistence farming operated by families.[12]

During 2001-2015, 238,000 ha (0.7% of PNG's total area) of forest were lost. Among these, 209,000 ha (88%) of deforestation was due to conversion to cropland and, among that, 63% (134,000 ha) was due to shifting cultivation and 30% (59,000 ha) to oil palm plantation (Figure 2).[13]

While illegal and/or unsustainable logging, palm oil monoculture, mining and infrastructure are the primary causes of deforestation in the lowlands and islands of PNG, semi-subsistence agriculture is the primary driver of deforestation and biodiversity loss in PNG's Highlands.

In the Southern Highlands and Hela Provinces, 20,000 hectares were deforested for conversion to agricultural land between 2002 and 2014, whereas only 100 hectares were commercially logged during the same period (Table 1).

Table 1. Change rainforest area in the Southern Highlands and Hela Provinces during 2002-2014.[14]

	Rainforest area 2014			Rainforest change 2002-2014				Total change (%)
	Total (area)*	Unlogged (area)	Logged (area)	Deforested (area)	Logged (area)	Deforested (%)	Logged (%)	
Southern Highlands and Hela	1,857	1,850	7.4	20	0.1	1.0	0.0	1.0
TOTAL PNG	27,877	24,187	3,690	375	770	1.3	2.7	4.1

* in 1,000 hectares.

The growth of subsistence agriculture is linked closely to the high population growth (rural 2.3-2.6%), but this also reflects the needs of communities to develop increased cash crops in response to modern cash driven economic pressures. With almost all remaining forest areas in the hands of communities, clearance and conversion for planting subsistence and cash crops continue to be a strong underlying driver for the loss of biodiversity, with the added pressures from hunting in areas proximal to settlements, agriculture or access routes.

Land improvement practices that support agricultural intensification and reduce pressure on land were, in the past, widely adopted in the Highlands' traditional way of farming, but are becoming less and less common. Although these lands have been cultivated for millennia, pressure of population growth, the need for cash crops, unsustainable extraction of firewood, among others, are resulting in relatively rapid losses of topsoil and land degradation. The direct drivers of land degradation by conversion of tree-covered areas to cropland include (i) improper management of annual, perennial, shrub and tree crops, (ii) improper soil management, (iii) deforestation, (iv) overexploitation of forest trees for domestic use, and (v) over-grazing.

Around 3 million people live in the highlands accounting for 43% of PNG's population that is accommodated within only 13.5% of PNG's land area. The most disadvantaged people in the country live in the fringe areas of the Highlands. Approximately 40 per cent of the rural population in these mountainous live on land with very low to low land potential. These people are constrained by some combination of poor soil, high rainfall, steep slopes, excessive cloud cover, frequent flooding and low temperatures.

Table 2. Area of degraded land in the Highlands region from 2000 to 2014[15]

PNG (ha)	Highlands (ha)	Highland (%)
14,533,962	2,259,922	15.5

Land degradation in the Highlands region is happening a faster than in other regions of PNG, except for East & West Sepik. Between 2000 to 2014, 2,259,922 hectares of land were degraded in the Highlands, representing 15.5 percent of the total land in PNG that was degraded during the same period (table 2).

The growth of subsistence agriculture is linked closely to the high population growth (rural 2.3-2.6%), but this also reflects the needs of communities to develop increased cash crops in response to modern cash driven economic pressures. At higher population densities in the Highlands, more intensive gardening is required to meet local and industry-driven demands for food. There has been a growing shift towards production of cash crops at the expense of subsistence food crops.

As population and economic pressure increase, the demand for land for economic survival has forced the people to use as much as possible from whatever arable land that is available for cash crops while subsistence farming is pushed onto marginal arable land. The cash cropping system have claimed mostly flat, fertile land, leaving the sloping hillsides for subsistence food production. The situation is exacerbated in the face of current booming mining and petroleum industry sectors. Local and industry-driven demands for fresh food translates to increasingly shorter fallow periods and the formation of contiguous garden patches and land conversion to permanent agriculture use. Unsustainable cropping practices pose a direct threat to soil quality and land potential.

Soil erosion is another problem due to the clearing of vegetation, particularly the loss of well-developed tree root systems. Pushing food production and subsistence farming onto steep land accelerates soil erosion problems. Steep sloping fertile land are easily overexploited and mismanaged.

The slash and burn technique further exposes soils to rain and wind. Fires lit by people usually associated with clearance for subsistence gardening that frequently involves burning, which commonly spreads into adjacent forest vegetation. Fires, while recognised as one of the major drivers of deforestation and degradation, is also a significant driver of biodiversity loss particularly in many parts of PNG where species richness among vertebrate biota is highest, such as in the central Highlands where diversity of mammal species is highest.

Also, logging activities through clear felling operations contribute to soil compaction and water logging leading to decreased soil fertility due to decline in soil organic matter, soil leaching and acidification, salt water intrusion, inundation and water logging.

Other causes of degradation of forest ecosystems include unsustainable harvesting of non-timber forest products (e.g. eaglewood resin) and hunting. Subsistence harvesting is generally linked to the need for cash, while hunting is generally for personal consumption or local sale. Hunting is the major threat to mammals, such as the now endangered Tree Kangaroos, often putting localized pressure on fauna. The need for cash is closely correlated with decrease in agricultural yields and population growth.

Many soils in the Highlands are quickly degrading due to poor management techniques, nutrient depletion, erosion and soil compaction. Near where land in the flat to undulating valley floors has been cultivated for over 50 years with only infrequent short periods of fallow, hill slopes have been cleared of forest, cultivated and abandoned. Farmers point out the loss of one and sometimes two soil horizons^[16] from these areas.^[17]

Falling crop yields force farmers to shift to new higher grounds, creating a vicious cycle of land degradation and deforestation.

Moving towards LDN requires bold and transformative action and urgent adoption of sustainable land and forest management practices in rural PNG. Improving PNG's forest resilience and maintaining its biodiversity richness are not only huge challenges but also matters of global urgency. Efforts and investments are being made to address land degradation and loss of habitat in various sectors of natural resource development. However, land degradation

and its impact on biological diversity and livelihoods continue to be addressed in a scattered manner and in isolation from economic development. Transformative changes are needed to mainstream LDN across institutional arrangements and production sectors in order to truly promote sustainable land use and forest management in the country.

2) Barriers to be addressed

The long-term solution for achieving LDN and halting the loss of biodiversity of the Highlands and beyond relies on improved governance for efficient land use planning and sustainable use of natural resources, and on solutions to enable farmers to become more efficient in cultivating crops on existing agricultural lands. This is currently prevented by the following barriers:

Weak governance systems and conflicting land use interests

Since its independence in 1973, most of PNG's earlier development plans and strategies were focused on achieving economic growth and social development through investments in health, education, infrastructure, minerals (such as gold and copper) and fossil fuels (petroleum and gas). All such strategies and plans were focussed on achieving short-term growth and development, largely dependent on the extraction of non-renewable resources and unsustainable use of natural assets, whilst negating the seriousness of the finite nature of non-renewable resources and irreversible damage to the environment and ecology.[18]

Only recently, the need to focus on sustainable long-term development and the risk of was exhausting natural resources were recognized in PNG's Vision 2050 and Development Strategic Plan 2010-2030.

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

Lack of effective management of customary land has transformed fertile marginal lands into degraded and/or potentially degradable land. Examples are widespread in the highlands and coastal areas. The invasion into degraded land by exotic grass species also has negative impacts on biodiversity and agricultural production. These scenarios are evident where human interference lead to land transformation and in the absence of suitable land management intervention, eventually leading to further degradation.

Lack of understanding of the cost incurred by nature

Without an understanding of their relationships to natural capital, regulators and decision-makers are at least partly "flying blind", and can consequently make decisions that are ineffective, inefficient or unsustainable.[19] For specific projects or activities, the lack of appropriate valuation of the cost incurred by nature makes it difficult for government agencies and companies to effectively price environmental externalities and integrate these natural costs into their calculation of the true cost of capital and the true cost of the product. To date, there are no regulations in PNG requiring companies to perform and disclose natural capital assessments during feasibility studies and implementation of their projects. There is also a lack of consistent data on natural inputs which can be used for developing replicable assessment frameworks. As a result, there are limited concrete valuations of natural capital available for policymakers to reach decisions in favor of sustainability.

Monetary valuations of natural capital are rarely part of environmental impact assessments carried out by businesses. Failure to understand the cost incurred by nature and the monetary value to ecosystem goods and services hinder informed decision-making related to projects and activities that rely, directly or indirectly, on natural resources.

Lack of access to the latest practices and approaches in SLM and SFM and lack of human capacity

Shifting cultivation is the main reason behind forest clearing followed by land degradation and biodiversity loss in the mountain landscapes of PNG. It has been estimated that the area of forest cleared for this purpose is between 150,000 and 200,000 hectares annually and, in total, some 6 million hectares are used in the rotational gardening cycle. The land which is most at risk of degradation is that which is cleared and subsequently utilized continuously or where the period of fallow is inadequate for the recovery of its previous condition or where there is gardening on slopes. The direct drivers behind the continuous need to convert tree-covered areas to land for cultivating subsistence and cash crops include (i) improper management of annual, perennial, shrub and tree crops, (ii) improper soil management, (iii) cropping on steep slopes and erosion, (iv) overexploitation of vegetation for domestic use, and (v) over-grazing.

PNG farmers and landowners suffer from a lack of sufficient and coherent information on the impacts of deforestation on soil quality and habitat degradation. While the traditional farming methods in PNG mountains have incorporated many land improvement techniques, these are being abandoned in favor short-term gains in productivity. Poor roads, geographical isolation and lack of awareness hamper farmers' access and exchange of resources and skills. There is little sharing of know-how and cooperation between researchers and farmers, and among farmers of different locations, to apply available good practices for SLM. For example, in some areas of the Huon Peninsula, large fences 2-3 meters high are constructed from *Piper aduncum* stems. The fences help prevent soil erosion. Soil is moved from higher up the slope down to behind the fence creating a small terrace, with the soil deeper just upslope from the fence. Crops that require more fertile sites, such as banana and leafy green vegetables, are planted in the deeper soil with sweet potato planted elsewhere.[20] These techniques could prove useful to many other mountain landscapes in PNG, but learning and participatory approaches and tools are not available to farmers. Moreover, there are limited opportunities for farmers to access financial incentives and identify marketing opportunities.

4) Baseline scenario

The Conservation and Environment Protection Authority (CEPA), was established in 1985 to "to ensure natural and physical resources are managed to sustain environmental quality and human well-being". CEPA is also the legal framework for the implementation of the CBD, UNCCD and related Conventions in PNG.

Together with the Department of Agriculture and Livestock (DAL), Department of Lands and Physical Planning (DLPP), Department of National Planning and Monitoring (DLPM), Climate Change Development Authority (CCDA) and PNG Forest Authority (PNGFA), CEPA has been working on integrating environmental plans and protected areas in land use planning and zoning, the issuance of exploration licenses, Forest Management Areas and Logging Plans.

Through its **LDN Voluntary Target Setting Programme**,[21] PNG identified a total of 7.73 million hectares to be restored while enhancing livelihoods and the country's biodiversity values. To achieve this ambitious target, a number of measures were identified, focusing among others, on restoring degraded forest and agricultural lands, implementing sustainable land and forest management, creating an enabling environment through regulations, incentives and partnerships, raising awareness of LDN and developing capacity. Mainstreaming of LDN into ongoing activities to promote agro-tourism, integrated pest management, Protected Area Network, mining and biodiversity offsets, and establishing of wildlife corridors in all agricultural settings, such as in the oil palm plantations, will strengthen interventions towards achieving the LDN target. PNG is currently in the process of moving from incremental changes to bold transformations at the scale and urgency required in order to achieve its national LDN targets.

Mainstreaming LDN and land use planning into national policies and mandates is actively being sought at different levels of the government. CEPA mainstreamed land degradation activities in its Protected Area Policy while the National Disaster Office and the National Weather Service have mainstreamed land degradation into their drought contingency plans and early warning systems. The Department of Agriculture and Livestock and the National Agriculture Research Institute has policies and strategies and initiatives that address Desertification, Land Degradation and Drought in their respective mandates.

Of particular relevance to the proposed project are two additional projects under GEF 7: ***Establishing System for Sustainable Integrated Land-use Planning Across New Britain Island in Papua New Guinea*** (GEF ID 10239; GEF grant: USD 10,709,174; technically cleared) under the Food Systems, Land Use and Restoration (FOLUR) Impact Program and focus on New Britain Island of PNG; and ***Enabling sustainable production landscapes in Eastern Highlands and Western Highlands Provinces for Biodiversity, Human Livelihoods and Well-being*** (PIF under review by GEF Secretariat) with the objective to mainstream biodiversity in priority sectors and landscapes in Eastern and Western Highlands Provinces. The proposed project and the two additional projects under GEF 7 are complementary both in terms of approaches and geographical scope. Cooperation among the projects will focus on creating synergy, avoiding duplications and maximizing the use of funds by coordinating the work plans and budget, as appropriate, during the project design phase and through implementation. Where possible, similar activities under the different projects will be carried out jointly, such as capacity building at national level, efforts to mainstream land use planning and biodiversity into national policies, exchanging lessons learnt and using joint databases for knowledge management. The many opportunities for synergies between the two projects will be explored during the PPG phase to maximize countrywide impact.

Furthermore, several other initiatives, as shown below, are being funded by the GEF, World Bank and other major donors in partnership with PNG's sector agencies to improve sustainable management of land-based resources. Other projects on biodiversity conservation and agricultural development, which are relevant to this proposal, can be found in annex C.

- (a) ***PNG Multi-purpose National Forest Inventory*** (2015-2020; € 7,500,000) is funded by the European Union and the UN-REDD Programme, and implemented by FAO in partnership with PNGFA and with collaboration of various national and international institutions. Under the framework of the ***Mountain Biodiversity for REDD+***, this project is part of a global effort to establish a multipurpose National Forest Inventory (NFI) and a National Forest Monitoring System in PNG to measure carbon stocks and their changes over time, as well as other forest values. The project is monitoring forest biodiversity to assess the trade-offs between protecting biodiversity and reducing emissions in order to support a more sustainable management of forests in PNG.
- (b) The ***PNG National REDD+ Strategy*** (2017-2027) is funded by the World Bank's Forest Carbon Partnership (FCPF), and implemented by UNDP in partnership with CCDA and key Government stakeholders. This project provides a framework for attracting additional funding to cater for land use planning in PNG. The Strategy emphasizes national development and land use planning where the bulk of area would be the forested areas and the introduction of carbon sequestration projects would ensure that these forest areas remain without less destruction and hence promote LDN.
- (c) ***Sustainable Financing of Papua New Guinea's Protected Area Network*** (GEF ID 9536; GEF grant: USD 11,311,915; under implementation 2019-2024). The objective of this project is to reduce the funding gap for Papua New Guinea's protected areas in order to improve their management effectiveness, and the livelihoods of their communal landowners. This project is strengthening the capacity of CEPA to effectively plan, secure and administer funds for PNG's protected area system. This project is also designing and implementing a suite of mechanisms to improve revenue streams in the protected areas. These outcomes will form a basis for scaling up with a view to improving the management of landscapes without formal designation as protected area.
- (d) ***Strengthening capacity in the agriculture and land-use sectors for enhanced transparency in implementation and monitoring of Nationally Determined Contributions (NDCs) under the Paris Agreement*** (GEF ID 9833; GEF grant: USD 863,242; under implementation 2018-2021). The objective of this project is to strengthened agriculture and land use sector components, including inventories of emissions by sources and sinks, and information necessary to track progress against priority actions identified in PNG's NDC for these sectors. The information obtained through this project will help inform the testing and scaling up of the SLM and SFM methodologies in the proposed project.
- (e) ***R2R Strengthening the Management Effectiveness of the National System of Protected Areas*** (GEF ID 5510; GEF grant: USD 10,929,358; under implementation 2015-2020). This project aims to strengthen national and local capacities to effectively manage the national system of protected areas, and address threats to biodiversity and ecosystem functions in these areas. Its interventions focus on the YUS Conservation Area located in the Huon Peninsula in Morobe Province and in the Torricelli Mountain Range located in the Sandaun and East Sepik Provinces in the north-west of PNG. Project ID 5510 built upon

the results of *Community-based Forest and Coastal Conservation and Resource Management in Papua New Guinea* (GEF ID 3954; GEF grant: USD 6,900,000; project closed in 2018). Experience gained through the R2R and PAS projects will provide a solid foundation for the proposed project particularly with regards to community-based management of natural resources, livelihood generation and land use planning and management.

5) Proposed alternative scenario

This project proposal focuses on sustainable land and landscape management as part of Papua New Guinea's Land Degradation Neutrality transformative strategy, which is anchored on creating investment opportunities through the identification of priority areas for feasible LDN investments, and incorporating and up-scaling best practices to achieve LDN. The identification and implementation of LDN transformative projects and programmes will contribute to good environmental practices such as biodiversity conservation, sustainable land management, ecosystem restoration, increased resilience and the eradication of poverty and food insecurity.

The proposal was formulated following guidance provided by the Global Mechanism of the UNCCD for LDN transformative projects and programmes that encourage innovation, ensure consistency and completeness in the implementation of LDN and support positive transformation by (i) ensuring transformation and innovation; (ii) promoting responsible and inclusive governance; (iii) ensuring sustainability; and (iv) leveraging innovative finance, especially from the private sector.

The objective of the proposed project is to support the introduction and scaling-up of innovative sustainable land and forest management practices to help achieve PNG's voluntary LDN targets and improve ecosystem services. The proposed project will create an enabling environment to improve land use planning and biodiversity conservation and by integrating natural capital assessment (NCA), Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) processes. Natural capital valuations will be done in biodiversity priority areas. The proposed project will also pilot an integrated approach to sustainable land and forest management in the Highlands region to revert land degradation and prevent further deforestation through shifting agriculture. The results of this project will enable scaling-up sustainable land management (SLM) and sustainable forest management (SFM) approaches across the country to help PNG achieve its LDN targets and conserve its natural capital.

The objective of the project will be achieved through the following three components with related outcomes and outputs.

Component 1. Enabling environment to support ecosystem goods and services and achieve land degradation neutrality (LDN)

One of the elements of land degradation neutrality is the control and management of land and natural resources so as to prevent any new degraded lands. Planning for neutrality involves evaluating trade-offs and counterbalancing anticipated losses with measures to achieve equivalent gains within individual land types, where land type is defined by land potential. The enabling environment for PNG to achieve LDN will comprise policies, legislation, procedures, licensing, finances, capacity, know-how and land use plans. Integrated land management principles and practices will need to be mainstreamed into regulatory framework to avoid future degradation.

SEA and EIA effectively promote sustainable development by mainstreaming the environment into economic development and integrating green economy targets into strategic and project-related decision-making. SEA and EIA processes will be applied for evaluating competing land uses in the PNG mountains, and to monitor and mitigate harmful effects. It will also help identify the respective roles and responsibilities for compliance monitoring, enforcement and prosecution.

Natural capital valuations can help in calculating the true cost of capital and thus differentiate sustainable projects from unsustainable ones. The development and adoption of processes, instruments and regulations for valuing natural capital, as well as for ensuring that values of/dependencies on natural capital are integrated into land-use planning and decisions, should be encouraged. Determining the extent and value of PNG's natural resources through natural capital assessments and valuations can assist the country to manage its natural resources more wisely and, ultimately, ensure sustainable

growth of the country's economy, which is critical for PNG's population as they are highly dependent on natural resources and ecosystem integrity for their livelihoods. To reap the benefits of NCA for sustainable development and harness its socio-economic and the environmental potential at micro-level, capacity development is a key requirement. Regulations must be in place requiring the inclusion of natural capital valuations in feasibility studies for any development project, and in particular for the mining, oil and gas, oil palm industry and tourism sectors. This should be done in addition to EIA, which only evaluate the possibility and impact of damage to nature (e.g. forests destroyed) but not assign a monetary value for the use of natural capital and the flow of ecosystem goods and services.

Operating at the national level, the expected outcome "*Improved policies and legal framework adopted and implemented at the national level to support integration of natural capital valuation into land use planning and LDN*" will lead to better institutional capacity and governance. The outcome be delivered through three interrelated outputs as follows.

National policies, legislation and procedures relevant to land use planning and management will be reviewed with a view to being adopted and implemented, and where possible harmonized, to include requirements related to NCA and SLM/SFM principles to reduce land and forest degradation and improve the flow of ecosystem goods and services. This includes the Environment Act 2000, the Forestry Act of 1991 and Mining Act of 1992. Moreover, consultations with stakeholders, including communities and private sector as well as the other government departments and agencies, will be carried out to finalize the National Sustainable Land Use Policy, which was drafted in 2014. The National Action Plan for the UNCCD – Combating Land Degradation through Integrated Management, which was developed in 2011 but never adopted, will also be reviewed and updated. Efforts will be made to ensure that LDN and biodiversity are mainstreamed into the institutional frameworks. To overcome challenges associated with passing legislation in PNG, awareness raising among decision makers combined with a strong stakeholder involvement plan with clear project institutional arrangements that specify roles and responsibilities of those concerned, as set out by the national guidelines that are supported by the project, and a strong communications plan will be put into practice throughout the life of the project. This will also be facilitated by a strong focus on enhancing capacity and know-how (see below) at CEPA and other relevant central government agencies in support of decision-making (*Output 1.1.1*).

Multi-agency strategic environmental assessment (SEA), environmental impact assessment (EIA) and NCA processes will be developed and integrated into land use planning and development strategies to strengthen coordination towards LDN. This will prevent land degradation and identify options for landscape rehabilitation and regeneration. The project will benefit from several mechanisms that are being put in place to measure progress and track achievements towards LDN. These include the development of provincial forest management plans, satellite monitoring of the logging activities, improved regulations on environmental permit, and enforcement of permit conditions. Furthermore, information and data regarding the state of the environment being uploaded by CEPA, other government agencies and stakeholders into the "PNG Data Portal"[22] will serve as basis for the natural capital assessments. The TerraPNG web portal[23] will also contribute with information on land use and land cover, and the PNG REDD+ web portal[24] will contribute with data from the national forest monitoring system. The project will also identify opportunities for biodiversity and social gains, reducing the negative impacts on other land uses (e.g. agricultural production), provision of ecosystem goods and services, and livelihoods (*Output 1.1.2*). The outcome will be linked to larger policy reforms towards LDN being undertaken as part of the development policy dialogue, development policy operations, or other efforts.

Capacity and know-how in the Conservation and Environment Protection Authority (CEPA) and other relevant central government agencies as well as at provincial government level will be enhanced through training courses, at institutional and individual levels. Training should also be provided for institutions responsible for development sectors for implementation of sustainable practices in their sectors and industries. The training will focus on building the capacity to conduct and evaluate environmental impact assessments and natural capital valuations, processing of environmental permit applications, and applying the necessary conditions, as well as on compliance monitoring and enforcement. The training will be coupled with drawing practical steps for maintaining institutional knowledge, identifying core and essential knowledge issues and building them into the onboarding process for new team members

and periodic refresher sessions for relevant staff, and using technology to create a process by which CEPA and other government agencies can continually capture, curate and access institutional knowledge as an evolving body of useful information that is accessible to people as they come into the organizations and over time (*Output 1.1.3*).

Natural capital valuations will be carried out in priority areas of the Southern Highlands and Hela provinces showing the value of biodiversity and its ecosystem goods and services. An assessment of the status of provision of ecosystem goods and services will be carried out highlighting dependencies and values with most relevant economic sectors (e.g. agriculture, mining, oil and gas, and tourism) and their role in a transformation towards LDN. The analysis will identify the current land use regimes at the target sites, as well as the state of biodiversity and the socio-economic scenarios, with a view to determining the key project stakeholders and the actual conservation and land-use requirements on-site. A review will be done to identify key lessons learned from the valuation of natural capital around the world and identify key datasets that can be adapted to PNG's context. Subsequently, assessments of the natural capital of mountain landscapes in the Highlands region will be carried out. Natural capital valuation reports will be produced for mountain landscapes showing the contribution of biodiversity and its ecosystem goods and services to key economic sectors (*Output 1.1.4*).

To prevent that natural capital valuations will encourage the conversion of forests, the project will tap from the experience gained through the several community-based conservation projects in PNG, such as for example, the Tree Kangaroo Conservation Program in the YUS Conservation Area and the Tenkile Conservation Alliance in the Torricelli Mountain Range, examining not only what worked but also what did not work. Best-practices will be adapted for the local context of the communities in the Southern Highlands and Hela provinces. The project will adopt a holistic approach to restoration and conservation, offering local communities access to financing options to incentivize support for the restoration and conservation efforts, and truly participatory monitoring, for example by employing their own rangers, the project will also be able to reinforce community support (see Component 2). Mapping and land-use planning give communities the tools to balance development with environment protection and will be critical to the success of community-based restoration and conservation efforts under the project. A strong participatory approach to land use planning will be key to the overall success of the project and the only hope of overcoming the challenges associated with customary land ownership – in other words, to be successful the project must demonstrate that the alternative scenario is more attractive to local resource owners than the *status quo*. Comprehensive and participatory land-use plans integrating NCA, and SLM and SFM principles will be developed for the Southern Highlands and Hela Provinces. The plans will include provisions for biodiversity impact abatement, offsets, rehabilitation, compliance, and sustainable land use within a landscape approach, while identifying needs and gaps hindering an effective land-use planning process that integrates guidelines for sustainable land and forest management. Mapping will enable communities to identify agricultural areas, riparian areas, and sites slated for restoration. It will also provide landowner clans with a way to come together to agree upon which forests should be used for hunting and which forests should be declared off limits to hunting. Mapping will further give local communities a better understanding of clan land claims and area boundaries, thereby reinforcing the value of clan land pledges to the agreed land use. (*Output 1.1.5*).

In collaboration with relevant authorities (e.g. Department of Lands and Physical Planning, Department of Agriculture and Livestock, and PNG Forest Authority) and provincial governments, LDN will be promoted through a stronger system for compliance monitoring (e.g. satellite monitoring of logged areas) and enforcement as part of multi-stakeholder land use planning and management systems to ensure that the targeted benefits are sustained. This will include monitoring of conditions arising from the land use plans, SEA/EIA/NCA processes and permitting system (*Output 1.1.6*).

Interventions for creating an enabling environment under this component of the proposed project will be carried out in close coordination with two complementary national projects under GEF 7.[25] Cooperation will focus on increasing efficiency, avoiding duplications and maximizing the use of funds among the three projects by coordinating the work plans and budget, as appropriate, during the design and through implementation of the projects to, for example, conduct joint capacity building activities at national level, mainstream of LDN and biodiversity into national policies, exchange lessons learnt and use joint knowledge management systems.

Component 2: Natural capital valuation and implementation of sustainable land and forest management (SLM/SFM) practices in mountain landscapes

Another element of land degradation neutrality is the rolling-back of degradation by restoring and rehabilitating the impacted environment. The proposed project will focus on significant impacts that can be reversed through the appropriate technology and approach. It will test comparative remedial methodologies to restore mountain lands, reinstate ecosystem goods and services. It will evaluate restorative approaches and methodologies and through knowledge management and awareness raising (Outcome 3), make them available for widespread replication. Activities will include multiple stakeholders and interest groups, including community representatives, landowners, women's groups, CSOs, and government representatives.

To overcome barriers related to lack of access to the latest practices and approaches in SLM and SFM and lack of human capacity, the project will focus on significant impacts that can be reversed through the appropriate technology and approach. The project will, on the one hand, promote a revival of traditional practices and, on the other hand, bring innovative SLM and SFM technologies available elsewhere to the project areas. This will be achieved by developing outreach and training materials, and building capacity tailored to the local factors and needs, including culture and spiritual values, local language and customary laws. The use of traditional knowledge combined with innovative technologies will enable farmers to use crop management techniques to help cope with extreme weather and environmental changes, plant and conserve resilient local landraces, adopt a wider range of crop varieties combining resilience and yield and slow- and fast-maturing varieties, use native plants for biocontrol, participate in plant breeding using modern and traditional crops and knowledge, produce and share seeds in the community. Engagement with local farmers' cooperatives in terms of training for new approaches and improving market accessibility will be reinforced and strengthened from planning the project planning phase through implementation.

The project will ensure that the interventions are embedded in broadly shared values and practices that reflect local social needs, taking into account gender dynamics and the specific needs of women, and that all the local people share the benefits.

The project will also assess the value of natural capital and test comparative remedial methodologies to restore mountain lands to their ecological functions. It will evaluate restorative approaches and methodologies and through the knowledge management and communication strategy in Outcome 3, make them available for widespread replication. Areas of forest and cropland will be rehabilitated, and innovative mechanisms applied to roll back land degradation in key production sectors.

The expected outcome ("*Mountain landscapes managed sustainably by linking valuation of natural capital, land use planning and SLM/SFM with development policy and financial incentives to reduce degradation, move towards LDN and restore ecosystem services*") will be delivered through three interrelated outputs as follows.

At the outset, collaboration with farmers and landowners will be established to rehabilitate degraded farmland and restore soil fertility in 50,000 hectares. Ten thousand households will be targeted for field-based interventions totalling 25,000 women and 25,000 men who will directly benefit from the project.[26] The proposed interventions will be a "menu" of technical options for restoration can only be widely adopted on a large scale if it is adaptable, flexible and testable by farmers under their own heterogeneous economic, social and environmental conditions. These techniques include, for example, contour bunds, mulching, planting of riparian vegetation strips, introduction of nitrogen-fixing intercrops, conservation agriculture (e.g. no-till and minimum tillage), crop rotation, optimization of nutrient use, drip-irrigation, continuous soil cover using cover crops, recycling compost and other natural fertilizer, soil enrichment, and bio-intensive integrated weed, disease and integrated pest management (e.g. through natural pest and predator controls). The project will also promote the exchange of land improvement practices that have been successfully implemented in some areas of PNG's highlands for millennia. On this basis, the project will introduce innovative sustainable land management practices that will be tested and evaluated, by the farmers and for the farmers, with a view to moving towards sustainable environmentally sound crop production. (*Output 2.1.1*).

Degraded forests will be restored (50,000 hectares) through SFM and agroforestry favoring natural processes and planting native species at risk (e.g. Klinki pine)[27] that enhance the productivity and resilience of the forest. This will be supported through the Saemaul Undong[28] concept, which was successfully introduced from Korea in PNG, to strengthen village participation and promote the status of women in the communities. Vegetation and soil resources will be

protected from uncontrolled grazing, excessive harvesting of wood for fuel, logging and on-slope crop cultivation allowing for an increase in perennial vegetation. In parallel, innovative sustainable forest management practices and new agroforestry systems will be introduced, tested and evaluated. Sustainable forest management methods to be tested will include those aimed at enhancing biodiversity habitat, community forestry co-management, identification and promotion of non-timber forest products (e.g. eaglewood resin), reducing stress on identified ecosystem services such as pollination, seed dispersal and nutrient cycling, reducing erosion by improving slope stability and testing sustainable alternatives, for example, fuel for cooking or more energy efficient technologies for wood fires (*Output 2.1.2*).

An in-depth gender analysis to identify opportunities to mainstream gender during and beyond the implementation of the project will be conducted during the PPG phase (further details are provided in the *Gender Equality and Women's Empowerment* section below). Gender-sensitive sustainable livelihood strategies for local communities will be developed and implemented at project sites.[29] The activities will be aimed at improving women's abilities to enhance sustainable land productivity for subsistence and increase cash crop production. Gender equality will be promoted during the trainings, visits, etc., as well as through leadership and empowerment capacity building activities to promote women's leadership and challenge the existing *status quo* so that women contributions to the community become more visible and valued and women's status will increase in all activity areas (*Output 2.1.3*).

By tapping from the experience and lessons learnt on the development and implementation of sustainable financing mechanisms through other projects,[30] the proposed project will pilot a series of sustainable financing mechanisms for LDN. SMEs in the agricultural sector will be targeted for financial incentives, including permits fees, credits, microloans, subsidies and certification. Large-sized enterprises in the project areas will be targeted for offset mechanisms, such as those in the coffee industry (including producers, processors and exporters) and oil and gas industry (both involved in prospecting and in operation). Experience gained through the PNG LNG Project in utilizing a offset mechanism will be useful (see section on "Private Sector Engagement" and annex C below). Effective and practicable permit and licensing procedures will take into account the timing of proposed operations and requirements for replanting and will be coupled with effecting monitoring and enforcement compliance mechanisms. These mechanisms will provide the means for scaling-up and replicating best practices for rehabilitation of degraded land, the prevention of further degradation and achievement of land degradation neutrality (*Outputs 2.1.4*).

Component 3. Knowledge management, monitoring and evaluation, awareness raising and training

This project component brings together the results obtained through the project to raise awareness and mainstream sustainable land and forest management by landowners and private sector. The project will make use of existing knowledge on knowledge management, awareness raising and training gained from past projects in PNG and in other SIDS, particularly in the Pacific region. A stocktaking exercise to identify best practices and success stories will be carried out during the PPG phase and incorporated, in consultation with other stakeholders, into the project planning (see also the "*Knowledge Management*" section below).

The expected outcome of this component ("*Dissemination and replication of project results with a view to scaling up and supporting land use planning, ecosystem good and services, and land degradation neutrality*") will be achieved through the following four outputs.

A project monitoring and evaluation plan will be developed and implemented in a participatory manner, with input from communities, landowners and other stakeholders, to measure project progress and impacts in terms of multiple global environmental benefits, and social and economic benefits. Baseline and targets for project indicators, which will be refined during the project development phase, will be used for monitoring progress and impacts, and reporting through three annual project reports and half-yearly project progress reports. A terminal evaluation will be conducted and will include the review of project reports, web-based information, and field visits to selected sites, with recommendations for ensuring sustainability of project outcomes. A communication strategy will be developed and implemented to showcase the outputs and outcomes of the project (*Outcome 3.1.1*).

Communication strategies and activities are essential for raising awareness and fostering engagement among sectors and for showing the value and benefits of forests and trees in landscapes, the costs of land degradation, and the potential returns on investments in restoration and SLM/SFM. Best practices arising from Outcome 2 above will serve as the basis for the development and dissemination of awareness raising and technical materials in local languages. These materials will be used to deliver training to landowners and communities to promote adoption of SLM and SFM practices, including integrated pest management, agricultural tillage, management practices for slope agriculture, agroforestry, etc. To simplify the complexity of communicating the sector-environment interactions in natural capital valuations, 'indicators' can be employed to support specific management purposes that are relevant to the community. A list of natural capital status and impact indicators prioritized by the stakeholders will be included in the stakeholder engagement plan to be developed during the PPG phase. On that basis, the project will generate a comprehensive set of indicators to facilitate communication of the status and trends of natural capital to various audiences. These indicators are important for both communicating issues with wider audiences, and developing targets for natural capital management that align with a transition to a green economy.[31] Using established outreach strategies for communicating at a local scale, taking into account the stakeholder engagement plan and gender dynamics, the project will communicate natural capital valuations, including the extent, condition and value of natural capital that are most important to the local communities and small farmers (*Outcome 3.1.2*).

The project will contribute to private sector development and inclusive growth in the non-resource sector. This will be done through capacity building, outreach and awareness raising targeting SME in the agricultural sector to improve their competitiveness, productivity and access to financial services, and deepen economic participation of women and youth. Training for small and medium-sized enterprises will be carried out in a cross-sectoral approach to integrate natural capital valuation and SLM principles in the development of feasibility plans and business models (*Output 3.1.3*). Furthermore, the project will carry out training of bank and other financier institutions for improving their lending standards to incorporate natural capital valuation and improve the "avoid" and "reduce" aspects of the LDN response hierarchy. Natural capital-based tools will be made available for businesses to support integrating natural capital values into their business models (e.g. Natural Capital Protocol – a decision making framework used by businesses to identify/measure/value their direct and indirect impacts and dependencies on natural capital).[32]

A national database for NCA and LDN will be established as part of an existing platform (for example, the PNG Data Portal[33] or PNG REDD+ web portal[34]) and become operational within the life of the project to exchange knowledge and lessons learnt. Information will be uploaded and maintained by CEPA, and will be available and accessible to the wider public (*Output 3.1.4*).

Together, the outcomes of this project will help manage competing land uses in the mountains of the Highlands. It will also provide the means for scaling-up and replicating best practices for NCA, SLM and SFM across PNG leading to better land use planning, improved flow of ecosystem good and services, and land degradation neutrality.

6) Alignment with GEF focal areas

Land Degradation Focal Area

The proposed project is aligned with Objective 1 of the GEF-7 Land Degradation Focal Area Strategy ("Support on the ground implementation of SLM to achieve LDN"). Under Component 2, the proposed interventions will introduce, test and evaluate SLM techniques, including continuous soil cover, crop rotation, management of crop residues, optimization of nutrient use, and integrated weed, disease and integrated pest management, among others. Component 1 also involves restoration of degraded forest, as well as the introduction, testing and evaluation of SFM techniques.

The proposed project is also in line with Objective 2 of the GEF-7 Land Degradation Focal Area Strategy ("Creating an enabling environment to support voluntary LDN target implementation"). This is reflected under Components 1 and 3 of this proposal, which aim at creating an enabling environment to support land use planning and LDN target implementation, and sharing knowledge and experience to enable scaling-up. The proposed project will link NCA, SEA and

EIA processes to voluntary LDN targets. The outcome from these interventions will inform policy instruments and fiscal reforms designed to mitigate perverse incentives leading to biodiversity loss. The outcome will be linked to larger policy reforms towards LDN being undertaken as part of the development policy dialogue, development policy operations, or other efforts. The proposed project will involve building capacity in planning and implementation to maintain functional landscapes. Besides, land use change and land degradation will be assessed, mapped and tracked in order to set up a monitoring and enforcement system. Guidelines and codes of practice for sector industries will be developed to mainstream biodiversity valuation and LDN. Ultimately, lessons learnt and experiences gained in the mountain landscapes of the Highlands and Momasa regions will enable scaling-up to the rest of the country. The experience gained will also be valuable to other mega-diverse countries facing threats of biodiversity loss due to habitat degradation and destruction.

Biodiversity Focal Area

Furthermore, the project is also in line with Objective 1 of the GEF-7 Biodiversity Focal Area (“Mainstream biodiversity across sectors as well as landscapes and seascapes Mainstream biodiversity across sectors as well as landscapes and seascapes”). The three project components will produce outputs relevant to Natural Capital Assessment. Under Component 1, multi-agency processes for SEA, EIA and NCA will be developed and integrated into land use planning and development strategies to strengthen coordination towards LDN and biodiversity conservation. Capacity and know-how of relevant government agencies, at national and provincial levels, will be enhanced through training courses on SEA, EIA, and NCA to support decision-making in the processing of environmental permit applications, as well as for compliance monitoring, environmental audits and enforcement. Under Component 2, natural capital valuation reports will be produced for mountain landscapes showing the value of biodiversity and its ecosystem goods and services and comprehensive land-use plans integrating NCA, and SLM and SFM principles will be developed for mountain landscapes. Under Component 3, training on how to integrate NCA and SLM principles into feasibility plans and business models will be carried out for small and medium-sized enterprises. Reports, results and best practices will be shared through a national database.

7) Incremental/additional cost reasoning and expected contributions from the baseline

Without project interventions, the landscape in the Highlands and Momasa regions would continue to be degraded due to the inefficient and destructive land management practices, and biodiversity integrity would be compromised in not only the adjoining PA landscape but in the corridors and areas of conservation value that is not currently afforded national protection. It is highly likely that degradation and fragmentation of the landscape would not only continue, but would worsen as the human population grows. Without the proposed project, there would be insufficient investment in addressing the downstream impact of human activities in the Highlands and Momasa regions and coordination between sectoral Ministries and agencies would remain limited, scattered and unaligned.

Table 3. Expected contributions from the baseline

Baseline practices	Alternatives to be put in place by the proposed project
<ul style="list-style-type: none"> - Poor regulatory and enabling environment for SLM and SFM and adoption of alternatives to meet the goals of sustainable natural resources management will lead to continued biodiversity loss and degraded productive landscapes. - Continued lack of coordination and capacity among agencies to manage and mainstream bio 	<ul style="list-style-type: none"> - Productive activities such as agriculture and forestry are better regulated and monitored, thereby reducing threats to the surrounding forests, biodiversity and protected areas. - Capacity development at: a) local level for sustainable, transformative action leading to participatory management of resources, and b) at government level to support the integration and mainstreaming of SEA, EIA and NCA.

diversity conservation into sustainable land management and plans in the Highlands region leading to duplication of effort, inefficiency, and limited positive outcomes.

- Persistent degradation of land resources and associated ecosystem services, resulting in negative impacts on (i) the country's potential for economic growth; (ii) poverty and vulnerability of rural people; (iii) social costs; (iv) ecosystem functions and services; (v) biodiversity.

- The demand for agricultural land, wood and charcoal will continue to grow as the human population grows in PNG, leading to increasing deforestation to meet the needs.

- The negative health consequences of the use of inefficient cookstoves will continue to impact on the health of a majority of the households.

- Due to a lack of available alternatives, communities continue to clear the forest for subsistence agriculture and use firewood for cooking, with a continued negative impact on human health and forest resources.

- Inadequate funding for community/farmer organizations to lead transformational land-use changes.

- The capacity of local authorities and enforcement agencies are strengthened for improved coordination for landscape management (including control of unsustainable land management practices such as bushfires and wood harvesting).

- Implementation of innovative SLM practices will restore degraded mountain landscapes, improve food security and livelihoods, and reduce deforestation leading to improved flow of ecosystem goods and land restoration.

- Degraded forests will be restored through SFM and agroforestry favoring natural processes and planting native species at risk that enhance the productivity and resilience of the forest. Vegetation and soil resources will be protected from uncontrolled grazing, excessive harvesting of wood for fuel, logging and on-slope crop cultivation allowing for an increase in perennial vegetation. Alternative non-timber uses of the forest will be promoted to reduce the negative impacts on the landscape.

- Dialogue and negotiations are created between the private sector and communities to develop and produce alternative forestry products (e.g. alternative sources of energy, marketing of bioenergy feedstock, compliance with renewable energy delivery frameworks, access to finance for small-scale investments in the value chain).

- The project will support the establishment of cross-sectoral, multi-stakeholder coordination mechanisms for strengthening SLM, SFM, biodiversity valuation and the upscaling of innovative techniques, which will lead to greater economies of scale and improve the cost-effectiveness of interventions.

- The project will assist the Government of PNG to explore innovative financial mechanisms to assist communities to establish SLM and SFM as means to improve natural resource management in the Highlands region.

8) Global environmental benefits

The Highlands region of PNG are experiencing habitat loss and fragmentation with the result that all species of wild fauna and flora are in need of improved management. As a recognized global reservoir of biological diversity and highlighted as a “priority place” by the World Wildlife Fund, harbouring at least 5% of the world’s animal and plant species, 2/3 of which are endemic to the island of New Guinea, PNG’s unique flora, and fauna are a high priority for conservation of biodiversity deemed to be of global importance.

The fauna and flora of PNG Highlands region include an assemblage of rare and threatened species of global importance, some which are poorly known and restricted to high-altitude tree fern savanna, tussock grassland, and adjacent upper montane forests. Agricultural production of annual and perennial non-timber crops, logging & wood harvesting and fire are among the main threats to the survival of these species. This is just a small number of the many species of global environmental concern that would benefit from the project, which could number in the several hundreds.

The Global Environmental Benefits that will be generated from project implementation include the sustainable management of natural resources and critical habitats in an integrated manner providing development and environmental benefits. The implementation of the proposed project will have an immediate global environmental benefit through the rehabilitation and restoration of degraded forests in the mountain landscapes of the Highlands of PNG.

More specifically, the project will lead to the development of participatory land use plans covering the provinces of Southern Highlands and Hela provinces. It will also lead to improved land management of at least 100,000 hectares of production landscapes introducing and promoting the use of SLM and SFM practices. At least 50,000 people will benefit directly from the project. Among the beneficiaries, at least half will be women.

The project will also link biodiversity valuation to a number of financial mechanisms to combat land degradation and move towards LDN. A knowledge management system to widely disseminate the lessons arising from the pilot tests which will be carried out.

The project will also bring about the protection of valuable ecological resources such as forests and arable land through the enforcement of land use plans, buffer zones, and riparian strips. This, in turn, will lead to the restoration and renewal of the natural habitats of a number of plant and animal species and valuable ecosystem services. In addition, land productivity, in various forms, will be enhanced. As a result, globally significant biodiversity will be conserved, valuable ecosystem services will be safeguarded and land under sustainable agricultural production will be increased.

Globally increased CO₂ capturing capacity contribute to reducing health impacts from degraded land, improve water quality and livelihoods. By promoting alternative ecologically friendly production systems in the project sites, including reduced levels of deforestation for cropping and fuelwood needs, the project will contribute to carbon sequestration and mitigation (to be calculated during PPG).

The results of the proposed project will pave the way for similar improvements nation-wide leading to the achievement of LDN voluntary targets^[35] and improved flow of ecosystems goods and services.

9) Innovation, sustainability and potential for scaling up

Innovation

The Government of PNG is committed to advancing interventions on sustainable development which are consistent with a number of regional and international frameworks, and affirming national strategies in order to fulfil its responsibility to various conventions and agreements. A number of SLM initiatives from key sectors have been initiated through co-operation of international development partners and national government with all projects impacting positively on the LDN vision and promoting SDGs. The identification of land degradation hotspots and priority areas at the landscape level through the LDN Target Setting Program provide a strategic entry point for land use planning and restoration.

Natural capital assessment is a relatively new concept in PNG. Although biodiversity value is widely recognized, little has been done to value biodiversity in monetary terms. The project will create an enabling environment to value natural capital to create a holistic approach to the implementation of policies, programmes, plans and development projects. In particular, the project will develop and integrate NCA, SEA and EIA processes into land use planning and development strategies to strengthen coordination towards LDN and biodiversity conservation. This will also allow for more informed decisions in the permitting process for mining, logging, agriculture and tourism. Pilot valuations of natural capital will be carried out for areas of high biodiversity value in the Southern Highlands and Hela provinces. The project will build on existing NCA tools, including those developed by UNEP's World Conservation Monitoring Centre,[36] as well as tools and approaches developed by UNEP under The Economics of Ecosystems and Biodiversity (TEEB)[37] and adapt them to PNG's context.

In the face of growing challenges, there will be a growing need for awareness on the importance and value of biodiversity, particularly among traditional landowners who are the custodians as well as consumers of wildlife products. Creating innovative incentives to increase greater participation in the allocation of land for conservation purposes (e.g. biodiversity offsets, payment for ecological services) will be useful to maintain the integrity of land, conserving biodiversity and achieving LDN in the future.

Reaching all areas of the country with "on site" environmental initiatives has been shown to be complex, dispendious and inefficient. Innovation through use of audio-visual, social media and interactive materials on conservation issues for education, awareness and advocacy will be developed. Involving churches and other community-based organizations and building their capacities to reach out to the communities.

Reliable financial resources are needed for effective land use and management in PNG. Annual budgets are needed for the development and implementation of management plans (including capital and recurrent expenditure), and to support the customary landowners in their management of the protected areas. Through a diversified mix of conventional funding sources (e.g., budgetary allocations, overseas development assistance) and innovative funding sources (e.g. payments for offsets and ecosystem services, trust funds and green taxes), the proposed project can help PNG achieve stable and sufficient long-term financial resources to support its protected areas networks.

A financing mechanism for sustainable land and forest management will be developed that would include multiple strategies for acquiring Targeted Scenario Analysis, monetary incentives and disincentives, permitting and licensing procedures, comparative scenarios, costs & benefits, consideration of offsets, calculation of cost of environmental degradation and social costs. Work on an offsets policy and sustainable financing through a Biodiversity Trust Fund is being progressed and will complement and operationalize the financial mechanism. A coordinated and long-term investment strategy will support protected areas and their management, incorporating innovative and effective mechanisms for funding biodiversity conservation, such as market-based instruments.

Sustainability

As the project builds a strong enabling environment taking into account the needs of the government sector and focussing on building their capacities for long term effective management, the actions proposed are expected to be sustainable. By focusing on financing mechanisms (see above) and scaling up from demonstration models (see below), project design has a strong focus on sustainability. In addition, the project will work closely and in full partnership with local communities and SME sector, which will be reinforced and strengthened engagement with local farmers cooperatives in terms of training for new approaches and managing competing land uses. This will create a better climate for sustainability.

Scaling up

The project approach is to develop the enabling environment and then test/demonstrate the resulting elements in pilot project situations. Pilot project sites for trialing SLM and SFM practices will be selected based on numerous factors including significant tree cover loss, socio-economic, bio-physical and major agro-ecological zones. The pilot sites will be trialed in separate regions to understand the successes and challenges in implementing SLM and SFM measures in

the respective regions. The pilots will be evaluated, refined if necessary, and written up as guidance and promotion materials for the various actors in the Highlands environment and to other provinces in PNG on a broad, nationwide landscape scale.

In order to be impactful, LDN will be mainstreamed in development sectors resulting in investments in SLM/SFM by private sector developers to prevent further land degradation. Lessons learnt and experiences will be shared in order to reduce the cycle from innovation to replication. In order to do so, Outcome 3.1, will ensure the dissemination for replication and scaling up of results, innovative approaches and achievements. These mechanisms will provide the means for scaling-up and replicating best practices for rehabilitation of degraded land, the prevention of further degradation and achievement of land degradation neutrality.

Collaborative work will be pursued with partners/initiatives such as Natural Capital Finance Alliance,[38] which provides natural capital-based tools to support financial institutions to reflect dependencies and impacts on natural capital into their business models. Using the existing tools, information generated through the project will be used to influence financial institutions' business models and investment decisions.

[1] UNDP (2019) Human Development Report 2019 – Papua New Guinea. Available at: http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/PNG.pdf.

[2] WWF (2011) Final Frontier: Newly discovered species of New Guinea (1998- 2008). WWF Western Melanesia Program Office, 56 pp. Available at: https://d2ouvy59p0dg6k.cloudfront.net/downloads/new_guinea_new_species_2011.pdf.

[3] WBG (2019) Papua New Guinea Country Partnership Framework FY2019 – 2023. World Bank Group, USA, 103pp. (<http://documents.worldbank.org/curated/en/986831558749746464/pdf/Papua-New-Guinea-Country-Partnership-Framework-for-the-Period-FY19-FY23.pdf>).

[4] Papua New Guinea Small and Medium Enterprise Policy 2016 (https://www.dci.gov.pg/images/article/png-sme-policy_2016.pdf).

[5] [https://www.pnglng.com/media/PNG-LNG-Media/Files/Environment/Biodiversity strategy/PGGP-EH-SSZZZ-000003_Biodiversity-Strategy_Rev4.pdf](https://www.pnglng.com/media/PNG-LNG-Media/Files/Environment/Biodiversity%20strategy/PGGP-EH-SSZZZ-000003_Biodiversity-Strategy_Rev4.pdf).

[6] Imbun BY (2014) Struggling or in transition: Small household growers and the coffee industry in Papua New Guinea. Asia Pacific Viewpoint 55: 24-37.

[7] Kappelle M, Brown AD (2003) Mountain Biodiversity in Neotropical Cloud Forests: Distribution, Status and Trends. CBD Technical Series 8: 54-55.

[8] WWF website (<https://www.worldwildlife.org/ecoregions/aa0105>).

[9] Helgen KM, Opiang MD, Thomas WH (2009) The Mammal Fauna of Wanakipa, Southern Highlands Province, Papua New Guinea. *In*: Richards SJ, Gamui BG (eds.) Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments. University of Chicago Press, 258pp.

[10] IBAT – The International Biodiversity Assessment Tool (<https://ibat-alliance.org>).

[11] https://knowledge.unccd.int/sites/default/files/ldn_targets/2019-11/Papua%20New%20Guinea%20LDN%20TSP%20Country%20Report.pdf.

[12] CCDA (2017) Papua New Guinea's National REDD+ Forest Reference Level. Submission for UNFCCC Technical Assessment in 2017, Climate Change and Development Authority, 37pp.

[13] *Ibid.*

- [14] Bryan JE, Shearman PL (Eds) (2015) *The State of the Forests of Papua New Guinea 2014: Measuring change over the period 2002-2014*. University of Papua New Guinea, Port Moresby, 225pp.
- [15] PNG Country Report of the Land Degradation Neutrality Target Setting Programme.
- [16] A soil horizon is a layer parallel to the soil surface, also the decaying matter on it, whose physical, chemical and biological characteristics differ from the layers above and beneath. s
- [17] <http://www.metafro.be/leisa/1988/4-1-6.pdf>.
- [18] Department of National Planning and Monitoring (2014) *National Strategy For Responsible Sustainable Development for Papua New Guinea*.
- [19] Natural Capital Solutions (<https://naturalcapitalcoalition.org/natural-capital-2>).
- [20] Bourke RM, Harwood T (2009) *Food and Agriculture in Papua New Guinea*. ANU E Press, 638 pp.
- [21] https://knowledge.unccd.int/sites/default/files/ldn_targets/2019-11/Papua%20New%20Guinea%20LDN%20TSP%20Country%20Report.pdf.
- [22] In 2019, through the GEF project "Building National and Regional Capacity to Implement Multilateral Environmental Agreements by Strengthening Planning and the State of Environmental Assessment and Reporting in the Pacific", referred to as the "Inform Project", CEPA launched a data portal for the collection, maintenance and sharing of information and data on biodiversity, ecosystem services and land degradation to help in decision-making. The portal is available at <https://png-data.sprep.org>.
- [23] http://png-nfms.org/portal/static/loc/en/documents/TerraPNG_Manual_Users_Guide.pdf.
- [24] <http://png-nfms.org>.
- [25] "*Enabling sustainable production landscapes in Eastern Highlands and Western Highlands Provinces for Biodiversity, Human Livelihoods and Well-being*" (PIF under review by the GEF Secretariat at the time of writing this document) and "*Establishing System for Sustainable Integrated Land-use Planning Across New Britain Island in Papua New Guinea*" (GEF ID 10239; under FOLUR Impact Programme).
- [26] For calculation purposes, it was assumed that each farming family would have 5 members benefiting from the project. The actual number is probably higher.
- [27] *Araucaria hunsteinii* (IUCN Red List of Threatened Species status: "Near Threatened").
- [28] https://en.wikipedia.org/wiki/Saemaul_Undong.
- [29] The percentage of women making up the farming communities in the project sites will be verified during the PPG phase once the project sites have been identified. This information will help determine gender-sensitive and women's empowerment activities during the implementation of the project.
- [30] For example, the projects "*PNG National REDD+ Strategy*" (2017-2027) and "*Sustainable Financing of Papua New Guinea's Protected Area Network*" (GEF ID 9536; 2019-2024) both have strong focus on the development and implementation of sustainable financing mechanisms to improve livelihood of landowners. An analysis of financing mechanisms tested through previous projects in PNG will be done during the PPG phase.
- [31] Brown C et al. (2016) *Natural Capital Assessments at the National and Sub-national Level*. UNEP-WCMC, Cambridge, UK, 116pp (www.unep-wcmc.org/system/dataset_file_fields/files/000/000/377/original/Natural_Capital_Report_WEB.pdf).

[32] <https://naturalcapitalcoalition.org/natural-capital-protocol>.

[33] Available at <https://png-data.sprep.org/>.

[34] <http://png-nfms.org>.

[35] As per the outcomes of PNG's project in the Land Degradation Neutrality Target Setting Programme, 700,000 hectares in the highlands and coastal areas will be targeted for forest restoration and sustainable land management by 2030.

[36] <https://www.unep-wcmc.org/resources-and-data/natural-capital-assessments-at-the-national-and-sub-national-level>

[37] <http://www.teebweb.org>.

[38] <https://naturalcapital.finance>.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

Under **Component 1**, the interventions of the proposed project will take place at the national level to create an enabling environment and improve governance.

Under **Component 2**, the proposed project will target the **Southern Highlands and Hela provinces**. On the one hand, these two provinces are among those with highest population densities and lowest levels of socioeconomic development in PNG (Figure 2). On the other hand, these two provinces have incredible biodiversity richness with many species yet to be discovered. Land degradation in the two provinces is a serious problem and a cause of deforestation.

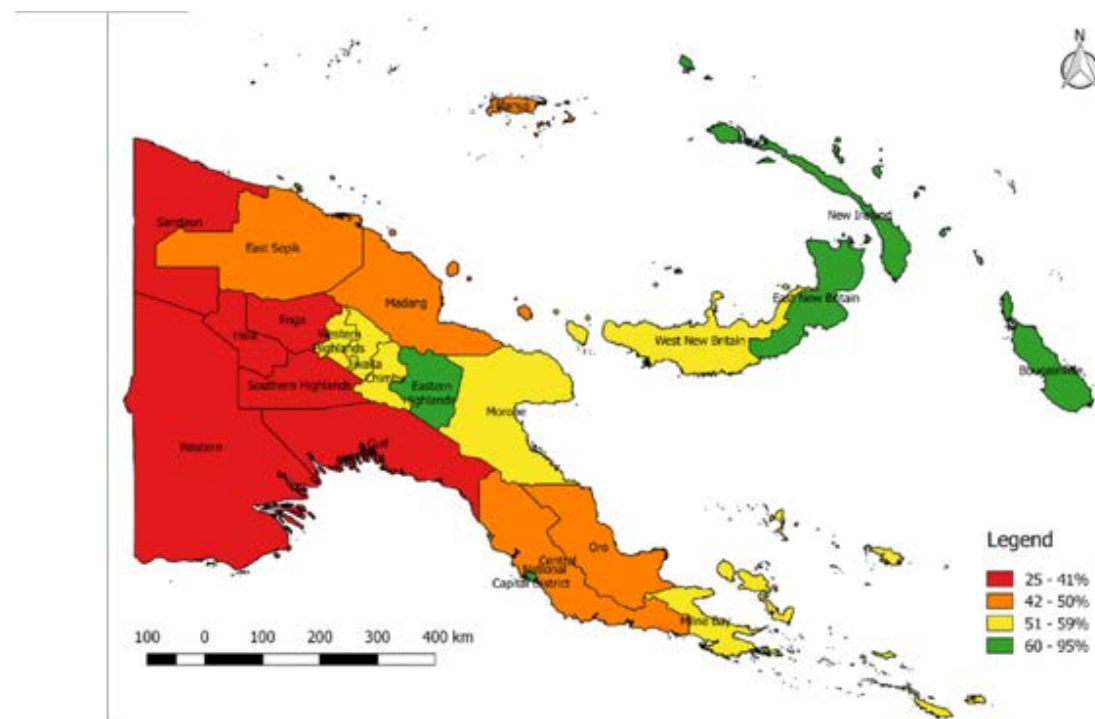


Figure 2: Ranking of socioeconomic development by province. The legend displays red, orange, yellow and green colours by provinces according to the level of development, with the more developed provinces ranking higher than less developed provinces.²⁶

Land use plans will be developed for the Southern Highlands and Hela Provinces. These provinces occupy 25,587 km² in the central west of PNG covering a diverse range of environments. The northwest is dominated by the Central Range, Lagaip Valley and the extensive volcanic hills, plains and swamps of the Tagari Valley. Most people live within an altitudinal range of 1200–2400 metres. The estimated rural population of Southern Highlands and Hela in the year 2000 was 451,000, which is 11 per cent of the national rural population. The provincial population growth rate is high and estimated at 3.5 per cent per year. Incomes in the province are very low to low, although some people receive relatively large amounts of money from oil and gas projects. Agriculture provides the main source of cash income through sales of coffee, fresh food and firewood. Most of the coffee is grown east of Nipa. Royalties and wage employment from the Kutubu, Erave and Hides oil and gas operations are the only sources of non-agricultural income. This income is very high, but only benefits people living close to the operations. Agriculture in the valleys is characterised by high intensity sweet potato production. Supplementary crops include banana and

taro at lower altitudes, and potato at higher altitudes. Production is maintained through the use of drainage, composting, mounding and bedding. The agricultural potential of flatter lands is improved by land improvement practices such as drainage, composting and mounding. The remaining areas of the province have very low to low potential because of combinations of steep slopes, poor soils, high rainfall, flooding, low temperatures, frost and frequent cloud cover. Land potential is reduced in areas where practices such as mounding and composting are used on steep slopes, resulting in increased soil erosion.

SLM and SFM practices will be implemented in mountain landscapes of the Southern Highlands and Hela provinces that are under strong pressure occurring as a result of high intensity agriculture being practised in environments with low land potential. These areas are vulnerable to various forms of land degradation and declining crop production. Farmers in these areas often forced to move onto steeper sloping land causing further deforestation and soil erosion. Some of these areas are also home to the most disadvantaged people where incomes are very low, and population densities are very high. People in many of these areas are vulnerable to land shortages, subsistence food shortages and have little cash to buy supplementary food.

The priority areas for SLM and SFM interventions include the *Upper Wage, Imilhama Valley, Lai Valley and Nembi Plateau*. These are significant areas of strong agricultural pressure as a result of very intensive agriculture being practised in low potential environments. These areas are vulnerable to various forms of land degradation, declining crop production, frost and food shortages. There are also significant areas of marginal and moderate agricultural pressure in the fringe areas of the Tari Basin, in the Mendi Basin and in the Nembi, Sugu and upper Erave valleys.[1]

For the **valuation of natural capital**, the interventions will focus on areas of high biodiversity and ecosystem services values in the Southern Highlands and Hela provinces.[2], [3] The priority project areas for valuation of natural capital include:

Doma Peaks/Leiwaro Highlands – Rich highlands environments with high scenic and biotic value. Doma Peaks (and Teri Gap) have been considered for national park status. These comprise a large mid-montane and upper montane tract of un-inhabited forest that is exceedingly rich in birds of paradise. Road access to 3,000 meters on Tari Pass. The Doma Peaks are also considered an important area for restricted-range bird species.[4]

Kikori River Basin/Lake Kutubu – There are currently five legally protected conservation areas in the Kikori River Basin. These are the Lake Kutubu Wildlife Management Area (WMA; 24,057 ha), Neiru (Aird Hills; 3,984 ha) WMA, Libano-Arisai WMA and Libano-Hose WMA (8,250 ha), and Sulamesi WMA (49,800 ha). These WMAs provide vital habitat for these species and protects parts of two sub-catchments of the Kikori River.[5]

Because of its biodiversity and ecological significance, the area including the Lake Kutubu WMA has been designated a “Wetland of International Significance” by the Ramsar Convention. The Lake Kutubu area is also included in the tentatively listed Kikori River Basin - Great Papuan Plateau World Heritage Site. The lake supports a diverse aquatic plant flora, and 11 of the 14 known fish species in the lake are endemic to it, including the critically endangered variegated mogurnda (*Mogurnda variegata*) and black mogurnda (*Mogurnda furva*) and several vulnerable species, including Kutubu tandan (*Oloplotosus torobo*), Lake Kutubu rainbowfish (*Melanotaenia lacustris*), Kutubu hardyhead (*Craterocephalus lacustris*), Adamson's grunter (*Hephaestus adamsoni*), Blotched mogurnda (*Mogurnda spilota*), and Striped mogurnda (*Mogurnda vitta*). The limestone flora in the area is poorly known, but it will likely include many undescribed species and possibly new generic records. This region also supports other unique animal species such as birds of paradise, cassowaries and crocodiles, and a number of threatened species such as the lowlands tree kangaroo, the long-beaked echidna, the New Guinea sheath-tailed bat, Campbell's fairy wren and the reclusive chestnut forest rail.

Muller Range – This area preserves an essentially pristine altitudinal transect that spans hill forests, lower and upper montane forests, and diverse subalpine habitats. Although most of the mammals that inhabit these forests are probably quite widely distributed in the extensive catchments of the Strickland and Kikori Rivers, the intact nature of the forest ecosystems across such a broad elevational gradient is almost without parallel in the wider region. Long-term preservation of this spectacular series of interconnected ecosystems represents a conservation priority of the highest international importance. The presence of the lowland tree kangaroo and a long-beaked echidna in the montane forests of the Muller Range testify to a very low hunting pressure.[6]

Giluwe – The massive Giluwe shield volcano is capped by the largest contiguous expanse of alpine vegetation in PNG. This is a globally significant montane and alpine wilderness threatened by logging of the beech podocarp forests of its middle and upper slopes. Very rich in biodiversity with extensive subalpine bogs.

- [1] Hanson LW, Allen BJ, Bourke RM, McCarthy TJ (2001) Papua New Guinea Rural Development Handbook, Australian National University, 362 pp.
- [2] Swartzendruber JF (1993) Papua New Guinea Conservation Needs Assessment, Synopsis Report. The Biodiversity Support Program, Government of Papua New Guinea, pp 34.
- [3] CEPA (2017) Land-Sea Conservation Assessment for Papua New Guinea. Conservation and Environment Protection Authority, PNG, 34pp.
- [4] BirdLife International (2020) Endemic Bird Areas factsheet: Central Papuan mountains.
- [5] UNESCO website (<https://whc.unesco.org/en/tentativelists/5060>).
- [6] Aplin KP, Kale E (2009) The non-volant mammal fauna of the Muller Range, Papua New Guinea. *In*: Richards SJ, Gamui BG (eds.) Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments. University of Chicago Press, 258pp.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities Yes

Civil Society Organizations Yes

Private Sector Entities Yes

If none of the above, please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.

Ninety-seven percent of PNG's land is customarily owned, not private or state property. The land is governed instead by the customs of tribes and clans which use land for hunting, fishing, living and farming. It is illegal to sell communally owned land as private property in PNG and all decisions on land management must be made by consensus of the community managing the land.

The Government of PNG recognizes that LDN can not be achieved without full engagement of various stakeholders, in particular indigenous peoples and local communities. Furthermore, establishing inter-agency biodiversity-working groups, building long-term partnerships with international and regional NGO's, collaboration with the private sector in biodiversity conservation and management programmes are essential for successful achievement of biodiversity goals. CEPA, as lead agency in implementing the CBD and Aichi Biodiversity Targets, has established long-term relations with various stakeholders including government agencies, NGO's, civil society and the private sector.

Through its LDN Voluntary Target Setting Programme, a leverage plan was developed highlighting the key players involved in SLM and related fields. These key players are engaged in the process towards achieving goals and objectives of the plan and in keeping with the national development priorities such as food security, poverty reduction and climate change. The leverage plan identifies sector line agencies, civil society organizations and development partners that are involved in sustainable land management while highlighting leverage opportunities and identifying actions and responsibilities towards LDN.

The proposed project will promote public education and participation as articulated in the draft SLM national action plan so that all stakeholders, including communities, CSOs and NGOs can contribute to the development and implementation of the LDN. Therefore, the proposed interventions will engage a wider community such as the private sector, educational institutions, non-government organizations and other interest groups (churches, schools, learning institutions in those localities, media, etc.). Training packages and awareness materials will be developed with respect to good practices in LDN, sustainable communities and benefits to economic development.

LIST OF POTENTIAL STAKEHOLDERS AND THEIR EXPECTED ROLES

Below is a non-exhaustive list of potential project partners and stakeholders, including government agencies as well as civil society, private sector, academic and community organizations. The relevance to the project and the expected roles/responsibilities of each stakeholder will be determined during the PPG phase and detailed in the stakeholder engagement plan.

Stakeholder	Type	Expected roles/responsibilities
Conservation & Enviro	National Govern	As GEF Operational Focal Point, CEPA ensures the alignm

Environment Protection Authority (CEPA)	Government	Responsible for the management of GEF strategic areas and country priorities as well as performs overall coordination of GEF funded projects. CEPA will be the Executing Agency of the proposed project.
Papua New Guinea Forest Authority (PNGFA)	National Government (with administrative units at provincial and district levels)	Promotes the management and wise utilization of the forest resources of PNG as a renewable asset for the well-being of present and future generations. PNGFA will contribute to the project through data collection on forestry and land use change; compilation of activity data from forestry sector down to field level; disseminating guidelines and latest tools; building capacity of regional advisors and district staffs on improving data accuracy, archiving and documentation for national reporting.
Department of Agriculture and Livestock (DAL)	National Government (with administrative units at provincial and district levels)	Lead government agency responsible for the management of the agriculture sector in PNG. It will contribute to the project by providing technical support for the implementation of SLM practices, facilitating outreach to farmers and landowners, and building capacity for knowledge management in agriculture. DAL will also contribute to the project by exchanging information on national agricultural development programs; compiling activity data from agriculture sector at district level; and disseminating guidelines and latest tools.
Department of Lands and Physical Planning	National Government	DLPP will actively participate in the land use planning ensuring the plans reflect the interests of citizens, individually and collectively.
Climate Change Development Authority (CCDA)	National Government	May participate in coordination among baseline projects, and use of data in the platform for Agriculture, Forestry and Other Land Use (AFOLU).
Research institutes/universities: National Agriculture Research Institute (NARI), University of PNG (UPNG)	Academic	NARI and UPNG both play a role in agriculture research may contribute to the project by providing extension services to facilitate the implementation and monitoring of SLM practices in the project sites.
Center for Environmental Law and Community Rights (CELCOR)	NGO (national)	CELCOR is a not for profit, non-government environmental organisation that works to protect the environmental and customary rights of the people of PNG.

		It may contribute to the project by using its network to act as a focal point for the project and liaise with landowners and communities in the project areas.
Bismark Ramu Group	NGO (national)	The Bismarck Ramu Group (BRG) is a non-governmental organization that works with local communities, groups, or organizations and individuals throughout PNG. It may contribute to the project by using its network to act as a focal point for the project and liaise with landowners and communities in the project areas.
Other civil society organizations (e.g. BirdLife International, The Nature Conservancy, World Wildlife Fund, Wildlife Conservation Society)	NGOs (international)	NGOs will be engaged in the implementation of the project, including the best practice analysis and validation and a appraisal of data. NGOs engaged in forest conservation, land use management, extension services, biodiversity and climate change mitigation and adaptation work in PNG will be invited to participate in the project. The institutional and coordination structure will consider including dissemination strategies for effective data management and reporting processes for CSOs. NGO partners will be consulted and invited to provide feedback on overall monitoring, reporting and transparency arrangements.
FORCERT	Private sector	FORCERT is a local not-for-profit service company in PNG that supports village communities in their sustainable forest management. It may contribute to the project by facilitating the access by farmers and SMEs to financing mechanisms and other incentives.
Mining companies, oil & gas companies and coffee industry	Private Sector	Large-sized enterprises will participate in dialogue and planning to develop and implement offset mechanisms, natural capital valuations, access to finance for small-scale investments in the value chain, etc.
Provincial Council of Women and women's associations (e.g. <i>Southern Highlands Province</i> : Kutubu Foe Women's Cooperative Society; Samberigi Polopa Women's Voice; Sissihia Women in Agriculture	Community organizations in Southern Highlands and Hela Provinces	These organizations promote gender equality and empower women in socio-economic developments to alleviate poverty in the Southern Highlands and Hela Province. They support and promote economic livelihoods for women through agriculture and harness women engaged in farming and selling crops. They organize and carry out programs to promote and protect the interest of women in the Southern

<p>Group; <i>Hela Province</i>: Hela Rural Women's Development Foundation; Hela Women Cooperative Society; Koroba Kopiago District Women's Association)</p>		<p>promote and protect the interest of women in the Southern Highlands province, promoting women's entrepreneurship through agricultural and livestock activities, health care issues, training and skills development.</p> <p>Women's groups will play an active role in the project, starting in the project development phase. They will participate in the development of the gender plan during the PPG phase and will actively participate in capacity building, awareness raising, monitoring and evaluation, etc. during implementation.</p>
<p>Farmers associations and cooperatives</p>	<p>Community organizations in Southern Highlands and Hela Province</p>	<p>Engagement of farming cooperatives in the project areas in terms of training for new approaches and improving market accessibility will be reinforced and strengthened from planning the project planning phase through implementation.</p>
<p>Non-state actors, including households and communities</p>	<p>National, regional, district</p>	<p>97% of PNG's land is customary owned and engagement with the community is imperative when developing projects and infrastructure for country. Several of the proposed interventions will be community-based. The community and landowners will also be active players in public awareness, training and capacity development in sustainable land management.</p>

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

There is a significant imbalance and inequality in PNG's society, favoring the male gender and marginalising the equitable participation of women in all sectors of society. Women comprise approximately 50% of the country's population, but make up only 30% of the work force. Female literacy and school enrolment rates lag significantly behind those for males, accounting for fewer than 40% of the combined gross enrolment ratio for primary, secondary and tertiary education. There are few women in management, leadership and decision-making roles in the workforce.

Greater participation of women must be encouraged at all levels of society. Major education and empowerment interventions are needed to address strong cultural beliefs and value systems that marginalize women and move towards gender equality. PNG's Vision 2050 recognizes the importance of gender equality and strongly recommends that intervention programs to achieve gender equity must be given more attention and be supported with sufficient resources.

The participation of PNG's women in the use of land and natural resources requires special attention. Over 90 percent of women in PNG who deal directly with the environment and natural resources are very active in the semi-formal and subsistence sectors, particularly in selling produce and merchandised goods.

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. SLM and SFM are closely associated with the women whose livelihoods depend on use of land and other natural resources. The attachment of women with subsistence lifestyle and cash crop production is significant for food security and healthy families for the local economy. The participation of women in the informal sector with appropriate facilities and conditions/policy is more beneficial to sustainable development in terms of recognizing the potential of women as partners in utilizing land.

In terms of subsistence farming, the women in PNG are those who get affected the most by adverse conditions and loss of production, and are eager to engage in issues relating to improving land productivity and crop resistance to, for example, drought and frost.[1] Therefore, the participation of women in both sustainable land management and development is paramount.

Through the proposed project, support will be provided to sensitization on gender of agricultural advisory/extension services linked to agricultural cooperative development, establishment of networks of rural women and "women to women" visits, and training of young women entrepreneurs in computer skills, business management and basic accounting. The project will also support public advocacy for rural women's rights. Support to strengthening local value chains with special attention to activities that engage a large number of women, such as processing and marketing, will also be explored.

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 awareness-raising. Introduction of SLM/SFM practices in the project areas will require a gender-sensitive approach assuring that women can be included during each and all steps of the process. In the first year of the project, trainings in gender sensitive SLM and SFM practices will be carried out to promote agroforestry and enhance land productivity will be organized. In the next two years, innovative technologies will be introduced and tested in the project pilot areas with a selected number of female-headed households in order to facilitate adoption of sustainable management practices, rehabilitate ecosystems, improve food security and reduce the vulnerability of women and children in rural areas. Work to create additional capacity development opportunities will be carried out in cooperation with established conservation projects in the Highlands region, for example, the Tree Kangaroo Conservation Program (TKCP) in the YUS Conservation Area in Morobe province, and the Tenkile Conservation Alliance in the Torricelli Mountain Range of Sandaun Province.

In order to mainstream gender equality during the project implementation, an in-depth gender analysis will be conducted at the PPG phase to identify opportunities and analyze the gender context from the concept phase to ensure to include gender indicators, targets and outputs in the logframe. Ways to apply affirmative action to promote the participation of women in decision-making, planning and implementation will be explored. Additionally, to ensure that gender is properly mainstreamed, the project budget will allocate sufficient financial and human resources to the corresponding activities.



Figure 4. A woman sells firewood and cane grass beside the Highlands Highway (A) Road-side sales of casuarina timber are common along the Highlands Highway, and are a useful source of cash income for people in Simbu Province. Casuarina trees are planted in gardens to help restore soil fertility during the fallow period and to reduce soil erosion. The timber is used for fencing, household construction and firewood. The cane grass for sale in the background is used to build walls for houses. **Men sell fresh food at a market near Tari, Southern Highlands Province (B).** This market is unusual because women are generally the main sellers of fresh food at local markets. The total value of fresh food sales is exceeded only by oil palm and Arabica coffee.³⁴

[1] Forman S (2019) Project Information Document-Integrated Safeguards Data Sheet - PNG Agriculture Commercialization and Diversification Project - P166222. The World Bank, Washington, D.C., 29pp.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources; Yes

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

The project will mainstream LDN and natural capital valuation in development sectors resulting in investments in SLM/SFM by private sector developers to prevent further land degradation and promote biodiversity conservation and sustainable use. Private sector engagement is crucial to conserving and enhancing PNG's natural capital. Working together with the private sector, the proposed project will help identify natural capital risks, the reputational benefits of adopting innovative sustainability approaches, and the synergies between natural capital assessment and larger sustainability goals.

The greatest impediment to restoring land and protecting biodiversity in PNG is the lack of sustainable financing mechanisms. The Government of PNG cannot lead the land restoration programme in isolation, therefore, engaging landowners and the private sector is a crucial component of any effort towards LDN. Landowners cannot be expected to give up rights over their land and natural resources without seeing benefits in the form of service delivery or support for economic development and improved livelihood. Therefore, SLM practices must be seen as going hand-in-hand with sharing of the benefits arising from the use of natural resources through agriculture, fisheries, eco-tourism and other production sectors. Furthermore, the mining and oil palm industries are key stakeholders in the LDN endeavor and further collaboration with them will ensure their participation to offset the impacts and prevent further degradation.

Offset mechanisms and tax benefits are among the best practices to offset impact from development projects. Such offset mechanisms will be developed through the proposed project for mobilizing part of the income resulting from resource extraction and investing it in the conservation and sustainable management of forest and productive landscapes. The experiences gained through the PNG LNG Biodiversity Offset program can be used to advance this process. The PNG LNG program is regarded as a "game changer for the country and the economic growth that it drives along with other current and future resource extraction projects must also fund activities to implement the new responsible development strategy that lead to sustainable ecological and biodiversity management. This will require political will, a clear implementation plan and a fully resourced and capable agency to lead a collaborative effort of implementation in partnership with all stakeholders".[1]

[1] PNG's Fifth National Report to the Convention on Biological Diversity.

5. Risks

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

The following risks were identified. Further details on mitigation actions will be provided during the PPG phase.

Risks	Likelihood	Mitigation actions
Lack of community buy-in and land ownership issues.	Medium	<p>Actual implementation of SLM and SFM lies at the community level but there is a lack of understanding about the concept of sustainable development at local levels. Although the situation has seen significant improvements in the recent past, community consultation regarding SLM/SFM must feature among the government's priorities in terms of resource allocation. Basic education and awareness about sustainable development and management including sustainable resource use is important to achieving the objectives of sustainable rural livelihoods. The provincial, local government systems, NGOs, communities and landowners and provincial and local level governments must be integrated and linked to the national system in order for SLM/SFM to be realized.</p> <p>To minimize the possibility of behavioral changes not taking effect and farmers not shifting from traditional techniques to new sustainable approaches, the project will have a strong component of awareness raising and communication. It will include consultations with communities and landowners during the project design phase and throughout implementation. It will ensure that the communities' input is taken onboard through open dialogue and advocating best practices using examples from REDD+, Protected Areas Network and other initiatives.</p>
Lack of coordination among government agencies and stakeholders.	Medium	SLM must transcend bureaucratic, administrative, cultural, legal and political boundaries. The institutional framework through which SLM is designed and implemented should be made clear and transparent to all stakeholders. Core SLM functions including implementation, monitoring, evaluating, and coordination and reporting will transcend from decision centers to the action fields. This requires developing and maintaining effective inter-agency linkages, partnership and colla

		<p>...maintaining effective inter-agency linkages, partnership and collaboration.</p> <p>The project will promote more networking and harmonization of national legal and policy framework across sectors to address land use issues. Communication and information-sharing will be prioritized throughout the project, including its development phase, among various government channels (i.e. information sessions and briefs for Central Agencies Coordination Committee, parliamentarians / cabinet, etc.) and stakeholders.</p>
Conflict of interest between logging and restoration and the mining, oil palm sectors and other development initiatives.	Medium	<p>The lack of efficient financing mechanisms is one of the greatest impediments to the sustainable management of productive landscapes. The mining and oil palm industries are key stakeholders in the LDN endeavor and working collaborative with these sectors will help offset their impacts and prevent further degradation. Other developments proposed will be required to undergo vigorous regulatory processes.</p> <p>The project will mainstream LDN in development sectors resulting in investments to prevent further land degradation. Financial mechanisms will be developed, including offsets for mobilizing part of the income resulting from resource extraction and investing it in the conservation and sustainable management of productive landscapes.</p>
Seasonal cyclones, drought, floods and other extreme weather and climate events	Medium	<p>Extreme weather events are not uncommon in PNG.</p> <p>Contingency plans will be put in place and activities will be planned accordingly to minimize adverse impacts on the project deliverables. SLM practices will be tailored to minimize the effects in drought- and flood-prone areas due to irregular and increased rainfall. The project will collaborate with PNG National Weather Service to integrate drought contingency plans and early warning systems.</p> <p>Climate risk mitigation measures will be further elaborated during the project development for scenarios of irregular and increased rainfall.</p>
Lack of political support due to change / turnover of political leaders and government staff	Low	<p>The government's continued commitment to supporting sustainable development in general and SLM in particular is imperative. The ability of the political leadership to endorse sustainable land management requires realignment of resources towards SLM. This includes providing political leadership at the highest decision-making forums and soliciting resources support. Stability within the key departments and agencies advocating and managing the Multilateral Environment</p>

		<p>Agreements (MEAs), especially the UNCCD is paramount in ensuring continuity, policy coherence and securing resources for implementing the Convention. Regular updates on the projects to be provided through the administration hierarchy to the Ministers/Cabinet.</p> <p>During the project design period, project management structure and mechanisms will be reviewed in detail to ensure an effective project implementation structure and governance mechanism. Lessons learned will also be examined through past and ongoing initiatives.</p>
<p>Limited capacity at national level, which could limit success of project implementation.</p>	<p>Low</p>	<p>SLM policies need to be mainstreamed and implemented through effective administrative structures. The administrative capacity of agencies responsible to facilitate development should be properly resourced and be transparent for an effective implementation. International treaties on the environment and sustainable development can be achieved through properly instituted agencies and administrative support units.</p> <p>The project will include a capacity enhancement program based on an assessment to be conducted during the project preparation period to identify required and useful skills, recognise which of these skills are available in the country, and methods for acquiring those skills currently lacking. The project will allocate sufficient resources to ensure participation of key technical staff. Technical partnerships and support opportunities with regional technical agencies such as the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Pacific Community (SPC) will also be explored.</p>

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

Coordination between national, provincial, district and local level governments are crucial to providing effective policy and institutional support for achieving LDN targets.

The proposed project will be executed by the Conservation and Environment Protection Authority (CEPA), which acts as the Focal Point for UNCCD and CBD. Among its responsibilities in the project, CEPA will oversee the project's implementation, monitoring and evaluation, and reporting. Establishment of project management unit with staff to coordinate the project(s) over the duration of the projects.

Adequate funding will be allocated to ensure continued collaboration between CEPA and the other government departments and agencies, and to develop adequate synergies between the proposed project and ongoing programs. Through the recently established LDN Working Group, coordination will take place with a number of the key national agencies that will act as project partners, including the Department of Lands and Physical Planning (DLPP), Department of Agriculture and Livestock (DAL) and PNG Forest Authority (PNGFA). These partners will form a body in the form of Project Steering Committee, which will play an advisory role.

The project will also promote harmonization of sectoral legal and policy frameworks across state agencies to drive LDN across sectors and provincial borders. As such, CEPA will promote coordination to include relevant agencies beyond the project partners, such as with the National Agriculture and Quarantine Inspection Authority (NAQIA) with a view to better controlling illegal introduction of alien invasive species and export of wildlife across national borders.

Close coordination will take place between the proposed project and two additional related projects submitted under GEF 7: *"Enabling sustainable production landscapes in Eastern Highlands and Western Highlands Provinces for Biodiversity, Human Livelihoods and Well-being"*^[1] and *"Establishing System for Sustainable Integrated Land-use Planning Across New Britain Island in Papua New Guinea"* (GEF ID 10239; under FOLUR Impact Programme). Cooperation will focus on increasing efficiency, avoiding duplications and maximizing the use of funds among the three projects by coordinating the work plans and budget, as appropriate, during the design and through implementation. Similar activities under the different projects will be carried out jointly, such as capacity building at national level, efforts to mainstream LDN and biodiversity into national policies, exchanging lessons learnt and using joint (or inter-operational) databases for knowledge management.

Further coordination will also take place with the GEF-funded projects *"Sustainable Financing of Papua New Guinea's Protected Area Network"* and *"Building National and Regional Capacity to Implement Multilateral Environmental Agreements by Strengthening Planning and the State of Environmental Assessment and Reporting in the Pacific"*. The proposed project will also benefit from coordination in capacity development under the project *"Ratification and Implementation of the Nagoya Protocol in Countries of the Pacific Region"*, and the regional component of project *"Strengthening national and regional capacities to reduce the impact of Invasive Alien Species on globally significant biodiversity in the Pacific"*.

[1] PIF under review by the GEF Secretariat at the time of writing the present document.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

Supported by its Vision 2050, Development Strategic Plan (2010-2030) and the Medium-Term Development Plan III (2018-2022), the Government of PNG is committed to advancing interventions on sustainable development which are consistent with a number of regional and international frameworks, and to fulfilling its responsibility to various conventions and agreements. PNG is a Party to the three Rio Conventions: United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD) and the Convention on Biological Diversity (CBD).

The *PNG Development Strategic Plan* (2010-2030) emphasizes environmental sustainability and further articulates a 20-year plan to reach the Millennium Development Goals and targets for the environment. Within the plan the primary goal is to promote a sustainable environment, but recent economic development initiatives have posed new challenges to this strategy.

The *National Sustainable Land Use Policy* is currently being developed that recognizes the threats of climate change to sustainable land use, environment and biodiversity in PNG and highlights the importance of incorporating climate and disaster risk concerns in the land using planning for risk reduction and sustainable development. The Policy will be implemented through a Strategic Land Use Plan (SLUP) that will guide physical development throughout the country. To achieve the goals of sustainable land use practices and balancing rural-urban development, whilst optimizing the use of the countries finite land resources. Within this policy there is a specific section on Environment and Conservation where conservation areas are identified under the three broad categories of land use. It recognised however, that the existing legislation on the protection of conservation areas needs to be strengthened. The three broad categories, land use zones, that the National Sustainable land Use Policy has identified are for development promotion, sustainable rural development, and conservation.

The *National Biodiversity Strategic Action Plan* for PNG is seen as the instrument to protect rural areas from the impacts of developments on landscape quality, conservation and enhancement of wildlife species and biological diversity. Therefore, there is a need for up-to-date information on the environment characteristics and potential impacts at the landscape level to ensure development is guided by principles of sustainability

The Ministry of Environment and Conservation and Climate Change, through the Conservation and Environment Protection Authority (CEPA), serves as the National Focal Point for the CBD[1] and UNCCD[2]. CEPA also leads the implementation of the Aichi Biodiversity Targets and the 2050 Vision for Biodiversity, as well as the 2030 the LDN vision associated with Sustainable Development Goal 15 and its target 15.3, which translates into a comprehensive set of targets and associated measures that can serve as an accelerator to achieve a land degradation neutral world by 2030.

PNG first joined the UNCCD LDN Target Setting Programme in 2018, and is committed to its implementation as a way forward to achieving SDGs goals towards effective management of the land which will support the country plans for sustainable land management as land is a strategic asset as identified in its responsible sustainable development policy (STaRS). As part of the LDN voluntary target setting, PNG has set an ambitious target of restoring 7.73 million hectares of degraded land and will be working with stakeholders in the country to meet the target by 2030.

A number of biodiversity and SLM/LDN initiatives from key sectors have been initiated through co-operation of international development partners and national government with all projects impacting positively on the biodiversity and LDN visions and promoting related SDGs. The proposed project is fully consistent with PNG's national priorities for sustainable development and environmental sustainability and its efforts to address the drivers and impacts of

land degradation towards land degradation neutrality.

In 2018, the draft ***National Sustainable Land Use Policy*** was developed making reference to the CBD, UNFCCC and UNCCD. The draft policy highlights land use planning and has the potential to contribute meaningfully in achieving the objectives of the three conventions. The policy remains at a draft stage and consultations with stakeholders in the public and private sector as well as the other government departments and agencies are continuing with a view to finalizing the policy for adoption.

Other key legislation, policies and strategies include:

- (a) National REDD+ Strategy (2017 – 2027) focused on land use planning and financial incentives for land holders;
- (b) National Agriculture Sector Plan (2019 – 2029) which is in the process of being developed and will supersede the National Agriculture Development Plan (2007 – 2016);
- (c) Land Registration (Amendment) Act 2009 relates to the amendment and confirmation of what the land is intended for;
- (d) Incorporated Land Group (Amendment) Act 2009 ensures the rights and benefits of landowners;
- (e) National Food Security Policy (2016 – 2026) which works to ensure food security in conjunction with other policy measures within a sustainable development policy framework;
- (f) National Climate Compatible Development Management Policy endorsed in 2013 includes a national-level Carbon Neutrality goal of 50 percent by 2030 and 100 percent by 2050;
- (g) Climate Change (Management) Act 2015 sets out the institutional arrangements for climate change management and associated responsibilities of national authorities and institutions; and
- (h) Agriculture Smart Policy involves assisting farmers to switch to commercial operations and to make informed decisions.

Other policies for tourism development; water, sanitation and hygiene (WaSH); provincial and local level government; forestry, mining, oil and gas, and the environment are available and add value to the activities that will promote LDN at the national, provincial and district levels in PNG.

[1] To date, PNG has submitted five National Reports to the CBD, the last one covering the period up to 2019. In 2007, PNG also submitted its National Biodiversity Strategy and Action Plan, and its Review of the Implementation of the Protected Areas Work Programme (available at <https://www.cbd.int/reports>).

[2] PNG has submitted three National Reports to the UNCCD, the last one covered the period up to 2006. A National Action Programme (NAP) was drafted during the Capacity Building for Sustainable Land Management (SLM) project, which ran from 2007 to 2013, but this was not finalized and remains as a draft (available at https://png-data.sprep.org/system/files/National_Action_Programme_Main%20Text_Draft%282%29_June%202011%2015_August_2017.pdf).

8. Knowledge Management

Outline the Knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The project will have an immediate impact on the project sites in the Southern Highlands and Hela provinces, but its ultimate impact will be nationwide through replication through dissemination of the lessons and knowledge gained. In order to ensure this, the project will develop and implement an efficient knowledge management system through activities under Outcome 3.

During the PPG phase, an overall knowledge management plan will be generated and stocktaking exercise of previous or existing GEF projects and projects funded other donors to identify existing opportunities to incorporate learning, knowledge products, assessment, studies, etc. By reviewing existing data and results from previous experience, the most and least successful approaches will be identified and replicating past problems will be avoided. Opportunities for sharing of experiences with successful initiatives in PNG, such as the Tree Kangaroo Conservation Program in the YUS Conservation Area and the Tenkile Conservation Alliance in the Torricelli Mountain Range, will also be explored during the PPG phase. Furthermore, an in-depth gender analysis to be conducted during the PPG phase will examine the gender context of target groups and project beneficiaries in order to develop knowledge management tools, which fully take into account contextual factors, to maximize reaching out to the target audience and project outcomes.

To document and share knowledge generated by this project and exchange knowledge with other similar projects in PNG that are being implemented at the same time, the project will set up a webpage, to be maintained by CEPA, to provide access to government agencies, NGOs, communities and other stakeholders. A database and monitoring system for LDN and NCA will be also established as part of an existing platform (for example, the CEPA's PNG Data Portal^[1] or PNG REDD+ web portal) and will become operational within the life of the project to communicate the results of the project. Exchange with other initiatives, such as the National Forest Inventory executed by PNGFA and the national forest monitoring system on the CCDA website, will also provide valuable information to the project.

[1] Available at <https://png-data.sprep.org/>.

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And Gef Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Mr. Gunther Joku	Managing Director	Conservation and Environment Protection Authority (CEPA)	3/11/2020

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

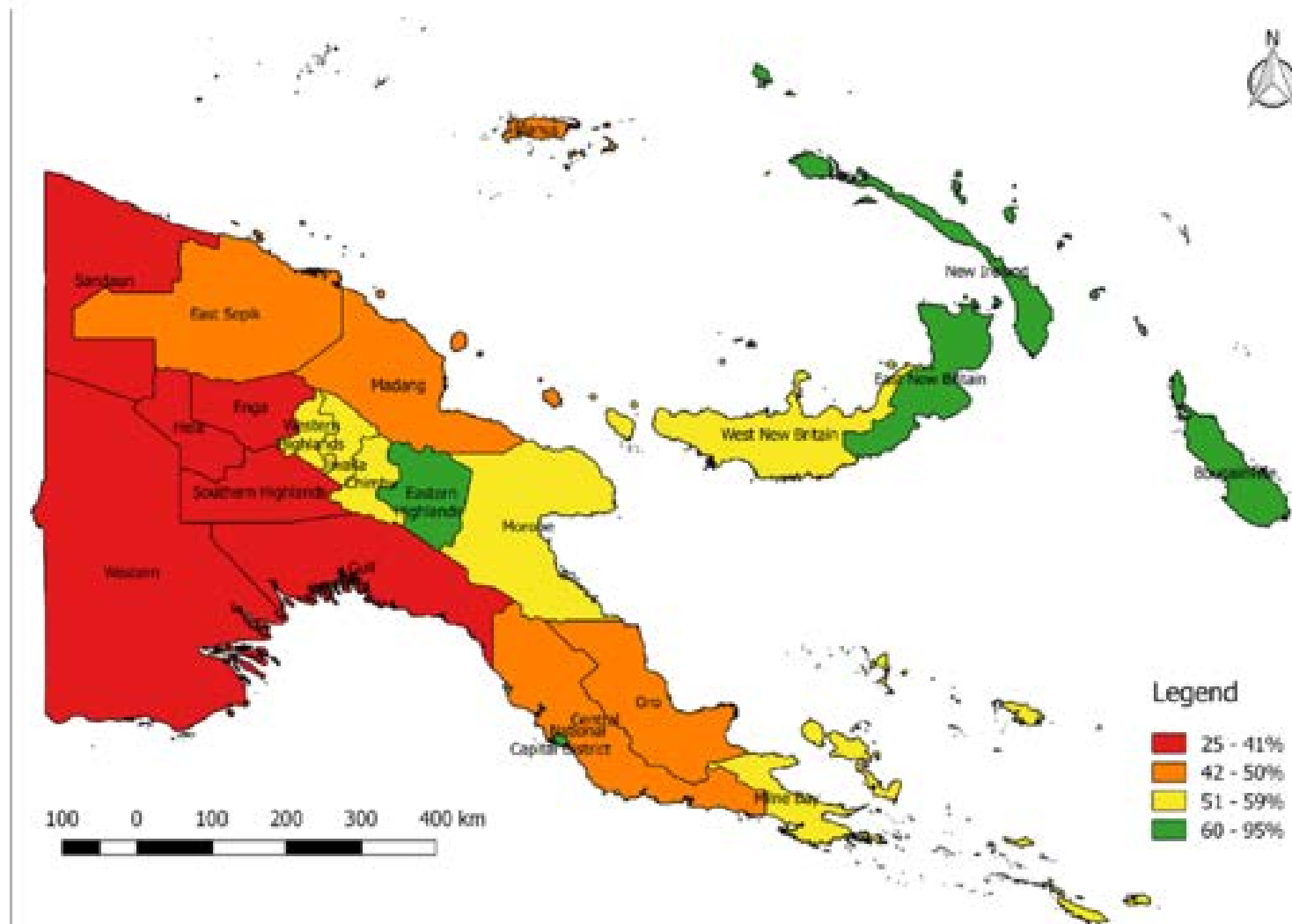


Figure 2: Ranking of socioeconomic development by province. The legend displays red, orange, yellow and green colours by provinces according to the level of development, with the more developed provinces ranking higher than less developed provinces.²⁶

