



MURUNG RAYA

2015



Murung Raya
Central Kalimantan, Indonesia

Murung Raya
Green Growth Strategy

Produced by:

District Government of Murung Raya, Provincial Government of Central Kalimantan, Ministry of National Development Planning (BAPPENAS) and the Global Green Growth Institute (GGGI).

Acknowledgements to:

District Government of Murung Raya

Nyarutono Tunjan, Beng Petony, Markudius Dani, Regita, Asnawiyah (Secretariat of Murung Raya District Government), Pahala Budiawan, Moh. Arief Hidayat, Negu, Stardian Tingan, Syahrial Pasaribu, Leni Mentari Dewi (District Development Planning Agency), Ganefo L. Amin (District Environmental Agency), I Wayan Jati, Sri Karyawati (District Plantation Agency), Reyzal Samat, Humerus Elmar (District Forestry Agency), Suhardi Buhoy, Irwan Ritoyan, Putu Suranta, Friadi Irawan (District Mining and Energy Agency), Kariadi (District Industry, Trade and Cooperatives Agency), Richard F. Lundju (District Public Works Agency).

GGGI team

Chris Stephens, Benjamin Tular, Hendrik Segah, Anna van Paddenburg, Timothy Jessup (all GGGI), Jeffrey Chatellier, Jeni Pareira, Pisca Ayuning Tias, Prasetya Mahardhitama, Rizki Permana, and Santosa Yulianto (all SNV/Forest Carbon).

Published in:

May 2015

For further information please contact:

District Government of Murung Raya

A Jl. Letjen Soeprapto No. 01 Puruk Cahu 73911
Central Kalimantan Province, Indonesia
P +62-528-31001 / +62-528-31647
W www.kabmurungraya.go.id

Provincial Government of Central Kalimantan and
GGGI Joint Secretariat

A Kantor BAPPEDA Provinsi Kalimantan Tengah
Jl. Diponegoro No. 60, Palangka Raya 73111
Central Kalimantan Province, Indonesia
P +62-536-3221715 / +62-536-3221645
W www.gggi.org

Contents

03	Preface Foreword
04	Chapter 1 Introduction
06	Chapter 2 Green growth vision
08	Chapter 3 Green growth sectors
10	Chapter 4 District overview
14	Chapter 5 Green growth sector details
14	Forestry
26	Mining
38	Plantations
52	Energy
60	Cross-cutting
64	Chapter 6 Next steps
67	Chapter 7 Annexes
67	Logical framework
73	Financial information
76	Appendix Citations
76	Footnotes
79	References



Foreword



© Hendrik Segah / GGGI



“

Green growth is a pathway that allows Murung Raya to balance economic growth and environmental sustainability, and will ultimately deliver prosperity for our people.

”

Murung Raya has made significant progress since it became a district in 2002. Although our location at the very heart of Borneo presents development challenges, we are on track to becoming a self-reliant, prosperous, democratic and peaceful district.

Achieving this goal requires us to sustainably manage the valuable natural assets with which we are blessed, including the minerals under our soil, the water in our rivers, the tropical forests that cover our land, and the animals, birds and insects that live all around us. These stocks of natural capital underpin both our economic activities, our society and our culture. Maximizing the potential of these natural resources for the benefit of the people of Murung Raya is at the center of my green growth vision.

This goal is reflected in the priorities of the district’s medium-term development plan (2013 – 2018). This document aims to reduce poverty, address income inequality and create jobs, especially in isolated and remote areas, while improving our environmental performance. Achieving these targets through the simultaneous pursuit of economic development and environmental protection is fully aligned with the ‘Murung Raya Emas 2030’ plan.

Over the past year, our district government has been working together with the Global Green Growth Institute (GGGI), as part of the GoI-GGGI Green

Growth Program, to conceptualize and develop an operational green growth strategy. This document outlines a clear set of actions that will drive future growth of our key economic sectors and ensure that Murung Raya’s natural resources are preserved and enhanced for future generations.

Achieving green growth will require the revitalization of our land-based sectors, especially forestry and plantations, to create high-value, high-quality products. Our mineral reserves must be responsibly utilized by avoiding negative social and environmental impacts. We must maximize our local sustainable energy solutions to increase our communities’ access to electricity. Finally, we need to create an attractive investment climate and recognize the value of our natural capital in our policy and investment decisions.

This strategy will serve as an internal reference document for the district government as we develop future development and work plans, and allocate our financial resources. In addition, this strategy will hopefully attract interest from donors, NGOs and the private sector to invest in creating a prosperous and sustainable district.

Green growth is a pathway that allows Murung Raya to balance economic growth and environmental sustainability, and will ultimately deliver prosperity for our people.

Yours truly,

— Drs. PERDIE, MA District Head of Murung Raya

01 Introduction

OVERVIEW

Each intervention aims to support efficient, productive economic activity, job creation, social inclusion, while minimizing environmental risks.

Murung Raya's Green Growth Strategy (from now on referred to as the 'strategy') outlines and explores the opportunity for the district to shift to a new economic growth pathway that delivers prosperity while simultaneously reducing poverty and achieving environmental sustainability. The strategy identifies and outlines green growth interventions across four of Murung Raya's key sectors: forestry, mining, plantations and energy. Each intervention aims to support efficient, productive economic activity, job creation, social inclusion, while minimizing environmental risks. The strategy provides a rationale for why each sector is important for green growth and then describes the key interventions within each sector that will support sustainable economic development. The potential

locations for each intervention are identified, where possible, and a list of key stakeholders for each of the sectors are provided. A range of cross-cutting interventions are also identified, which support sustainable economic activities across all sectors. This strategy covers a three year period that is aligned with the current administration's time in office and a high-level timeline is provided for the interventions within each sector. Annex 1 includes a logical framework for the strategy, including the goal, outcome, outputs, actions and specific, measurable, assignable, realistic and time-related (SMART) indicators at each level, while Annex 2 provides an overview of the finances of the Murung Raya district government.

The five desired outcomes of green growth

These outcomes were defined by the Government of Indonesia - GGGI Green Growth Program (2013)

01



Sustained economic growth

02



Healthy and productive ecosystems

03



Inclusive and equitable growth

04



Social, economic and environmental resilience

05



Greenhouse gas emission reduction

Background

The objective of the GoI-GGGI Green Growth Program is to promote green growth in Indonesia that recognizes the value of natural capital, improves resilience, builds local economies and is inclusive and equitable.

This strategy is the result of a partnership between the Murung Raya district government and the Global Green Growth Institute (GGGI), an international organization with its headquarters in Seoul, Republic of Korea. This work has been carried out as part of the Government of Indonesia's (GoI) collaboration with GGGI, known as the GoI-GGGI Green Growth Program. The objective of this program is to promote green growth in Indonesia that recognizes the value of natural capital, improves resilience, builds local economies and is inclusive and equitable. Following extensive stakeholder engagement, the five desired outcomes of green growth were identified as (i) sustained economic growth, (ii) healthy and productive ecosystems, (iii) inclusive and equitable growth, (iv)

social, economic and environmental resilience, and (v) greenhouse gas emission reductions.

In November 2013 the Governor of Central Kalimantan, one of the program's pilot provinces, selected Murung Raya and Pulang Pisau districts for initial support from GGGI. The collaboration between Murung Raya and GGGI was launched in February 2014 when the first district-level Green Growth Visioning Workshop took place in Puruk Cahu. Murung Raya's Regional Development Planning Agency (*Badan Perencanaan Pembangunan Daerah*, BAPPEDA) has lead the cooperation with GGGI, while also coordinating the engagement with the relevant district government agencies (*Satuan Kerja Perangkat Daerah*, SKPD) and other stakeholders.

Next steps

Implementation of this strategy can be achieved in two ways. Firstly, the interventions and actions can be included in the district's future planning documents and budgets. The strategy has been written to be aligned with Murung Raya's existing development goals and this 'mainstreaming' work has already started. Secondly, it is hoped that this strategy will generate interest from donors and investors, who can finance the identified programs and activities. To achieve this the strategy has been developed using a 'logical framework' approach with a green growth vision (or goal), sector-specific outcomes, an output for each intervention and then an underlying set of actions. As a result, the strategy's structure should facilitate the development of operational program proposals that can be submitted to both international and national funds that support green growth in the context of sustainable development. The final chapter of the strategy provides more details of these next steps.



02 Green growth vision

06

Murung Raya’s green growth vision

“
A sustainable economy that delivers prosperity equitably to the people of Murung Raya while minimizing greenhouse gas emissions and maintaining our natural capital stocks for future generations.
”

— Drs. Perdie, MA
Bupati, Murung Raya district

Context

This green growth vision defines the overall goal of this strategy and is aligned with the objectives of the district's medium-term development plan (RPJMD) for 2013 – 2018. This strategy is focused on four sectors that are central to the district's economy and environment: forestry, mining, plantations and energy. The achievement of green growth in Murung Raya will depend on putting these sectors onto a path of greater sustainability, while improving governance and valuing natural capital across all sectors.

Economic development in Murung Raya is no simple matter. Positioned at the very center of the island of Borneo, the district is the largest and most remote in Central Kalimantan. It is also sparsely populated, landlocked and mountainous, with abundant untapped natural resources, including coal and gold. Murung Raya district has the largest area under forest in the province, most of which is still in a relatively healthy state, storing millions of tons of carbon and hosting an incredible array of biological diversity.

The obstacles facing Murung Raya's economic development, primarily its terrain and remoteness, also are the basis for its enormous potential to deliver green growth. To date the district has generally avoided the rapid, short-term exploitation, seen in other parts of Kalimantan, and it is still host to numerous pristine ecosystems of immense natural beauty. Murung Raya's ecological resources, its natural capital, play a critical role in underpinning its own economy, along with those of downstream areas. Integrating the value of this natural capital into policy and investment decisions will ensure that the district achieves sustained economic development.

With significant new infrastructure links being proposed, Murung Raya is on the cusp of greater connectivity and economic opportunity. As a result, the next few years will define the district's pathway to prosperity. Achieving the vision of Murung Raya's medium-term development plan, "the realization of a prosperous community that is independent, dignified and based on rural development" requires a strategy that avoids 'business as usual' growth where unsustainable exploitation leads to social conflict and environmental damage. Green growth offers an alternative approach based on efficient and equitable land-based sectors that produce high-quality, high-value products, while utilizing the district's resources through appropriate technology and planning systems to ensure the ongoing provision of valuable ecosystem services.

These interventions and the underlying actions include both new solutions for overcoming the challenges related to operating in the district and also build on the existing efforts of the government, private sector and broader society to achieve sustainable development in Murung Raya. In addition, this strategy proposes actions that are aligned with Central Kalimantan's regional action plan for the reduction of GHG emissions (*Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca*, RAD-GRK) and the regional strategy (*Strategi Daerah*, STRADA) to reduce emissions from deforestation and forest degradation (REDD+), two key documents that guide the province's path to sustainable development.



© Hendrik Segah / GGGI

Measuring green growth

It is vital that the Murung Raya government establishes a robust monitoring system to assess the district's performance towards its green growth vision. This requires a measurement framework that captures the comprehensive and integrated nature of the five desired outcomes of green growth, and a set of performance indicators to track the district's progress.

Table 1 outlines a 'dashboard' of 12 districtwide green growth indicators for Murung Raya. In addition, each sector chapter in this strategy includes a set of specific indicators to measure the green growth performance of that sector. Annex 1 includes a definition of each of these 12 districtwide indicators and the strategy's logical framework, which includes indicators for each sector, intervention and action.



Table 1 — A dashboard of green growth performance indicators for Murung Raya

No.	Indicator	Desired GG outcome
1	Annual GDP growth rate (%)	Sustained economic growth
2	GDP per capita (IDR)	
3	Gross capital formation (IDR)	
4	Employment/population ratio (%)	Inclusive and equitable growth
5	Population below the poverty line (%)	
6	GINI coefficient	
7	Greenhouse gas (GHG) emissions per capita (tons of CO ₂ e)	GHG emissions reduction
8	Net annual change in above and below ground carbon stocks (tons of CO ₂ e)	
9	High Conservation Value Area (HVCA) (ha)	Healthy and productive ecosystems
10	Environmental Quality Index (EQI)	
11	Fiscal capital index	Social, economic and environmental resilience
12	Household Vulnerability Index (HVI)	

07

03 Green growth sectors

Green growth vision

A sustainable economy that delivers prosperity to the people of Murung Raya while minimizing greenhouse gas emissions and maintaining our natural capital stocks for future generations

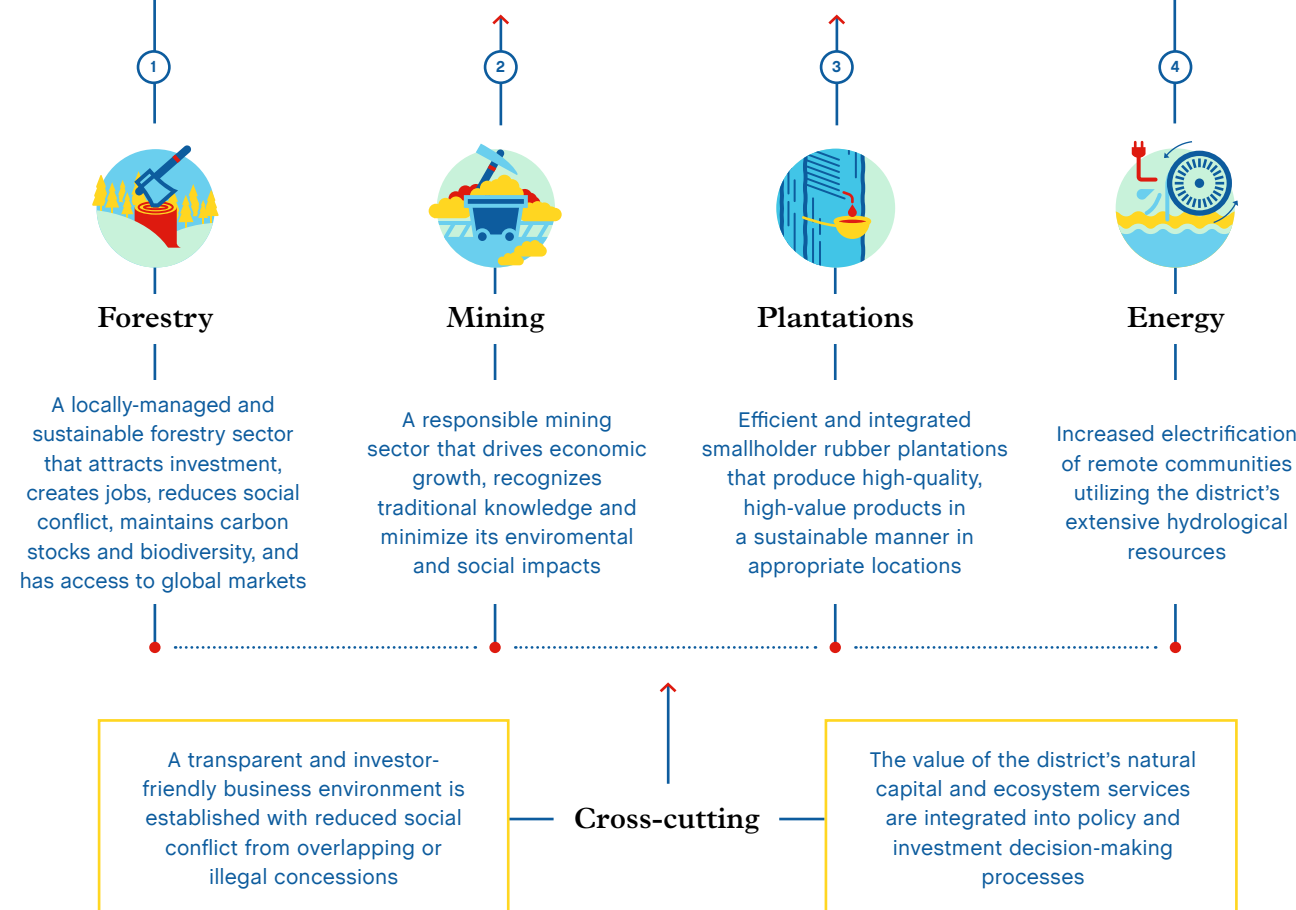
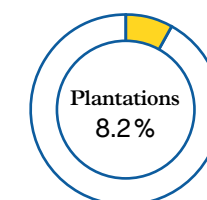
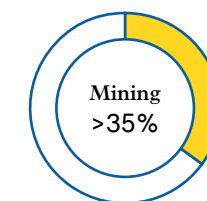
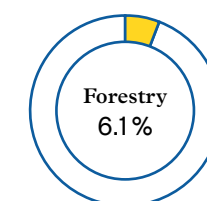


Figure 1 — Murung Raya's Green Growth Vision and the sector-specific and cross-cutting outcomes

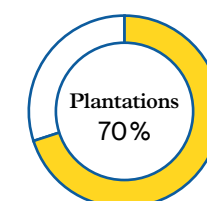
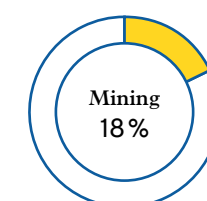
This strategy focuses on four key sectors that are central for achieving green growth in Murung Raya due to their contribution to the economy and impact on the environment.

This strategy focuses on four key sectors that are central for achieving green growth in Murung Raya due to their contribution to the economy and impact on the environment. In addition, a series of cross-cutting interventions are identified that are fundamental to the sustainable and equitable economic development of the district. Activities within the forestry, mining, plantations and energy sectors all have the potential to be profitable and create livelihoods in the district. However, irresponsible actions in each sector can also cause social conflict and damage the environment, thus harming Murung Raya's long-term prosperity. As a result, each intervention in this strategy must be carefully planned to strengthen the economic performance of the sector, while minimizing the negative social and environmental impacts. Below is a high-level introduction to the sectoral and cross-cutting interventions in this strategy, and Figure 1 outlines the desired green growth outcome of each of the sectors and the desired cross-cutting outcome

Sector's contribution to the district's GDP



Sector's contribution to the district's overall employment



1

Forestry

Murung Raya is covered by significant areas of lowland and sub-mountainous forests that contain a wealth of biodiversity and a variety of ecosystems, as well as 14 registered timber concessions. Until recently forestry was the dominant economic sector in the district. However, timber operations have reduced considerably and the sector now only contributes 6.1% of the district's GDP. While the conservation forest and nature reserves in the northern half of the district are relatively well-managed, the forestry sector interventions focus in the south of Murung Raya, where there is greater pressure on the forests due to the higher population density and increased economic activity. These interventions aim to revitalize the district's forestry sector by resolving land tenure issues, while creating jobs and increasing income for local communities. As a result, the interventions focus on strengthening governance and adopting community-based forest management practices, operationalizing a production forest management unit (*Kesatuan Pengelolaan Hutan Produksi, KPH-P*) and shifting the commercial forest sector toward certification.

3

Plantations

Murung Raya's main land-based commodity is rubber and in 2012 it accounted for nearly 9% of the district's GDP and provided 70% of the overall employment. Considering the district government's ambition to prioritize rubber production, this strategy's interventions in the plantations sector focus exclusively on this commodity. The Murung Raya government is committed to both increasing the productivity of smallholder rubber farmers and expanding the area under rubber cultivation. However, efforts to further develop rubber production in Murung Raya are threatened by a recent price drop that has decreased interest in cultivating rubber. This downturn provides an opportunity to reinvigorate the sector by supporting the sustainable expansion of rubber plantations, adopting best management practices to increase productivity utilizing an inclusive business approach to dampen rubber price volatility.

Cross-Cutting

Achieving green growth requires a number of cross-cutting interventions that support productive and sustainable activities in all economic sectors. Green growth needs private sector investment and good governance is at the core of an attractive business environment. In particular, social conflict is seen as a significant risk by potential investors, so must be minimized. Therefore, an intervention on improving the licensing systems across all sectors is essential for green growth. Equally, a systematic approach to integrating the value of the district's natural capital into policy and investment decision-making processes is fundamental to deliver economic growth that is compatible with environmental sustainability. This can be achieved by carrying out a High Conservation Value (HCV) assessment, establishing a community-based Payment for Ecosystem Services (PES) scheme and conducting a strategic environmental impact assessment of the district's spatial plan.

2

Mining

Murung Raya hosts a potentially valuable geological endowment, particularly coal and gold, and commercial mining accounts for more than 35% of GDP and 18% of employment. As a result, the district government believes that mining is a priority sector for future economic development but also recognizes the need to minimize the social conflict and environmental damage that can be caused by the sector. To foster green growth, the infrastructure development associated with mining, especially the road networks, need to be optimized to minimize deforestation, especially of ecologically important areas. Small-scale mining provides an important secondary income for much of the population but causes significant environmental damage and heightened social risk. Therefore, it is important to incentivize health, safety, environmental and social management amongst the operators of such community-run mines, and facilitate the legal creation of community mining areas. Finally, ensuring that the regulation on land reclamation post-exploitation is fairly and evenly enforced will ensure long-term land use plans for ex-mine sites are developed and implemented to deliver benefits to local communities.

4

Energy

Only a third of the households in Murung Raya have access to electricity from the state electricity company and even the areas with electricity access experience frequent blackouts. The district government recognizes that this is a major impediment to development, so this strategy is focused on increasing electrification, especially in rural areas. Expanding the grid to remote parts of the district is likely to take decades, so the priority is on maximizing the district's own resources to create sustainable, off-grid energy solutions. In particular, Murung Raya has an extensive network of rivers that provide considerable potential for micro-hydro facilities to generate electricity for rural communities. At the moment, there are limited other renewable energy options in Murung Raya, so the energy intervention focuses on repairing the existing micro-hydro facilities and constructing new plants in appropriate locations, in line with the district government's ambitions.



04 District overview

Biophysical environment

Murung Raya district, part of Indonesia's Central Kalimantan province, lies at the very center of the island of Borneo. As Central Kalimantan's largest and northernmost district, Murung Raya borders West and East Kalimantan provinces to the north and North Barito, Kapuas and Gunung Mas districts, all in Central Kalimantan, to the south. Murung Raya covers approximately 2.37 million hectares (ha), three quarters the size of Belgium, and comprises 10 sub-districts, 115 villages and nine hamlets.¹ The Barito River, Borneo's third longest at roughly 900 km, originates mostly in Murung Raya before flowing south to the Java Sea. The district is generally hilly, with altitudes ranging from 123 m to 1,891 meter above sea level², and northern Murung Raya encompasses part of the Muller-Schwaner Mountain Range. Temperatures range from 21°C to 35°C with little seasonal variation.

Straddling the equator, Murung Raya is primarily covered in tropical lowland forest and sub-mountainous highland forest. The district lost 78,706 ha of forest cover between 2000 and 2012 at an average of 6,559 ha/year, equivalent to less than 0.3% of the district's total area.³ This deforestation primarily took place in the southern half of the district (see Figure 2) as a result of plantation expansion and development of the district's road network. The district is home to more than 350 bird species, 150 reptile species and 15,000 flowering plant species, many of which do not exist anywhere else on Earth. More than 600 new animal and plant species have been discovered in Murung Raya since 1995, indicating just how much remains to be learned about the area.⁴

Straddling the equator, Murung Raya is primarily covered in tropical lowland forest and sub-mountainous highland forest.

10

Figure 2 — Forest loss in Murung Raya (2000-2012)

- 2001-2004
- 2005-2008
- 2009-2012

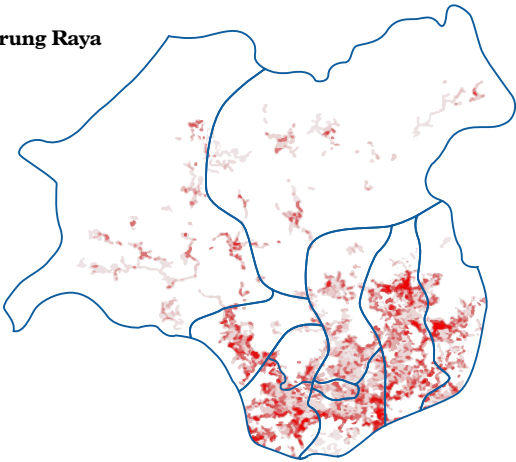


Figure 3 — Graphic of forest cover loss in Murung Raya district in 2001-20012

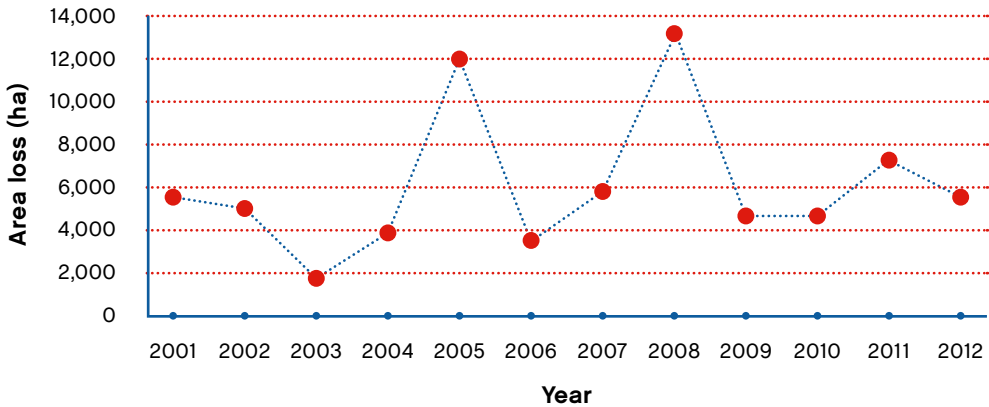
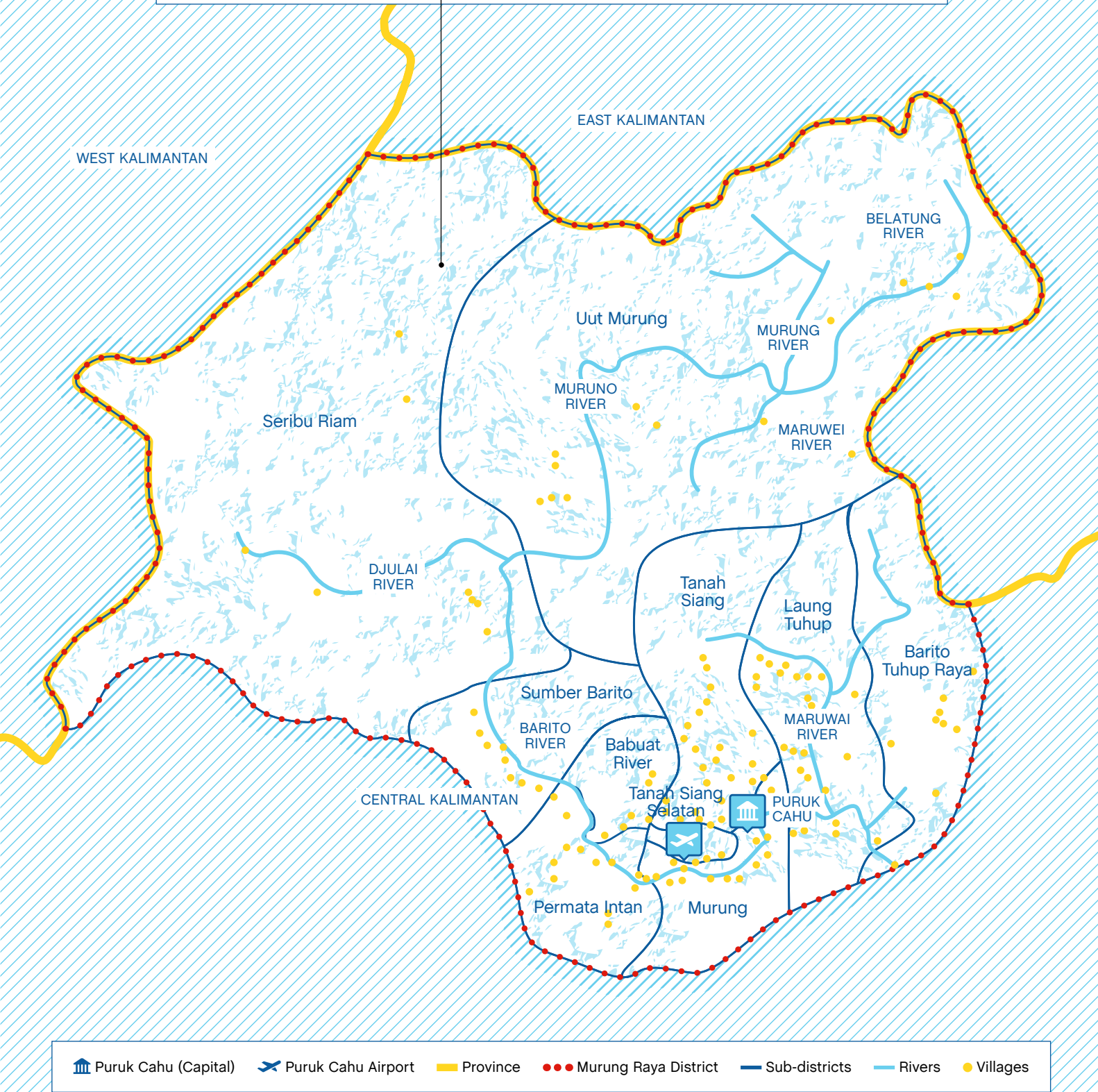


Figure 4
Murung Raya district



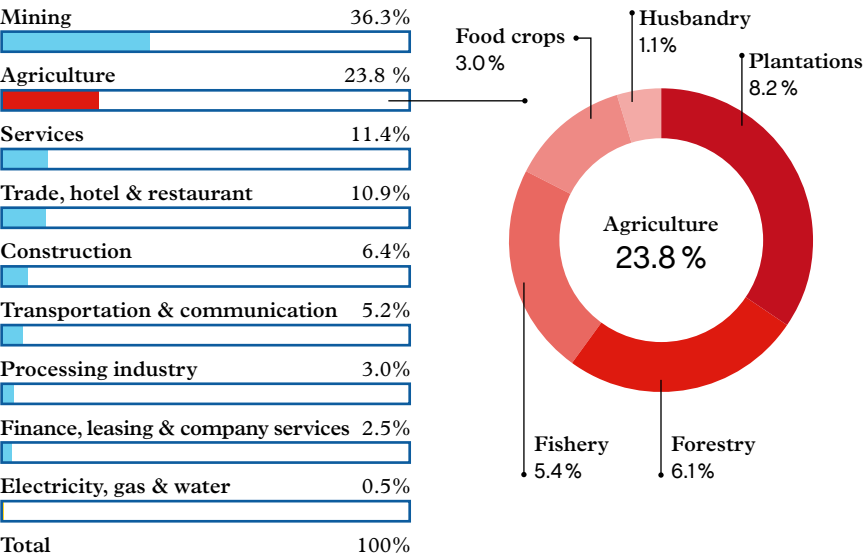
Country	Indonesia	Area	2.37 million ha	Population	105,100
Province	Central Kalimantan	Sub-districts	10	Population density	4.4 people/km ²
Capital	Puruk Cahu	Villages	115		



Socio-economic profile

Murung Raya achieved annual growth in gross domestic product (GDP) of 6.67% in 2013,⁵ resulting in a GDP of just below IDR 1.08 trillion (constant price), USD 84.2 million, in the same year. The district government is aiming for an annual GDP growth rate of 6-7%.⁶

Table 2 — Sector’s contribution to Murung Raya’s GDP in 2013⁷



Until fairly recently the dominant economic sector was the forestry industry, which started logging in Murung Raya in the 1970s. However, timber companies have nearly stopped operations and produce timber well below their annual allowable logging quota, resulting in the sector only contributing towards 6.1% of the district's GDP in 2013. The forestry resource levy received by Murung Raya in 2009 was over IDR 7.5 billion (USD 600,000), which is a fee based on the volume of timber harvested.⁸ However, this is dwarfed by the district's allocation from the Reforestation Fund (*Dana Reboisasi*, DR) for the same year, which was almost IDR 19 billion (USD 1.5 million).⁹ In recent decades timber companies played a vital role in developing a basic road network that improved access to many of the district's remote communities. As a result of the recent decrease in logging activities, most of Murung Raya's forests are still in good condition.

Recently the mining sector has become the main economic engine for Murung Raya and it now accounts for 36.3% of GDP and 18% of formal employment in 2011.¹⁰ The total mining sector revenues that Murung Raya received in 2009 was IDR 31.1 billion (USD 2.5 million).¹¹ The main interest is coal mining, including both hard coking coal essential for steel production and

thermal coal for electricity generation. One commercial gold mine has been operating in Murung Raya since the mid-1990s and scale-mining activities make up a large part of the informal economy.

The land-based commodity sector is also an important part of Murung Raya's economy and the main product is rubber,¹² which is primarily planted by smallholders. In 2012, this product contributed 8.2% of the total economy,¹³ and provides work for about 70% of the working population in the district.¹⁴ There are no active palm oil concessions in the district, although a few concessions have been issued in the very south of the district.

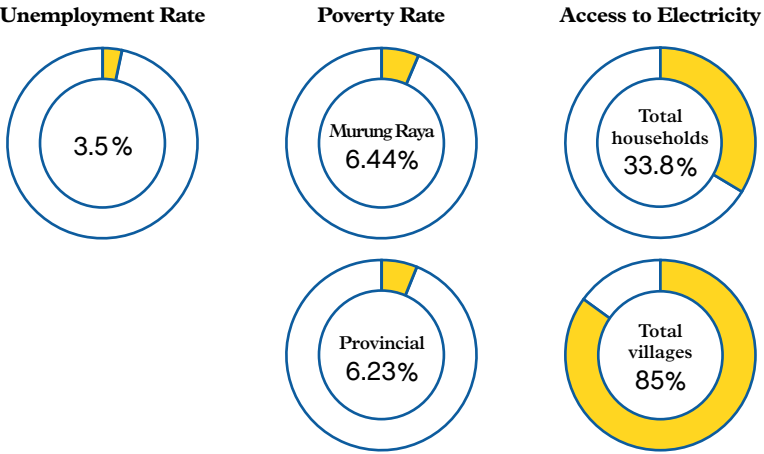
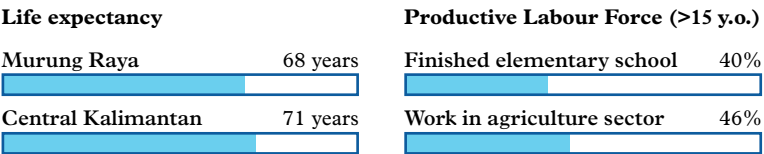
In 2013, Murung Raya's population was 105,100¹⁵ and residents' life expectancy

was 68 years, slightly less than the provincial average of 71 years.¹⁶ Of Murung Raya's total productive labor force (i.e. those older than 15), only 40% finished elementary school, while 46% work in the agriculture sector (e.g. food crop farmer, and aquaculture).¹⁷ The average population density is 4 people/km² but the population is unevenly spread across the district, with most people in the south, especially in Murung sub-district, where the population density is 43 people/km².¹⁸ In 2013, Murung Raya's unemployment rate, which has increased in recent years, was roughly 3.5%.¹⁹

In 2013, Murung Raya's poverty rate of 6.44% is slightly above the provincial average of 6.23%, in addition to a disparity

that exists between the north and south of the district.²⁰ Most residents live in the south, which is more accessible and has better agricultural soils, making it wealthier on average. But 43 of Murung Raya's 124 villages lie in the northern highlands, where isolating forest peaks and river valleys mean access to electricity, education and health services is especially limited.²¹ In 2012, 85% of the villages in Murung Raya had access to electricity; however, only 33.8% of the total households in the district had access to electricity from the state electricity company.²²

Annex 2 includes a summary of the revenues and expenditures of the Murung Raya district government.



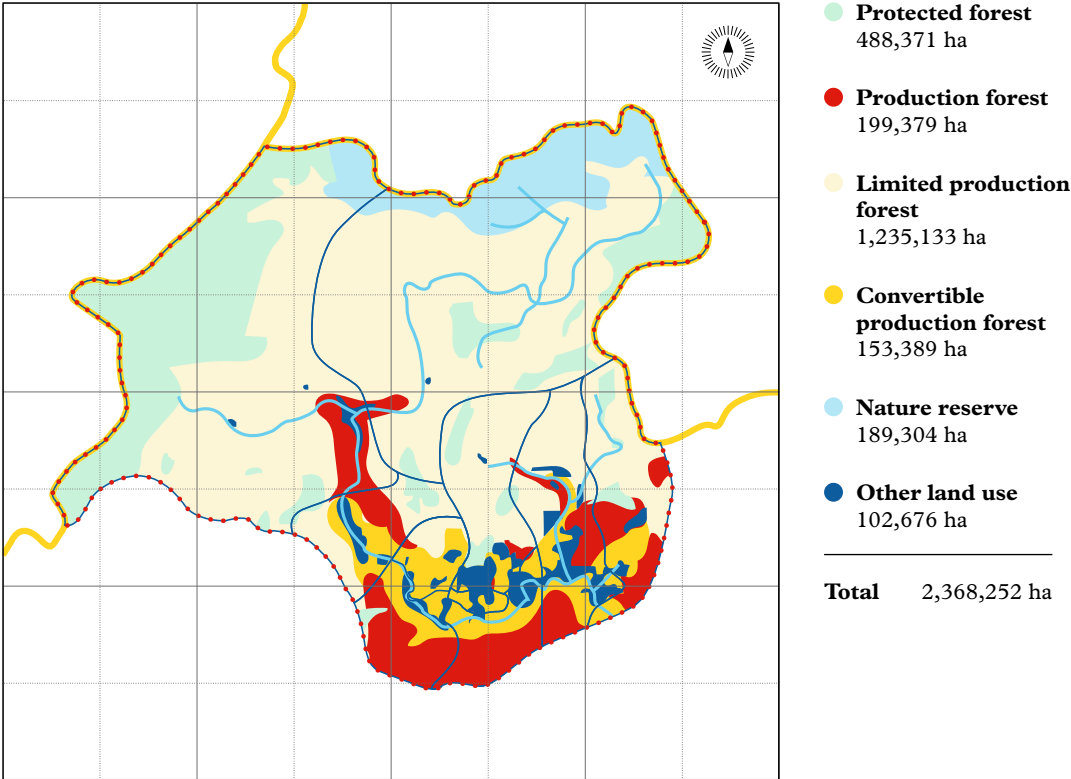
5.1 Forestry

RATIONALE



More than 95% of Murung Raya is designated as state forest area (*kawasan hutan negara*), covering 2,265,576 ha. The remainder of the land is designated as area for other land use (*areal penggunaan lain*, APL), which is primarily in the south of the district.

Figure 5 — Murung Raya land classification map



As Figure 5 shows, the primary classification is limited production forest, where low-intensity timber production is allowed. Murung Raya also has a significant amount of protected forest and nature reserves, which are primarily in the very north of the district. These ecologically important areas are under the responsibility of the national government and are fairly well-managed with support provided from a range of international NGOs. According to

Ministry of Environment and Forestry data (2014), the district is home to 14 natural forest concessions (IUPHHK-HA) covering 690,155 ha, which are mostly limited production forest, although only half of those concessions are active. These seven concessions cover 343,424 ha and produced 160,190 m³ of timber in 2014. Each concession employed an average of 30 people and accounted for a smaller number of daily workers.

Despite the timber industry's longstanding presence in Murung Raya, most of its forests remain in good condition. Timber companies have played a vital role in developing a basic road network and improving access to many outlying communities, but many timber firms have all but stopped operating and now produce well below their annual allowable logging quota. As high-value, easy-to-access timber stands have been harvested and land tenure conflicts inhibited new development, Murung Raya's forestry industry has declined.

For the government to realize its goal of revitalizing the commercial forestry sector, a host of challenges must be overcome. A lack of clarity over land status and tenure along with minimal enforcement means clear lines of responsibility over particular forest areas are difficult to trace, encouraging informal or illegal harvesting and forest conversion. As in most of Indonesia's forest regions, forest cover has decreased in Murung Raya. As Figure 2 highlights, this has taken place primarily in the southern half of the district with 78,706 ha of forest cover lost between 2000 and 2012,²³ creating significant CO₂ emissions.²⁴ Many of the existing concessions lack the required permits, with only four having achieved the mandatory Sustainable Production Forest Management (*Pengelolaan Hutan Produksi Lestari*, PHPL) certification.

Another problem is that Murung Raya's timber sector is poorly placed vis-à-vis broader supply chains, with almost all of its timber exported as raw logs for processing elsewhere. The district used to have a number of timber processing facilities; however, these have all closed causing Murung Raya to miss out on the benefits of value-adding activities, including increased income from selling higher-value products and wood-processing jobs. Moreover, the raw logs produced by the district fail to fetch high prices when they are exported.

In addition to PHPL and the Timber Legality Verification System (*Sistem Verifikasi Legalitas Kayu*, SVLK) certification, which is also mandatory, most concessions lack voluntary certification from institutions like the Forest Stewardship Council (FSC). This prevents the district's timber from accessing global markets. If Murung Raya can bring its timber industry in line with global best practices, the industry will become more sustainable and demand for its products will also increase, creating more jobs.

According to the district government, there is insufficient support from the central government for small and medium-sized enterprises. In addition, the lack of alternative livelihoods for local people has

The Indonesian government has recognized the need to develop forest management plans that align with the socioeconomic reality of local communities and government spatial plans.

intensified pressure on forests as the population grows and demand for agricultural land increases.²⁵ The existing redistribution system of forest revenues also frustrates the Murung Raya government, as insufficient revenues are returned to producing regions, causing the district government to look for other sources of income, e.g. mining and plantations, which lead to forest conversion. The government's objective to increase revenue from the mining sector further threatens forest ecosystems.

In Murung Raya, there are often overlapping activities within different sectors, including forestry, mining, infrastructure development and community activities. This leads to conflict that disrupts commercial operations, sometimes indefinitely. If operations are constantly under threat, companies are incentivized to engage in "grab-and-go" logging to repay loans and secure short-term profits, even at the expense of long-term profitability. Where there is clear tenure, communities can establish micro-enterprises that add value to forest products instead of clearing new land to maximize gains from resource extraction.

The Indonesian government has recognized the need to develop forest-management plans that align with the socioeconomic reality of local communities and government spatial plans. With a basic districtwide management plan, implemented by well-paid officials to minimize corruption, the commercial forestry sector can be revitalized. Murung Raya is situated far upriver, so transportation costs will remain relatively high, but with reduced uncertainty and corruption, the savings from operational efficiencies can overcome these costs. Furthermore, as forestry operations are transformed to achieve certification, access to high-value markets will become possible. Improved infrastructure into rural and remote areas will also help community-based forestry operations reduce transportation costs and thus access a wider range of local markets. Given commercial investment and private development, forest resources can generate private wealth and public tax revenues, which can be used to provide public services, such as health and education.

OVERVIEW OF
GREEN GROWTH INTERVENTIONS

In order to respond to the challenges faced in Murung Raya and to revitalize the district's forest sector, this strategy proposes three coordinated interventions to support green growth. As the district's forest loss primarily occurred in the southern half of the district, these interventions are focused in this area. In addition, the protection forest and nature reserves are managed by the national government, so the district government has less influence over their state compared to the extensive limited production forest further

south. Also, considering the higher population density in the southern half of the district, there is greater potential for land conflict, which needs to be addressed to ensure the revitalization of the sector along with achieving equitable growth. As a result, the following interventions are focused on strengthening governance, adopting community-based forest management practices, operationalizing a production forest management unit (*Kesatuan Pengelolaan Hutan Produksi*, KPH-P) and shifting the commercial forest sector toward certification.



F1
Resolve land-tenure conflicts and enable
community-based forest management

Community-based forestry is designed to provide clear land boundaries in order to reduce land conflicts and strengthen management of forest areas that previously lacked a formal management plan. Limited community timber extraction will also increase local livelihoods, one of the district's goals. In addition, the production of non-timber forest products (NTFPs) and potential payments for ecosystem services, will diversify the communities' income streams and help create biodiversity-based community enterprises.



F2
Operationalize a production forest
management unit (KPH-P)

Murung Raya's proposed KPH-P covers 900,000 ha and includes numerous production and community forest (*hutan kemasyarakatan*) concessions, community mining areas and important watersheds, although land conflicts and low productivity are problems in these areas. The KPH is a major initiative of the national, provincial and district governments, with government funds already being used to develop the institution.



F3
Shift the commercial forestry sector toward
certification

Forest certification will give Murung Raya's timber sector access to global markets for tropical hardwoods, making it more attractive to investment and increasing employment and profitability. Certification will also ensure that well-designed forest plans are implemented and that timber stocks are maintained sustainably. This strategy is in line with the district's goal of revitalizing the commercial forestry sector.

Desired
green growth outcome



The ambition of this strategy is to create a locally-managed and sustainable forestry sector that attracts investment, creates jobs, reduces social conflict, maintains carbon stocks and biodiversity, and has access to global markets.



— Reyzal Samat, S.Hut.
Acting Head of Forestry Agency,
Murung Raya district

Table 3 — A dashboard of green growth performance indicators for the forestry sector

No.	Indicator
1	Annual change in forestry contribution to GDP (IDR)
2	Direct investment in the forestry sector (IDR)
3	Annual change in production levels of all forestry-related products (unit/year)
4	Jobs in the forestry sector (#)
5	Number of tenure-related conflicts in state forest area (#)
6	Annual change in area of degraded land within state forest area (ha)
7	All forestry concessions comply with spatial plan (Y/N)



F1

Forestry 1

Resolve land tenure conflicts and enable community-based forest management



© FFI

Background

Land conflict often occurs when the state fails to recognize indigenous peoples' rights to their customary forests. The 2013 Constitutional Court ruling addressed this by removing customary forests (*hutan adat*) from the state forest area. Mapping and registering customary forests is an important first step towards resolving land tenure, after which the demarcation of state and customary forest, and village administrative boundaries should be carried out. This is an important prerequisite for establishing effective community-based forest management systems.

Community-based forestry designation is a government mechanism that enables communities to manage state forest area (both protection and production forest) in and around their village. The village forest (*hutan desa*) program is a community-based forest management approach that is regulated by the Ministry of Environment and Forestry.²⁶ The village forest scheme was designed to accommodate local forest management contexts, provide additional revenue for local communities, contribute

to climate-change mitigation activities and, most importantly, provide clear land tenure for local communities to manage their forest.²⁷ Village forest permits are given as licenses to manage the state forest land for 35 years with a possible extension. Strengthening local communities' status and role in managing forests, including participatory mapping of forest boundaries, are priorities actions in Central Kalimantan's STRADA REDD+.

Village forests offer an economically, ecologically and socially appropriate solution that serves both local and national interests. It recognizes non-timber forest products (NTFPs), such as coconut, rubber, rattan, in conjunction with forest services such as tourism, groundwater filtration and flow regulation and carbon storage. Allowing local communities to manage their forests provides them with the additional security, which increases community awareness of ownership. Well-managed village forests with good market access for both timber and NTFPs have the potential to improve community income.

Baseline

Working together with Fauna & Flora International (FFI) and Perhimpunan TeROPONG, Murung Raya's Forestry Agency has strengthened the capacity of four villages in Tanah Siang sub-district (Kolam, Saruhung, Olong Soloi, and Olong Ulu) to establish village forests, with a total area of 4,857 ha.^{28, 29} However, due to unclear village boundaries, the process was tentatively suspended until the borders were agreed. In addition, the Fauna Flora Foundation (FFF) hold a license to work in the Gunung Bondang area, adopting community-based approaches for conservation and ecotourism activities.

At the provincial level, the Dayak Customary Institution (*Dewan Adat Dayak*, DAD) launched a new program in October 2014 called Kalteng Misik, which pursues the establishment of *hutan adat* in Central Kalimantan, following the Governor's Decree No. 13/2009 on customary land and customary rights over land. This program is supported by several high-ranking government officers and will influence the establishment of village forests in Murung Raya. In addition to community-based forest management related to the customary land, the provincial government is working with POKKER SHK to carry out a participatory mapping of community forest.

Desired results

Four village forests are established and managed effectively.



KEY ACTIONS

- 01 Demarcate the state and customary forest areas, and village administrative boundaries by overlaying the necessary thematic maps. The first step is mapping and registering all of the customary forest land using participatory approaches, while the administrative borders are determined by following the standard operating procedures provided by the government.
- 02 Support the establishment of community-based forest management areas, including providing capacity building for the targeted community, establishing the necessary institutions (a village forest management institution (*Lembaga Pengelola Hutan Desa*, LPHD)³⁰ for village forests), developing the management plan to earn revenues from the forest's resources, and following licensing application and registering processes.
- 03 Implement the community-based forest management plan, including managing multiple revenue streams, such as the sale of NTFPs, selective logging, ecotourism, and potentially Payments for Ecosystem Services (PES). This will require gaining access to global markets, where appropriate, and re-investing the revenue into community.

F2

Forestry 2

Operationalize a production forest management unit

Background

Regulation PP No. 6/2007 on forest administration and management planning introduced forest management units (*kesatuan pengelolaan hutan*, KPH), which are government units intended to ensure sustainable and efficient management of forest resources. Through this system, all state forest areas in Indonesia will be divided into KPHs that will be staffed with an administrative unit that is responsible for the areas management. The establishment of a KPH should be done in a transparent and accountable manner that is inclusive of all relevant stakeholders. The establishment of KPHs is one of the national priorities that have been set forth in the national mid-term development plan 2015 – 2019.³¹ Establishing KPHs is also a priority action in Central Kalimantan's STRADA REDD+.

KPHs will enable and oversee forest-resource planning, conservation, harvesting and regeneration by both commercial and community stakeholders on the district government's behalf and for the public's benefit. KPH

management activities include forest use planning, preparation of 10-year forest management plans, forest utilization and forest area use, in terms of monitoring and controlling permit holders, forest utilization in specific areas, forest rehabilitation and reclamation, forest protection and nature conservation.

The KPH system has the potential to fundamentally improve forest management by increasing accountability over forest outcomes and improving local stakeholder involvement. By placing forestry professionals at the local and field levels, KPHs will facilitate better law enforcement and more structured and localized approaches to addressing land based conflicts and improving local people's access to forests. The development of medium-term management plans over a 10-year period that include production targets along with environmental goals, such as GHG emission reductions and biodiversity conservation, will help ensure the sustainable management of forest resources.

Baseline

KPHs have been established in 28 provinces and the initiative has considerable support in Central Kalimantan. KPH Murung Raya is one of seven model KPHs in Central Kalimantan³² and it contains approximately 908,255 ha, including protected forest (103,578 ha), limited production forest (598,948 ha) and production forest (205,729 ha). So far KPH Murung Raya has established a management institution instrument with a small team, although it has not yet prepared a development plan. The Murung Raya forestry RENSTRA describes the need to develop and improve KPHs but it does not provide a clear program for achieving this.

Since September 2014, WWF-Indonesia has coordinated stakeholders to develop management plans for KPHs in Central Kalimantan. The outcome has been an agreement to prioritize and formulate long-term development plans for three KPHs, including the one in Murung Raya. WWF has pledged to support Murung Raya with technical assistance to begin the work to operationalize its KPH. Murung Raya's KPH is currently preparing its management plan.



© Hendrik Segah / GGGI

Desired results

One production KPH is operationalized and managed effectively.



KEY ACTIONS

01

Provide technical assistance to the KPH staff (once they have been recruited) to develop a 10-year management plan, in collaboration with all key stakeholders, and then provide capacity building to support implementation of this plan. This will require following the necessary rules and regulations and ensuring that the plan accurately reflects the situation on the ground and accounts for existing community development programs. Best practice from existing KPHs, such as the Berau KPH in East Kalimantan, should be followed. Two priorities within the 10-year management plan are outlined in the following key actions.

02

Develop and implement site-specific interventions to address inactive concessions within the KPH. This will require analysis of each inactive concession to fully understand the level of degradation or deforestation, and the cause of the inactivity, e.g. slow forest productivity, financial problems, inadequate human resources, and land tenure conflict (see cross-cutting chapter for more information on improving licensing mechanisms).

03

Improve law enforcement in areas within the KPH that are not under license but do contain forestry activities, to prevent further encroachment and conversion. This activity will be based on the analysis of each inactive concession mentioned in point 2 above that will include regular patrols and law enforcement activities to stop illegal activities in the area.

F3

Forestry 3

Shift the commercial forestry sector towards certification

Background

To improve sustainable forest management, the Indonesian government created the Timber Legality Assurance System (*Sistem Verifikasi Legal Kayu*, SVLK), which includes the Sustainable Production Forest Management (*Pengelolaan Hutan Produksi Lestari*, PHPL) certification system. SVLK/PHPL certification is mandatory for all natural concessions in Indonesia and is increasingly required by international markets. There are also voluntary market-driven certification systems, such as those managed by the Forest Stewardship Council (FSC).

For third-party certification, an independent organization develops a standard for sustainable forest management and independent certification bodies issue certificates to forest managers that comply with the standard's requirements. In addition, Chain of Custody (CoC) certification can be used to track forest

products from the certified forest through processing to the final products. Forest and CoC certification both promote ethical trade and market access by appropriately balancing the ecological, social and economic aspects of sustainable forest management. Monitoring and controlling the CoC of forest products is identified as a priority action in Central Kalimantan's STRADA REDD+.

Certification is a policy instrument that aims to ensure that forest resources will be used in an efficient and sustainable way to support local economic growth and improve the access of forest products to local and international markets. Certification encourages the forestry business to not only focus on economic aspects but also to reduce environmental risks while improving the livelihoods of forest-dependent people.

Baseline

As in many parts of Indonesia, Murung Raya's forestry sector lacks the necessary capacity to support concessions to achieve certification. Only seven of Murung Raya's 14 forest concessions are active. Just four have achieved PHPL certification and none has obtained any form of voluntary certification. Although SVLK is mandatory, limited enforcement means concession owners do not justify the costs of certification. To date the district's forestry sector has minimal links with global markets that require certified timber, such as Europe and the United States, so local producers do not see the benefits of obtaining certification.

The Borneo Initiative (TBI) and partners (WWF, TFT, TNC etc.) has provided technical and financial support to forest concessions to pursue FSC certification in Central Kalimantan, although not yet in Murung Raya. The initiative also supports SVLK certification for natural forest concessions. Currently, more than one million hectares of Indonesian forests are supported by TBI and 1.2 million hectares (12 concessions) hold FSC certification. Murung Raya's KPH could be a potential expansion area for this program.

Desired results

All active forest concessions achieve PHPL certification and at least half achieve FSC certification.



KEY ACTIONS

- 01 Carry out a coordinated outreach program targeted at the timber companies that operate in Murung Raya to identify which active forest concessions should be supported for certification.
- 02 Build the capacity of the district government's Forestry Agency to support the certification process. This will involve teaching them about the emerging trends in the global timber market related to certification and best practices.
- 03 Provide assistance to the chosen active forest concessions to obtain both mandatory (PHPL) and voluntary (e.g. FSC) certification by applying recognized best practices for forest management.
- 04 Apply CoC certification to all registered timber-related industries in KPH Murung Raya to ensure that these industries are applying best practices and only sourcing legal timber.

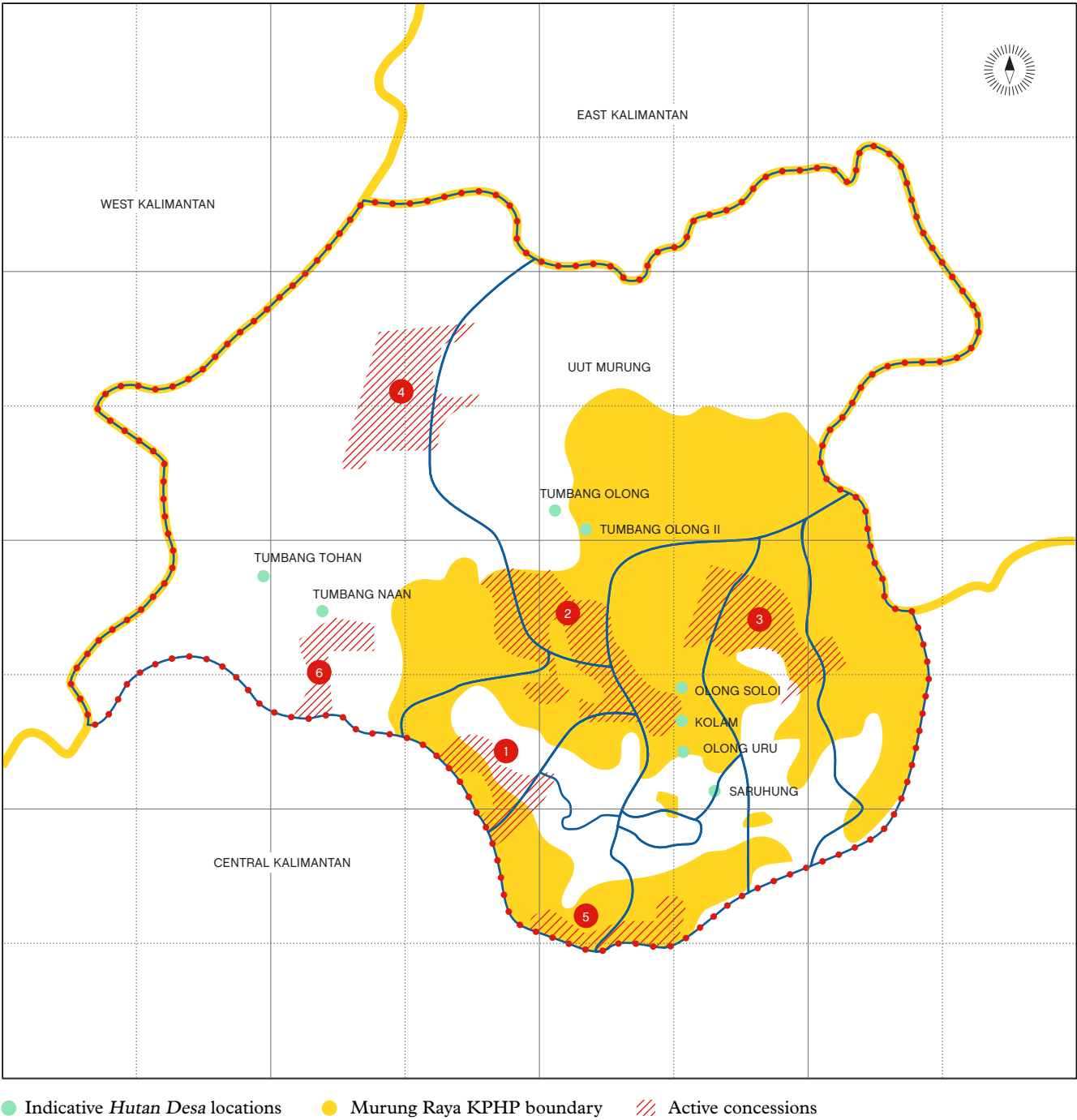


Identified locations for green growth interventions

The locations of the proposed forestry sector interventions are shown in Figure 6, including the indicative location of community-based forest management areas, in terms of village forests, Murung Raya's production forest management unit (KPH-P) and the active forestry concession areas in the district.

- 1 PT. Ranggau Abdinusa
23,289 ha
- 2 PT. Karya Delta Permai
78,936 ha
- 3 PT. Pemantang Abaditama
52,951 ha
- 4 PT. Mitra Perdana Palangka
23,289 ha
- 5 PT. Pandu Jaya Gemilang Agung
16,944 ha
- 6 PT. Kahayan Terang Abadi
23,269 ha

Figure 6 — Location of forestry sector interventions



● Indicative *Hutan Desa* locations ● Murung Raya KPHP boundary ▨ Active concessions

Key stakeholders

The planning and implementation of all the strategy's interventions will require a collaborative effort between all levels of government, private companies, communities and other stakeholders. Any changes to the level of government that is responsible for managing this sector related to Law 23/2014 will need to be considered before implementing this strategy. This section identifies the key stakeholders in the forestry sector.



Public

The interventions within the forestry sector will be led and coordinated by Murung Raya's Forestry Agency (*Dinas Kehutanan* or *DISHUT*). Other local government bodies that need to be involved are the KPH Murung Raya management unit and the LPHD of the village forests, once they are established. Collaboration will also be required with the provincial *DISHUT*, the national Ministry of Environment and Forestry, the Ministry of Home Affairs and the National Land Agency. Efforts to identify and register customary land will require coordination with the provincial and district Dayak Agencies (*Dewan Adat Dayak*, *DAD*) and the national Dayak Assembly (*Majelis Adat Dayak Nasional*, *MADN*).



Private

The companies that own and manage the active forest concessions in Murung Raya will need to be actively engaged to achieve their support for the certification of their operations. These include: PT. Ranggau Abdinusa, PT. Karya Delta Permai, PT. Pemantang Abaditama, PT. Mitra Perdana Palangka, PT. Pandu Jaya Gemilang Agung, PT. Kahayan Terang Abadi, and PT. Nusantara Alam Raya Sejahtera, whose boundaries are all shown on Figure 6 (apart from the last concession whose information was not available).

Other

NGOs and civil society organizations already involved in the activities described in this sector will play a key role in the implementation of the forestry sector interventions. These include WWF-Indonesia, The Borneo Initiative (TBI), the Global Forest Trade Network (GFTN), The Nature Conservancy (TNC), the Forest Trust (TFT), the Tropical Forest Foundation (TFF), Wana Aksara, POKKER SHK and AMAN. Recently, the REDD+ Management Unit (*Badan Pengelola REDD+*, *BP REDD+*), the United Nations Development Programme (UNDP), the Partnership for Governance Reform (*Kemitraan*) and their local partners initiated a program called Green Village (*Desa Hijau*) in Central Kalimantan, which includes some Murung Raya villages (Olung Soloi, Saruhung and Kolam) and ran from January to September 2014.³³ The interventions in this strategy should build off this program's activities, including participatory village mapping, support to Medium-Term Village Development Plans (*Rencana Pembangunan Jangka Menengah Desa*, *RPJMD*) and training for farmers.

Timeline for implementation

		Key actions	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
F1	RESOLVE LAND-TENURE CONFLICTS AND ENABLE COMMUNITY-BASED FOREST MANAGEMENT	1												
		2												
		3												
F2	OPERATIONALIZE A PRODUCTION FOREST MANAGEMENT UNIT (KPH-P)	1												
		2												
		3												
F3	SHIFT THE COMMERCIAL FORESTRY SECTOR TOWARD CERTIFICATION	1												
		2												
		3												
		4												

5.2 Mining

RATIONALE



Murung Raya's extractive sector is currently central to the district's economy with commercial coal and gold mining accounting for more than 35% of GDP and 18% of employment (7,915 of 44,195 formal jobs).³⁴ The total mining sector revenues that Murung Raya received in 2009 was IDR 31.1 billion (USD 2.5 million).³⁵ In addition, the district has known deposits of coal and gold, with considerable potential for further discovery of commercial resources. Therefore, ensuring that Murung Raya's mines are managed in a responsible manner that minimizes environmental impact will be central to achieving green growth.

Murung Raya's mining sector is still at a nascent stage and presents an opportunity to become Indonesia's benchmark for responsible exploitation of natural resources.

Murung Raya contains 47 commercial mining exploration concessions and eight concessions authorized for exploitation, mostly for coal and to a lesser extent gold.³⁶ The exploitation concessions cover 160,663 ha,³⁷ almost 7% of the district's area, with actual mining operations covering approximately 10,952 ha.³⁸ To date only a few companies have produced coal in Murung Raya,³⁹ with BHP Billiton's mine currently under active development. Gold production in the district has been halted with the disruption of PT. Indo Muro Kencana's mining activities due to conflict with the local community. While only large-scale and foreign-backed mining companies currently operate in Murung Raya, the proposed development of a railway linking Murung Raya to coastal ports could drastically increase the number of mines in operation, as transportation is one of the major operating costs that holds back commercial coal mining operations.

In 2014 rubber prices dropped from IDR 10,000/kg in February to IDR 3,000/kg in September,⁴⁰ causing an increase in small-scale community mining for gold and galena as an alternative source of informal employment.⁴¹ At present, most of these

operations are unregulated, resulting in significant environmental and public health risks from dredging activities and the use of mercury. However, the district is working to regulate the sector through development of community mining areas (*wilayah pertambangan rakyat*, WPR), which require community mining licenses (*izin pertambangan rakyat*, IPR) that protect tenure and require appropriate management practices. Murung Raya has so far created eight WPRs, which cover an area of 65,333 ha and include 31 IPRs.⁴²

Murung Raya's mining sector is still at a nascent stage and presents an opportunity to become Indonesia's benchmark for responsible exploitation of natural resources. While the debates around responsible mining practices remain unresolved, all stakeholders acknowledge the need to balance economic, social and environmental aspects.⁴³ Murung Raya has the potential to apply its own approach to responsible mining as the sector matures. The tax revenue generated from the extractive sector make a considerable contribution to district's public finances and are central for future government investments to achieve important social goals (e.g. education



© FFI

and health). In addition, the expansion of the mining sector will include the development of much-needed physical infrastructure in remote parts of Murung Raya (e.g. roads), which needs to be carefully planned to minimize further environmental impact.

The Murung Raya government considers the mining sector to be a priority area for the medium- to long-term development of the district. In the regional medium-term development plan, the government provides specific policy direction on improving the supervision of community mining activities to reduce the environmental impact and improved law enforcement to reduce the number of illegal mines. Murung Raya's Mining and Energy Agency seeks to improve its regulations, crack down on illegal mining and provide assistance for conservation and land rehabilitation.

Shifting to a responsible growth model by avoiding key environmental hotspots and working alongside local communities will help the district's mining sector reduce risk, attract investment and transition from exploration to exploitation. This approach will also ensure that mines remain operational for the

expected life of the project with minimal social disruptions. This will boost employment as mining expands combined with skills training that can generate positive spillover effects for non-mining employment and entrepreneurship, such as skilled trades or project management.⁴⁴ This will require innovative partnerships between government, mining companies and local communities to incubate new business models and accelerate the shift towards the responsible exploitation of natural resources. While the combustion of coal extracted from Murung Raya will ultimately contribute to global climate change, mining is integral to realizing Murung Raya's green growth ambitions. Mining is the most important current and future driver of the district's economy, both in terms of revenue generated and jobs created. Not engaging with this sector poses significant environmental and social risks for the district. This strategy seeks to establish a model for responsible mineral extraction that can be replicated across Indonesia.

OVERVIEW OF
GREEN GROWTH INTERVENTIONS

In order to ensure that Murung Raya's largest economic sector supports green growth, this strategy proposes three coordinated interventions. Infrastructure development is a primary driver of deforestation and as more of the district's mines are exploited a considerable network of roads will be built to allow access to the remote minerals. Minimizing the environmental damage of this road network is essential to avoid a rapid increase in deforestation, especially of ecologically important areas. Furthermore, following the drop

in the rubber price in 2014 and the associated increase in community mining, providing capacity building to these small-scale miners, facilitating the creation of community mining areas and establishing partnerships with large-scale mining operations will help shift them towards responsible extraction. Finally, enforcing the regulation on land reclamation post-exploitation will ensure long-term land use plans for ex-mine sites are developed and implemented to deliver benefits to local communities.



© FFI



M1
Optimize road planning within and between
mining concessions

Optimal road planning reduces deforestation from road construction and reduces the overall environmental impact on natural habitats. The active engagement of all companies that already have mining concessions in Murung Raya is essential and providing local planners with geospatial software will optimize road networks and avoid all high conservation value (HCV) forest (see cross-cutting chapter).



M2
Support small-scale mines to improve their
environmental performance

It is important to support small-scale mining operations to obtain a community mining license, as this requires the adoption of certain basic management practices. Beyond this, further capacity building, awareness raising and monitoring is needed to improve their environmental performance. In addition, partnerships with large concession holders could be established as this can reduce conflict and introduce best practices to the small-scale mining sector. Banks may also be incentivized to provide credit to small-scale mines that meet environmental performance standards.



M3
Ensure effective mine land reclamation and
rehabilitation

Mine sites that are not properly closed or prepared for rehabilitation have the potential to create serious negative impacts on local ecosystems. Degraded mine sites also cease to be economically or environmentally productive. Mining companies should be supported to fulfil their legal obligation to carry out land reclamation activities, working in partnership with local communities to ensure the post-mining land use responds to local needs.

Desired
green growth outcome



This strategy aims to create a responsible mining sector that drives economic growth, minimizes its environmental and social impacts and recognizes traditional knowledge.



— Suhardi Buhoy, S.Hut. MM
Head of Mining and Energy Agency,
Murung Raya district

Table 4 — A dashboard of green growth performance indicators for the mining sector

No.	Indicator
1	Annual change in mining contribution to GDP (IDR)
2	Direct investment in the mining sector (IDR)
3	Annual change in production levels of mining commodities (ton/year)
4	Jobs in the mining sector (#)
5	Number of tenure-related conflicts in mining concessions (#)
6	Mercury pollution levels in rivers (Hg/m ³)
7	All mining concessions comply with spatial plan (Y/N)

M1

Mining 1

Optimize road planning within and between mining concessions

Background

As mining roads penetrate deep into forests, they divide populations of forest species, often causing irreversible negative impacts. Migratory patterns are interrupted, individual animal communities can be isolated from larger communities, disrupting breeding activities and invasive species might use the opportunity created by the disturbances to encroach upon and displace native species. Furthermore, as mining companies build new roads, new groups of human migrants seeking new economic opportunities might enter the region to further exploit the landscape. These outsiders often lack a sense of stewardship for local ecosystems.

Following the completion of a HCV assessment (see cross-cutting chapter), efficient road-building planning must be prioritized. Before an extensive network of mines are built across a delicate landscape, it is important to consider how narrow-linear features (e.g. roads, trails, power lines, pipelines) and small area disturbances (e.g. exploratory drilling sites, quasi-permanent industrial structures) disturb the landscape.⁴⁵ Individually these forest disturbances might seem minimal

but in aggregate they have a significant negative impact on forest ecosystems. Therefore, road networks within and between mining concessions need to be designed to minimize negative impacts on the landscape.

The infrastructure associated with new mining operations, especially road networks, can help connect remote rural communities to markets and present employment opportunities, assuming that a local work force is recruited to build the roads. However, there are considerable environmental and social risks that need to be mitigated to ensure that any new infrastructure contributes towards green growth. Ultimately a balance must be found that allows for new mining roads to be constructed while ensuring that environmental impact is mitigated. Central Kalimantan's STRADA REDD+ proposes a program on integrated infrastructure development, including mining roads, to reduce forest opening, while the province's RAD-GRK recognizes limiting forest conversion in mining areas as a GHG mitigation activity.

Baseline

Large-scale and foreign-owned mining companies in Murung Raya are currently assessing the environmental impact of their proposed road networks and optimizing roads to reduce these impacts.⁴⁶ However, smaller, less-capitalized mines across Indonesia generally do not do this as standard operating procedure.

Desired results

All new mining road networks are constructed to minimize environmental impact.



KEY ACTIONS

- 01 Engage with all companies that already have mining concessions in Murung Raya to highlight the need to design their road networks with minimal environmental impact. Case studies from existing mining companies should be used to highlight best practice.
- 02 Equip local planners with geospatial software to optimize road building and provide training to use these tools to ensure the road networks are designed in an efficient manner, reducing the clearing of HCV forest.
- 03 Support the district government to update local regulations to ensure that mining licenses are only issued to companies that commit to designing their road networks to minimize environmental damage. Support will also be required to ensure the application and compliance with this regulation.

M2

Mining 2

Support small-scale mines to improve their environmental performance

Background

Based on Law No. 4/2009 on Minerals and Coal Mining, a district head can prescribe a mining zone as a community mining areas (*wilayah pertambangan rakyat*, WPR) based on a set of criteria, including a maximum depth (25 m) and area (25 ha) and a requirement that the site has been used as community mine for at least 15 years. In order to mine in a WPR, an individual or a group must acquire a community mining license (*ijin pertambangan rakyat*, IPR), which does not have any environmental safeguards. As consequence of this and limited access to knowledge and capital, small-scale mining operations tend to pollute heavily due to a lack of tailings management and land reclamation programs. Harmful byproducts of these mines may include arsenic, lead, petroleum byproducts, cyanide and acid mine drainage, which is uniquely destructive to aquatic life.⁴⁷ In addition, mercury has been identified as a toxic product of the gold smelting process.⁴⁸ Therefore, Indonesia's small-scale mines often have a significant negative ecological footprint.

The development of WPR and the requirements for IPR are critical steps to formalizing small-scale mining operations. However, to reduce the impact on the surrounding environment, further support is needed to minimize or stop, if possible, the use of hazardous materials, introduce periodical

performance monitoring and awareness raising activities. Moreover, creating sustainability partnerships between large and small-scale mining operations can improve the environmental and social performance of small-scale mines. Small-scale miners can gain access to knowledge and resources, and large-scale facilities can assist with value-added processing, increasing their overall production levels. Partnerships with large companies that already comply with environmental regulations could offer a less confrontational approach to enforcing performance standards.

Small-scale mining remains an important component of the low-skilled rural economy, as it allows local communities to access high-value opportunities as an alternative to agriculture. By ensuring more responsible mining in the WPR, small-scale miners can diversify their livelihoods, which will increase communities' resilience. Proactive and persuasive government measures to control their performance will reduce the negative environmental impact of community mining, while the partnership with large-scale mining will reduce the potential for social conflict. Developing mining operations with clear environmental safeguards, including the application and monitoring of "green mining" practices, is a priority action in Central Kalimantan's STRADA REDD+.

Baseline

Community gold mining is currently a major economic activity in Murung Raya's waterways. The district contains eight official smallholder mining areas, mostly along the Barito River in Sungai Babuat, Tanah Siang Selatan, Permata Intan and Murung sub-districts, all which lie adjacent to large concessions.

Recognizing that the district's environmental health was at stake, the Murung Raya government issued a regulation (14/2005) that controls the distribution of mercury. This regulation requires that all mercury distributors have permission from the district head and only allows distribution to licensed industries, non-importer manufactures for hazardous

substances, cooperatives that meet with legal requirements, and government themselves. Unfortunately, mercury still can be easily found by individual miners.

Beyond this regulation, the Murung Raya government has proactively socialized the prohibition of using hazardous materials and clamped down on illegal gold miners. As a result, the mercury content in the Barito River has decreased. The district government also worked with Yayasan Tambuhak Sinta (YTS), an NGO based in Palangka Raya, who use a combination of technical and awareness raising approaches to minimize mercury pollution in Murung Raya.

Desired results

35% of small-scale mines adopt necessary environmental measures.



KEY ACTIONS

- 01 Support small-scale mining operations to obtain a community mining licenses plus provisions to avoid the use of hazardous materials.
- 02 Regular on-site monitoring and awareness raising for the community miners to improve their environmental and social performance. Training modules from government and YTS can be used.
- 03 Facilitate the establishment of partnerships between large and small-scale mining operations. This can support small-scale miners to gain access to knowledge and resources, while large-scale facilities can explore the potential to assist with value-added processing.
- 04 Engage banks to ensure they recognize community-based mining operations and provide credit to those that meet environmental performance standards. Small-scale operations face barriers accessing capital on commercial financial markets without government support, so making access to funds conditional on environmental performance will help strengthen the sustainability of the sector.

M3

Mining 3

Ensure effective mine land reclamation and rehabilitation



© FFI

Background

Mining is a temporary activity and mine closures, subsequent land reclamation and rehabilitation efforts are the true long-term indicators of sustainability. However, in practice very few miners provide plans for restoring mine sites or specify to what level of environmental functionality. In remote areas of Indonesia, including Central Kalimantan, many mines are simply abandoned, leaving local governments or communities, which usually lack the financial resources to absorb clean-up costs, to live with the toxic aftermath.⁴⁹ Ministry of Mining and Mineral Resources regulation No. 7/2014 requires large-scale mining operations to finance and oversee mine closure, and to restore the environmental and social functions of mining areas.

To ensure that reclamation activities are undertaken, companies must submit reclamation plans and financial guarantees, called reclamation bonds (*jaminan reklamasi*), during the early development phase of a project. The value of the reclamation bonds includes the total expected reclamation costs,⁵⁰ including dismantling the facilities, re-arranging the land, revegetation and civil works. These bonds must be deposited with a state bank and the estimated cost of reclamation activities is USD 0.30 – USD 0.50 per ton of coal.⁵¹ Companies should be incentivized to conduct progressive reclamation while still

operating, perhaps through preferential tax treatment of reclamation-oriented labor and operating expenses. Land-reclamation planning activities need to engage local communities from an early stage so that they can eventually benefit from economic opportunities from the post-mining land use. This is aligned with the international standard of ensuring that communities have free, prior and informed consent (FPIC) to the project. This is especially important in Indonesia, where subsurface mineral rights supersede surface rights, so even communities that have secured traditional forest harvesting rights (*hak adat*) can be threatened by mine development. Land reclamation activities should be integrated into the spatial plans to avoid any future conflict.

Mine reclamation can create a variety of useful landscapes that meet numerous goals, including the restoration of productive ecosystems and the creation of industrial and municipal resources. The post-mining land use should be determined by all key stakeholders and selected based on the needs of the local community and the proposals’ commercial feasibility. The reclamation process also offers an alternate form of employment and skills development to local communities that might not be prepared to work on the mines during the extractive phase.

Baseline

Since Murung Raya’s mining sector is still nascent, there are no permanently closed large-scale mine sites. However, there are significant former community-mining areas that require rehabilitation and these areas could be used as test sites for different models for future large-scale rehabilitation of commercial mine sites. There are several mining companies operating in Murung Raya. Each of these concessions has obtained the license (*ijin usaha pertambangan*, IUP) for exploration and production operations, and have already submitted the reclamation plan and open reserve savings.

Desired results

All operating mines have developed a reclamation and rehabilitation plan.



KEY ACTIONS

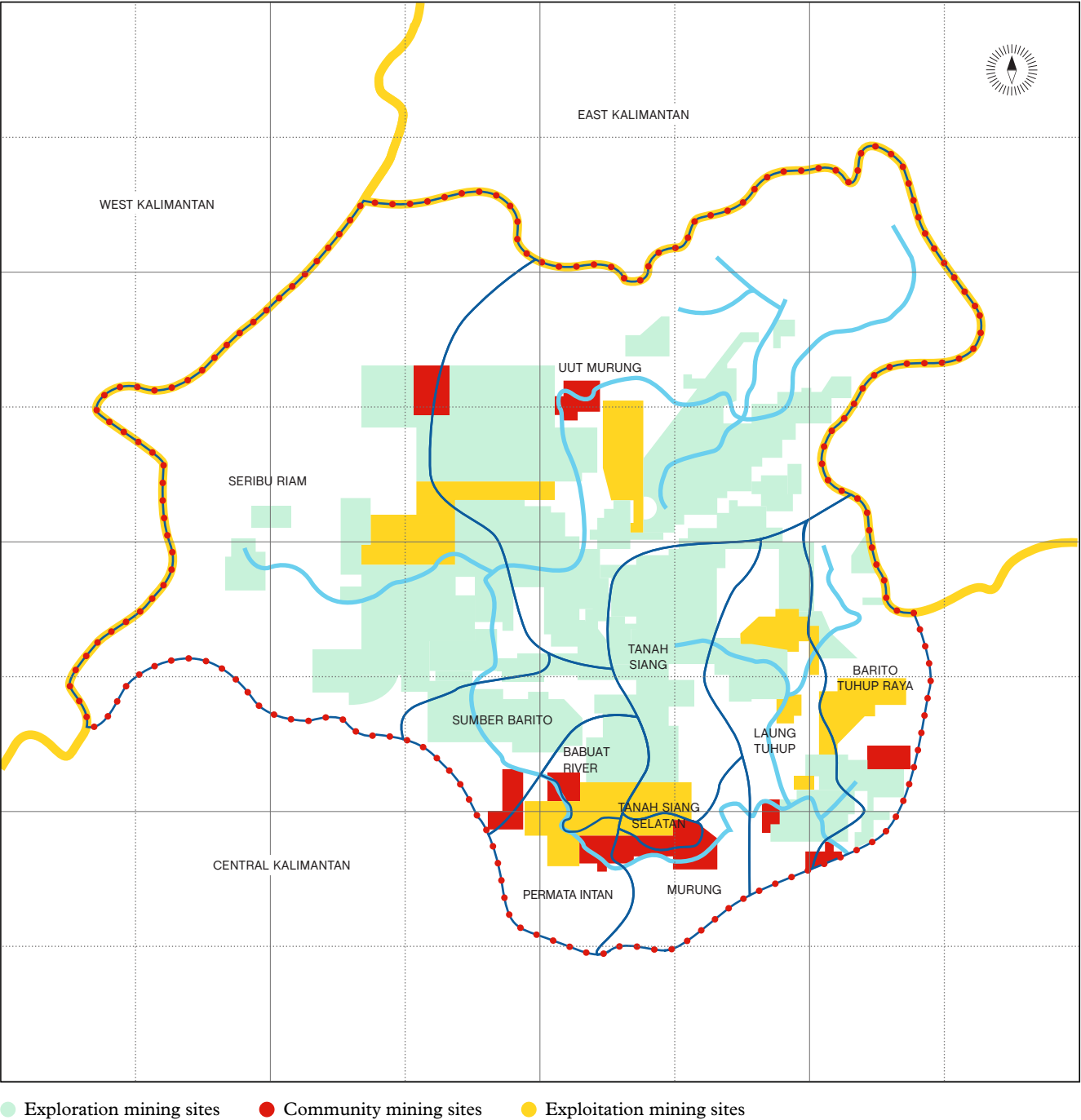
- 01 Train the district’s mining companies and their financing partners to ensure that they fully understand their land reclamation and corresponding financial obligations.
- 02 Work with mining companies to ensure that they involve local communities from an early stage of the land reclamation planning process. The land reclamation activities should respond to local needs and could be strengthened by the use of traditional ecological knowledge.
- 03 Devise a monitoring program to ensure mining companies carry out the planned rehabilitation activities, including procedures to assess their effectiveness and identify corrective actions, when required.
- 04 Ensure that the land-reclamation activities are integrated into the relevant spatial plans. This will allow for thorough project life-cycle assessments.

Identified locations for green growth interventions

Most of the interventions within this sector need to happen across all of the mines in the district, including the road network planning and reclamation activities. However, the intervention to improve the environmental performance of small-scale gold mining operations should focus on the

Barito River watershed, which contains the eight existing community mining areas in Sungai Babuat, Tanah Siang Selatan, Permata Intan and Murung sub-districts. This intervention will also require engagement in the neighboring commercial mining sites and surrounding communities.

Figure 7 — Mining sector overview map



Key stakeholders

The planning and implementation of all the strategy's interventions will require a collaborative effort between all levels of government, private companies, communities and other stakeholders. Any changes to the level of government that is responsible for managing this sector related to Law 23/2014 will need to be considered before implementing this strategy. This section identifies the key stakeholders in the mining sector.

Public



The implementation of this strategy will be led by Mining and Energy Agency (*Dinas Pertambangan dan Energi, DISTAMBEN*), which is responsible for overseeing all mining operations in Murung Raya and granting commercial and community mining licenses. This agency will work together with Environmental Agency (*Badan Lingkungan Hidup, BLH*), which has the authority, expertise and tools/equipment for environmental monitoring. Other local government bodies that need to be involved are the Development Planning Agency (*Badan Perencanaan Pembangunan Daerah, BAPPEDA*) for the program development and spatial planning, and Forestry Agency (*Dinas Kehutanan, Dishut*) for spatial planning. The provincial DISTAMBEN will need be engaged, along with the mine inspection division at the national Ministry of Energy and Mineral Resources.

Private



There are a variety of private-sector actors, including companies owned by foreign and domestic investors, including PT. Asmin Koalindo Tuhup (subsidiary of PT. Borneo Lumbung Energi and Metal Tbk), PT. Juloi Coal, PT. Kalteng Coal, PT. Marunda Graha Mineral, and PT. Maruwai Coal. Community miners are a major stakeholder group, as they represent a large percentage of the district's population and are a major source of environmental degradation.

Other

YTS is the current partner for district government to raise community miners' awareness on avoiding the use of mercury. Further cooperation may be needed to implement these mining sector interventions.

Timeline for implementation

		Key actions	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
M1	OPTIMIZE ROAD PLANNING WITHIN AND BETWEEN MINING CONCESSIONS	1												
		2												
		3												
M2	SUPPORT SMALL-SCALE MINES TO IMPROVE THEIR ENVIRONMENTAL PRACTICE	1												
		2												
		3												
		4												
M3	ENSURE EFFECTIVE MINE LAND RECLAMATION AND REHABILITATION	1												
		2												
		3												
		4												

5.3 Plantations

RATIONALE



In Murung Raya district, the land-based commodity sector is central to the economy, and the main product is rubber.⁵² This is mainly cultivated by smallholders using a form of agroforestry called jungle rubber, which intercroops a local variety of rubber with rattans, fruit trees and others. In 2012, rubber contributed 8.69% of the total economy,⁵³ and provided work for about 70% of the working population in the district,⁵⁴ although this number would have fallen following the decrease in rubber prices in 2014. Due to its significant role in Murung Raya's economy, this commodity has become one of the priority development targets of the district government for the period of 2013-2018.⁵⁵

The government has planned to execute programs that target rubber production. These programs are in line with those identified in the strategic plan of Murung Raya's Plantation Agency.

One of the main policies specified in Murung Raya's medium term development plan (RPJMD) is that the district's economy is developed based on local potential. Under this policy, the government has planned to execute programs that target rubber production, such as the establishment of a local economic cluster for the commodity, price stabilization, plantation expansion, smallholder farmer empowerment and building a rubber factory. These programs are in line with those identified in the strategic plan of Murung Raya's Plantation Agency. The agency has been promoting rubber expansion, requiring each smallholder farmer household to plant at least 1 ha of rubber.⁵⁶ Recognizing the crucial role of rubber in the local economy, the Plantation Agency has also planned to spend IDR 5 billion on rubber seedlings (PB260 variety) and fertilizer to help smallholders increase their production.⁵⁷ In addition, training on improved production for smallholder farmers has been implemented. Despite the amount of funding

The district's government is determined to prioritize rubber as the main commodity in Murung Raya due to its important role in supporting the livelihoods of the majority of the local inhabitants.

and number of programs implemented, the rubber sector still faces tremendous challenges, including low productivity, price drops, inappropriate post-harvesting treatments, as well as slash and burn practices to open new land.

The total production of rubber in Murung Raya in 2013 was 33,467 tons, generated from 52,245 hectares of land.⁵⁸ These figures indicate that rubber productivity in Murung Raya was about 600 kg per hectare per year. This low productivity is predominantly the result of the traditional rubber planting methods practiced by the local community.⁵⁹ Smallholder farmers usually spread rubber seeds randomly, leave them to grow without any intensive care for years, and then only return four to five years later to harvest. Even after farmers obtain quality seedlings from the government, they still plant and cultivate in a same way regardless of the fact that PB260 needs intensive care. Moreover, farmer extension programs have not reached all smallholder farmers due to the limited resources of the Plantation Agency.⁶⁰

In addition to low productivity, rubber farmers in Murung Raya face the challenge of high price volatility and in 2014 rubber prices dropped from IDR 10,000/kg in February to IDR 3,000/kg in September. In addition, about 90% of smallholder farmers sell their product to middlemen,⁶¹ who have been manipulating the price of rubber.⁶² The recent drop in the rubber price has significantly reduced smallholder farmers' income and further de-incentivized smallholder farmers to produce rubber.⁶³ Many of them are forced

to work in other sectors to sustain their livelihoods. Nevertheless, since rubber is still their main income generator, switching to another plantation commodity is not preferred. Poor post-harvesting treatment is another major problem in the rubber sector. Often, smallholder farmers soak raw rubber slabs (bokar or pre-processed raw rubber) in water or mix them with other substances to increase the weight. However, they do not realize that this practice actually further reduces the product price. Also, smallholder farmers typically open new areas for cultivation through slash and burn practices. This is amplified by the local customary system that permits such practices.

Despite the current challenges, rubber remains one of Murung Raya district's key economic products and, therefore, offers significant potential for green growth interventions. The district's government is determined to prioritize rubber as the main commodity in Murung Raya due to its important role supporting the livelihoods of the majority of the local inhabitants. In addition to productivity intensification, rubber extensification is also top of the district's government development agenda. This is because potential land for the expansion of cultivation is still available.⁶⁴ Nevertheless, all of the identified problems mentioned above need to be addressed to ensure that both local government agendas (particularly rubber extensification) are achieved in sustainable ways, especially considering the vast coverage of primary forest and the areas with high conservation value present in the district.

OVERVIEW OF
GREEN GROWTH INTERVENTIONS

The district government’s efforts to further develop rubber production in Murung Raya face a serious challenge due to the decreasing interest of the local community in the commodity due to the recent price drop. However, this downturn could be turned into an opportunity to evaluate and improve the performance of the sector. Therefore, when the price recovers, rubber production can increase in a sustainable

manner. This strategy proposes three interventions to support the creation of a resilient rubber sector and maintain the sector as the backbone for the district’s economy. These interventions include supporting the sustainable expansion of rubber plantations, adopting best management practices to increase productivity utilizing and an inclusive business approach to dampen rubber price volatility.



© Chris Stephens / GGGI



P1
Support the sustainable and resilient
expansion of rubber production

A land suitability assessment can identify the areas that are appropriate for sustainable rubber production in the long-term. The results of this assessment should be incorporated into the district’s spatial plan to ensure legal clarity before support is targeted to ensure farmers expand their rubber plantations in areas of long-term suitability.



P2
Promote better management practices (BMP)
to increase rubber productivity

The objectives of the BMP approach are to support smallholders to increase their productivity while reducing their environmental impact. A training needs assessment will ensure locally appropriate training materials are developed and these will be piloted at a farmer field school in a selected area. This approach will be scaled up using joint learning between farmer groups.



P3
Support an inclusive business model to
improve the rubber value chain

The inclusive business approach seeks to increase the income, production and the wellbeing of smallholder farmers, while simultaneously generating benefits for participating market actors. This can be achieved by creating a rubber value chain map, exploring the potential of a rubber factory in the district, developing a quality-based price mechanism and opening smallholder farmer groups’ access to financial services.

Desired
Green Growth Outcome



This strategy aims to create efficient and integrated smallholder rubber plantations that produce high-quality, high-value products in a sustainable manner in appropriate locations.



— Ir. I Wayan Jati
Head of Plantations Agency,
Murung Raya district

Table 5 — A dashboard of green growth performance indicators for the plantations sector	
No.	Indicator
1	Annual change in plantation sector contribution to GDP (IDR)
2	Direct investment in the plantation sector (IDR)
3	Annual change in production levels of plantation commodities (ton/year)
4	Jobs in the plantation sector (#)
5	Number of tenure-related conflicts in area for other land uses (#)
6	Annual change in area of degraded land within area for other land uses (ha)
7	All plantation concessions comply with spatial plan (Y/N)

P1

Plantations 1

Support the sustainable and resilient expansion of rubber production



A © FFI
B © FFI

Background

According to Law No. 39/2014 on plantations, the planning of plantation should consider the spatial plan, development plan, land and climate suitability, land availability and socio-economic conditions. In the context of rubber development in Central Kalimantan, the implementation of this law will be challenged by unclear forest area boundaries and local communities' plantation expansion to deal with low production. As a result, the remaining forest areas in the province are under pressure due to commonplace forest conversion to rubber plantation. The delineation of the forest boundary is waiting to be implemented once the provincial spatial plan is complete.

While waiting for the completion of the provincial spatial plan, analytical work can be carried out to determine the area that is suitable for rubber. This can be done using a siting tool to analyze and identify areas that could be converted to rubber plantations, while avoiding significant conflict and

HCV areas. The result is a 'Risk Indicator Map' that shows the future biophysical suitability analysis combined with an analysis of conservation values for the district. The map should be incorporated into the proposed district spatial plan to provide legal basis and security both for government and community to convert land to productive rubber plantations.

Identifying suitable areas for rubber expansion will secure smallholder farmers' investments in the long term, thus supporting sustained economic growth. This approach will ensure that the production of rubber is maintained while sensitive ecosystems and areas with high carbon stocks area are not converted. This minimizes social and economic costs for smallholder farmers whilst also averting damage to the environment. Central Kalimantan's RAD-GRK identifies the reduction of forest loss due to the expansion of commodities, such as rubber, as a key land-based mitigation activity.

Baseline

The Murung Raya government is currently promoting rubber expansion by providing funding and seedlings to farmers. However, the government has not determined the location to be expanded because the district's spatial plan is not finalized as of mid-2015. Moreover, parameters related to land suitability for rubber and conservation values are not taken into account in the government's strategy.



Desired Results

100,000 ha of new rubber plantations created in appropriate locations.



KEY ACTIONS

- 01 Carry out a land suitability assessment. The suitable land for rubber production is predicted to shift as the climate changes over time. The expansion of new rubber plantation should be directed to the areas where there is long-term suitability.
- 02 Incorporate the land suitability map into the district spatial plan. Once the rubber suitability map has been developed, it should be integrated within the district spatial plan. Thus, the map will serve as a guidance that has a clear legal base to provide security to those who are applying it.
- 03 Support the establishment of new rubber plantations on suitable lands. This can be done by creating a program to provide technical advice on establishing new rubber plantations and supplying planting materials, including high quality seedlings.

P2

Plantations 2

Promote better management practices (BMP) to increase rubber productivity

Background

The sustainability of agricultural production has long been a concern, as commodity expansion often causes deforestation, resulting in social issues and biodiversity loss. Enhancing productivity is a fundamental aspect of sustainability because higher yields per hectare increase land use efficiency and decrease the need for expansion into natural areas. In order to achieve this, better management practices (BMP) for productivity improvement have been developed and implemented in recent decades.

BMP are presented in modules that address different agronomic aspects of rubber plantations and are delivered using a farmer field school approach. These aspects include; (1) pre-harvesting management practices, such as improved selection of planting materials (i.e. quality

seedlings), appropriate fertilization and plant maintenance, and pest control; (2) post-harvesting treatment, such as good processing practices; and (3) environmental awareness. The proposed implementation strategy involves a two-tiered approach; a piloting, learning and generating-ownership phase, followed by a scaling-up phase.

It is also important to note that smallholders face constraints in plantation management practices, especially low productivity, which induces them to expand into new areas. BMP helps to improve smallholders' livelihoods through sustainable production of rubber while emphasizing environmental sustainability by encouraging stakeholders to comply with environmental parameters and norms.

Baseline

In Murung Raya the major constraints that need to be addressed by BMP are low productivity of rubber per hectare, the use of low quality coagulant (leading to a decline in rubber quality and rubber elasticity), poor post-harvest management (leading to additional costs to clean the rubber in processing facilities) and inappropriate storage of rubber slabs (causing a reduction of the dry rubber content). Those practices lead to a low selling price at the farm gate and result in farmers increasing their yield by expanding their plantations.

Unlike in southern parts of Central Kalimantan, there are no partner organizations supporting the Murung Raya government or farmers to improve their rubber production.

Desired Results

25% of rubber farmers adopt better management practices.



KEY ACTIONS

- 01

Carry out BMP training needs assessment and develop materials, including a curriculum. This entails a joint field based assessment of existing rubber management practices throughout the supply chain, including producers, collectors and processors. Based on this assessment, a locally appropriate curriculum and training materials for rubber development in Murung Raya will be developed. This will include the improved rubber agroforestry system (RAS) developed by ICRAF⁶⁵ as an alternative to BMP.
- 02

Pilot the farmer field school for rubber production in a selected area. A smallholders' farmer group will be created and developed to meet the needs of the farmers. The farmer field school will act as an entry point to improve land management and as a catalyst towards behavior change from extensive to intensive farming. The existing rubber-based local economic cluster will be selected as the pilot area for this activity.
- 03

Scaling-up the farmer field school to other areas. This will be done only if the pilot phase was evaluated to be a success and any necessary adjustments adopted within the implementation strategy. Scaling-up includes joint learning between farmer groups, a powerful tool to stimulate change and increase confidence of smallholder farmers to experiment with a new approaches.

P3

Plantations 3

Support an inclusive business model to improve the rubber value chain



© FFI

Background

In addition to BMP, an inclusive business approach (IBA) engages all actors in rubber production (farmers, collectors and processors) to develop inclusive and sustainable supply chains. Policy support for the improvement of rubber processing and marketing in Indonesia is already quite strong. At the farmer level, Minister of Agriculture Decree No. 38/2008 provides guidance on establishing a fair price. Under Minister of Trade Decree No. 53/2009, both traders and processors are requested not to buy/sell non-standard products.

IBA aims to increase smallholder farmer livelihoods by: (1) assisting them to apply BMP in their rubber cultivation, (2) helping them establish better storage facilities for raw processed rubber, (3) developing rubber collection points to improve supply, (4) establishing and/or strengthening farmer groups (cooperatives), (5) improving links to buyers, (6) improving administration skills, (7) increasing income through improved

sales (i.e. improved market price for the product), and (8) accessing financial services to cope with higher cost of on-farm maintenance, post-harvest application, and access to information and market. A key element of IBA is the creation of a rubber price mechanism, while will be based on quality of the rubber produced. This mechanism can have an immediate and direct impact on smallholder farmer income when they change their rubber production method.

Creating a more inclusive business for smallholder rubber suppliers generates better access to market, knowledge, technology and income. Buyers are better able to source rubber materials to their specifications at a competitive price and, in some cases, maintain access to better quality rubber products. These interventions are expected to increase the contribution of the rubber sector to the aggregate income of Murung Raya.

Baseline

In Murung Raya, rubber trading is currently conducted by the collectors. To ensure access to a rubber supply, processors typically have open market relationships with collectors. Processors pay a price on the estimated dry rubber content and the cleanliness (dirt content) of the rubber.

As with the BMP intervention, the Murung Raya district government does not have existing support from any partners to improve its rubber value chain. The district works through a rubber processing and marketing unit (*Unit Pengolahan dan Pemasaran Bokar*, UPPB) but still faces challenges in terms of inadequate expertise and resources.

Desired Results

30 rubber farmer groups agree to a quality-based price mechanism with the factories.



KEY ACTIONS

- 01 Create a rubber value chain map to define the relationship and interconnections between the actors involved, the flow of product and services, payment information and the entry points or key leverage points to improve the value chain.
- 02 Conduct a pre-feasibility study on establishing a rubber factory as target priority of district government. The objective is to assess the current business model of the company, the opportunities to improve the inclusion of smallholder farmers, and to create a baseline for innovations development in the business model.
- 03 Develop and implement the quality-based price mechanism, which is agreed by rubber processors, collectors and farmers. Once the price is agreed, the mechanism needs to be piloted to ensure that the pricing mechanism is economical feasible based on transparency and fair setting of prices for smallholder farmers. This exercise will be executed as part of the farmer field school and then scaled up.
- 04 Provide smallholder farmer groups with access to forward contracts and financial services that will allow them to acquire proper processing materials, seed stock, and cover storage facility expenses.

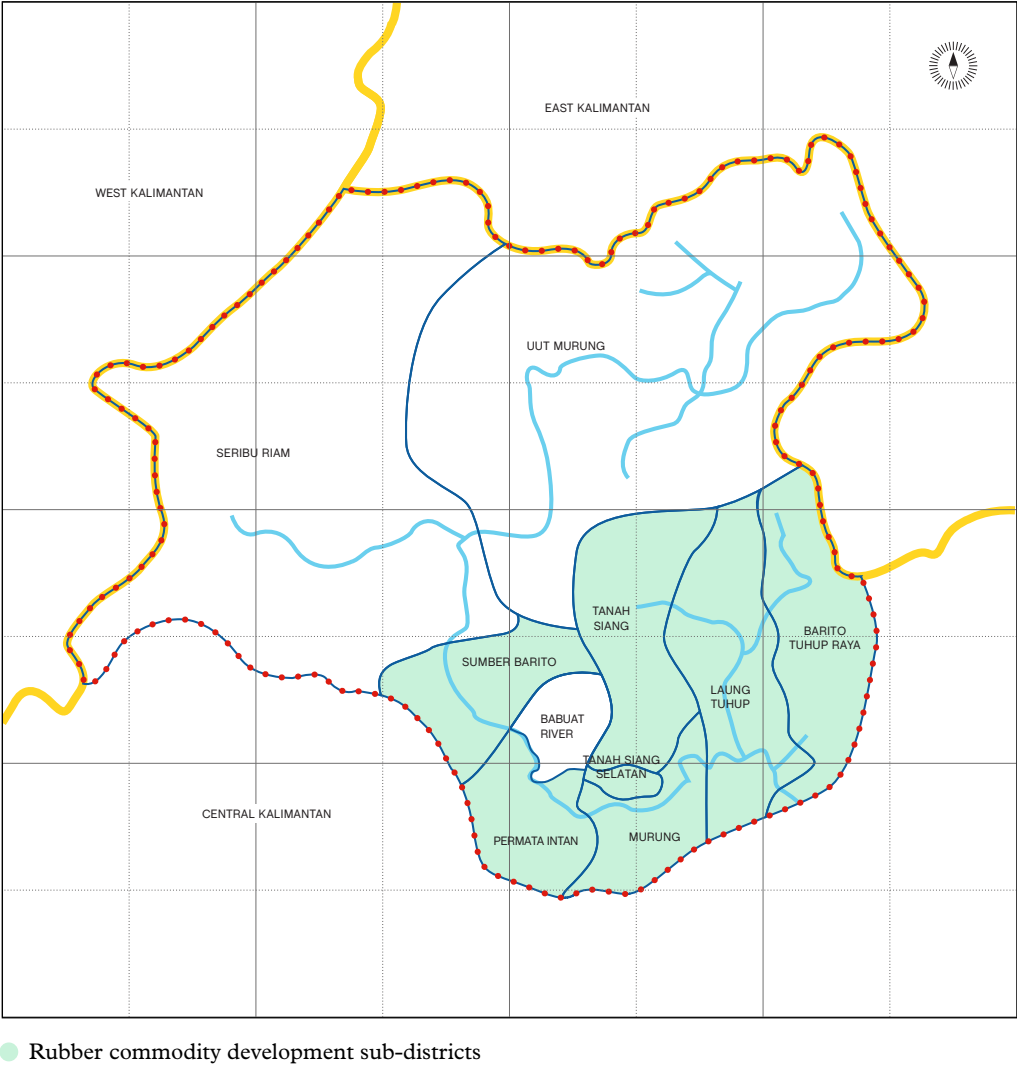
Identified locations for green growth interventions

The interventions that focus on supporting BMP and IBA will initially focus in the sub-districts where the majority of Murung Raya's existing rubber plantations are. These are Laung Tuhup, Tanah Siang, Permata Intan and Murung.⁶⁶ The pilot farmer field school will be situated within the rubber-based local economic cluster that covers these high production sub-districts, as seen in Figure 8.

An initial land suitability assessment has been carried out using a siting tool and Figure 9 shows where rubber production is likely to be suitable in the year 2030. This provides a preliminary indication of where the sustainable expansion of rubber could be targeted.

48

Figure 8 — Plantations sector overview map

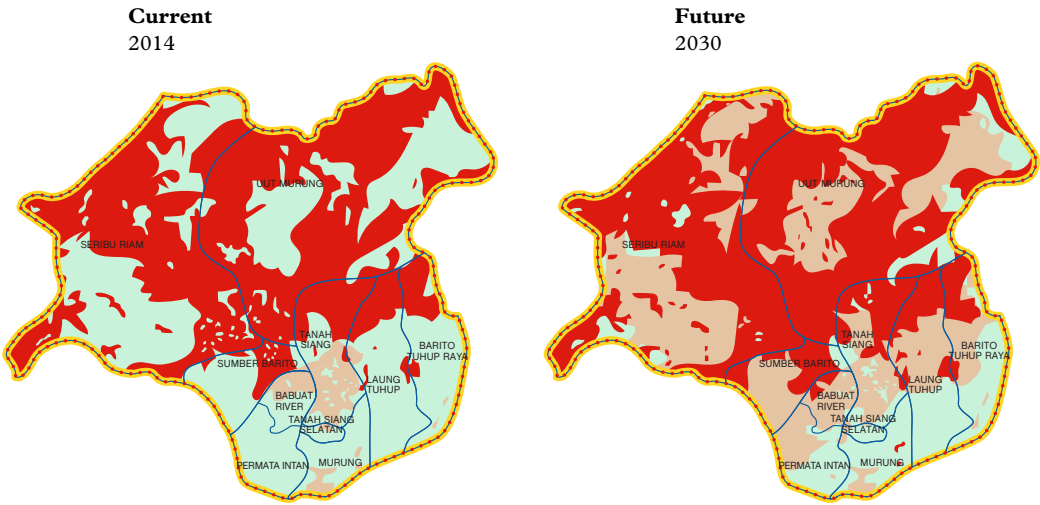


Timeline For Implementation

	Key actions	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
P1	SUPPORT THE SUSTAINABLE AND RESILIENT EXPANSION OF RUBBER PRODUCTION	1											
		2											
		3											
P2	PROMOTE BETTER MANAGEMENT PRACTICES (BMP) TO INCREASE RUBBER PRODUCTIVITY	1											
		2											
		3											
P3	SUPPORT AN INCLUSIVE BUSINESS MODEL TO IMPROVE THE RUBBER VALUE CHAIN	1											
		2											
		3											
		4											

Figure 9 — Distribution of areas based on biophysical suitability for rubber in Murung Raya

- High suitability
- Medium suitability
- Low suitability
- Not suitable



Key stakeholders

The planning and implementation of all the strategy's interventions will require a collaborative effort between all levels of government, private companies, communities and other stakeholders. Any changes to the level of government that is responsible for managing this sector related to Law 23/2014 will need to be considered before implementing this strategy. This section identifies the key stakeholders in the plantations sector.

Public

The interventions within the rubber sector will be led and coordinated by Murung Raya's Plantation Agency (*Dinas Perkebunan, DISBUN*). Other local government bodies that need to be involved are BAPPEDA, for the program development and spatial planning, the Industry and Commerce Agency (*Dinas Perindustrian, Perdagangan, Koperasi, Usaha Mikro, Kecil dan Menengah*, Disperindakop dan UMKM) on the rubber value chain, DISHUT, the management unit of KPH Murung Raya on the land status, the Agriculture, Animal Husbandry and Fisheries Agency (*Dinas Pertanian, Peternakan dan Perikanan, DISTANAKAN*) on the intensive farming system, planting materials and extension services. Most importantly, the Plantation Agency needs to work closely with all the actors in the rubber supply chain at the local level, including the smallholder farmer groups, rubber collectors and PNPM Mandiri Perdesaan, who have both manpower and budget resources.

Collaboration will also be required with the provincial-level government, through *DISHUTBUN*, BAPPEDA, the ad-hoc Spatial Plan Coordination Agency (*Badan Koordinasi Penataan Ruang Daerah, BKPRD*), the provincial National Land Agency (*Badan Pertanahan Nasional, BPN Provinsi*) for the proposed spatial plan. At the national-level, coordination with Ministry of Agriculture (*Kementerian Pertanian*), which is in charge of the plantation and commerce of agriculture commodities, Ministry of Environment and Forestry and the Ministry of Agrarian Affairs and Spatial Planning (*Kementerian Agraria dan Tata Ruang*) is required.

Private

In case that the government can facilitate direct selling from the smallholder farmer groups to the processors, then the government can apply the inclusive business approach to improve post-harvesting treatments and the market chain. Within the rubber supply chain, the private sector acts as processors (factories), such as PT. Inhutani III (Murung Raya), Banjarmasin (PT. Insan Bonafide, PT. Hok Tong, PT. Balimas), Palangka Raya (PT. Borneo Makmur Lestari) and Buntok (PT. Bumi Asri Pasaman). The processors in South and Central Kalimantan have also developed an association called GAPKINDO (*Gabungan Pengusaha Karet Indonesia*), which could be an important partner. This association is also responsible for providing input on pricing and sharing the daily price of rubber to the mass media.

Other

Currently, no NGOs partner with Murung Raya's Plantation Agency in developing the district's rubber sector. The district government can invite and provide written recommendations to targeted NGOs that have experience of implementing projects related to rubber development and community engagement. In this case, for example, Conservation International and SNV Netherlands Development Organization could be potential partners in providing the BMP training to rubber smallholders. Both organizations have plans to partner in developing a BMP training module for rubber farmers and Murung Raya could be a potential pilot area. The University of Palangka Raya should also be engaged to contribute ideas taken from their research and to provide expertise.

49

Box 1

Green growth
in the agriculture sector

Several interventions proposed in the forestry and plantations sectors of this strategy can support the district's target to shift from traditional agriculture practices towards a more permanent agriculture system. Currently, only 5% of the district is designated for wetland agriculture and most of the food-crops, including rice, are planted on dry land. Local communities apply traditional slash and burn farming techniques to open more land, even though there is sufficient available land for agriculture in the district (the average farmer in Murung Raya has roughly two hectares of land).⁶⁷

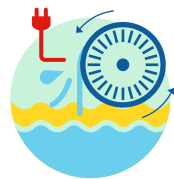
Slash and burn systems generate significant amounts of carbon emissions as well as haze, which has a negative impacts on communities' health due to the poor air quality. Therefore, the Agriculture, Livestock and Fishery Agency of Murung Raya has developed a plan to promote the establishment of permanent agriculture areas to address these issues. However, changing current farming practices is challenging as the slash and burn system is deeply embedded in the local culture. The establishment of a permanent agriculture area will maximize land function, support environmental protection and increase agriculture production, assuming that proper agriculture techniques are employed.

The proposed interventions in the forestry sector, such as resolving land-tenure conflicts and enabling the community-based forest management, will provide clarity on the land boundaries, including land allocated for agriculture activities. In addition, the plantations sector interventions can be adopted by the agriculture sector, with some relevant adjustments for the establishment of permanent agriculture activities.



5.4 Energy

RATIONALE



Increasing access to electricity is an important element of boosting Murung Raya's GDP and a focus on rural electrification will ensure inclusive growth.

In 2012, 85% of the villages in Murung Raya had access to electricity; however, only 33.8% of the total households in the district had access to electricity from the state electricity company (PLN).⁶⁸ Expanding the electricity grid to the remote areas of central and northern Murung Raya, where the population density is particularly low, is likely to take decades. At the present only the area near the district capital of Puruk Cahu has consistent electricity from the grid, which is provided by two commercial-scale 1–2 MW diesel generators operated by PLN.⁶⁹ However, this more densely populated area still experiences frequent blackouts. The district's rural communities mainly rely on diesel generators (gensets) that burn imported diesel fuel, which is a major cost to households (around IDR 660,000 month or 19.8% of typical household income in Central Kalimantan).⁷⁰

The responsible utilization of the Murung Raya's natural resources, as described in the other sector chapters, can provide a boon to the regional economy. However, this will only be achieved if the local communities are ready and able to capitalize on these opportunities. A central element of this is the availability of reliable and low-cost energy solutions in the district, especially for the processing activities that add value to the district's raw materials. Therefore, identifying and realizing the most appropriate methods to provide power to Murung Raya is a key part of delivering green growth.

Increasing access to electricity is an important element of boosting Murung Raya's GDP and a focus on rural electrification will ensure inclusive growth. The low levels of wealth in the northern



parts of Murung Raya represent a big opportunity to increase per-capita GDP by increasing access to electricity, a prerequisite to further economic activities. In addition, developing appropriate energy solutions in the district will generate employment opportunities for local communities and engaging with energy sector operators will help communities to develop the skills needed to effectively manage relationships with companies looking to support future mining logging operations.

Expanding the national grid, which is largely supplied by coal, is not economically viable and operating local diesel power plants will become even more costly as national fuel subsidies are removed. Developing a large-scale coal-fired plant is not currently possible as coal production in the district is still limited and acid rain caused by SOx and NOx emissions would be highly detrimental for biodiversity in the Heart of Borneo region.

In terms of renewable energy options, investors are assessing the feasibility of a large-scale hydro facility at Muara Joloi that would produce an estimated 130 MW and boost the district's generation capacity by almost 100%.⁷¹ However, if the plant is developed five villages will be flooded by a dam. This project is still years away from realization as the environmental impact assessment has not been finalized and no financing has been secured or license granted. Previous attempts to establish micro-hydro plants have been unsuccessful due to inadequate maintenance and poor upstream watershed management. The district has limited other renewable energy options, as there are no large scale plantations for biomass-to-energy facilities,

although there is potential for solar photovoltaic (PV) and reports of potential geothermal resources, which could be exploited in the future.

The equitable development of infrastructure is one of the seven priorities stated in Murung Raya's current RPJMD, including building appropriate power plants to stimulate economic growth. As a mountainous district that includes the catchment area for one of Borneo's main rivers, the medium-term development plan also recognizes the need to improve the management and conservation of the district's numerous rivers, lakes and water resources. Establishing a districtwide, distributed micro-hydro (100kW-1 MW per unit) generation program linked with village-based community forest conservation plans offer a locally-appropriate solution for Murung Raya to meet its rural electrification goal while delivering green growth.

The Murung Raya government sees rural electrification using micro-hydro power as a priority and recognizes its benefits to supporting future economic growth while reducing poverty and unemployment. The RENSTRA of the district's Mining and Energy Agency highlights the need to equally distribute electrification to improve community livelihoods and aims to bring electricity to all villages and communities in the district. Realizing the energy potential of Murung Raya's rivers has already been identified as a government priority and the district government has allocated a portion of its annual budget for micro-hydro development.



A © Hendrik Segah / GGGI

B © CIFOR (CC BY-NC-ND 2.0)

OVERVIEW OF
GREEN GROWTH INTERVENTIONS

Considering Murung Raya's mountainous terrain and good hydrological resources, this strategy focuses on increasing rural electrification by establishing a network of micro-hydro power facilities on the district's extensive river network. At the moment, there are limited other sustainable energy options to exploit in the district, although there is potential to develop biomass-to-energy, solar PV and, potentially, geothermal in the future. A program to establish a network of micro-hydro facilities should include both repairing the existing plants that are no longer operational and identifying appropriate sites for new facilities.

✓
E 1
Establish a network of micro-hydropower facilities

A new network of micro-hydro facilities should build off the district's existing efforts by repairing the plants that are no longer operational and ensuring that effective maintenance systems are in place. Beyond this, additional locations for micro-hydro facilities should be identified through community-based watershed mapping to ascertain accurate hydrological data. Once the sites for new micro-hydro facilities have been selected, careful design of each plant is necessary to optimize electricity generation and minimize environmental impact. Both financial resources and a company with the necessary experience need to be identified before construction can commence. An effective operations system will need to be developed to ensure local communities are equipped to carry out regular maintenance.

Desired
green growth outcome

“
Increased electrification of remote communities utilizing the district's extensive hydrological resources.
”

— Suhardi Buhoy, S.Hut. MM
Head of Mining and Energy Agency,
Murung Raya district

Table 6 — A dashboard of green growth performance indicators for the energy sector

No.	Indicator
1	Annual change in energy contribution to GDP (IDR)
2	Population with access to electricity (%)
3	Population with access to renewable energy (#)
4	Electricity generated using renewable energy resources (%)
5	Investments in renewable energy facilities (IDR)



© FFI



E 1

Energy 1

Establish a network of micro-hydropower facilities



© Karnalo / WWF-Canon

Background

Micro-hydropower technology is a proven solution to delivering a sustainable supply of electricity to rural communities. There are already hundreds of micro-hydro facilities operating across Indonesia,⁷² although to date there has been relatively little success with the technology in Kalimantan. However, initial financial costs and human resource requirements present considerable barriers to further use of the technology. The Government of Indonesia recognizes the green growth benefits of micro-hydropower and a number of programs have supported the development of facilities, including the *Lingkungan Mandiri Perdesaan* (LPM PNPM) program.⁷³ The Government of Indonesia has set a target to increase the installed capacity of micro-hydro facilities to 2,846 MW by 2025. The strategies to achieve this target include integrating micro-hydro facility development with community economic activities, maximizing irrigation networks for micro-hydro, promoting a national micro-hydro industry and developing an effective financing mechanism.⁷⁴

As with any mechanical system, a well-planned design, construction and operations are critical to success. The design should make the most the hydrological resources available to maximize electricity production, reduce

transmission costs, use appropriate technology and minimize environmental damage, including deforestation. It is best to engage companies that specialize in build-operate-transfer (BOT) schemes, as they will have the experience to keep costs down and ensure effective implementation. Micro-hydro facilities face numerous operational challenges to ensure regular maintenance is carried out, including access to technicians or the necessary parts, so training of local teams is essential. Before any construction can commence, financing must be secured, which requires the production of a feasibility study and a business plan.

Replacing diesel gensets with micro-hydro power can save households the cost of buying fuel, which can be a substantial portion of their monthly income. Burning kerosene also has negative health and climate impacts, which can be avoided to switching to other energy sources. Using micro-hydropower to increase electrification in remote areas facilitates access to basic services, such as the Internet and evening lighting, which are essential to extend study time and achieve higher educational levels. Finally, linking upland community forests to micro-hydro systems will improve communities' resilience.

Baseline

A number of villages in Murung Raya already have micro-hydro facilities, including Angkoi Liso, Belawan, Olong Siron and Serunung. However, only the Olong Siron facility is functioning well, while the other plants lack sufficient water flow, do not have operational turbines or have struggled collecting fees, resulting in difficulties implementing scheduled maintenance. The Murung Raya government has also been hesitant to allocate an operations and maintenance budget from its annual budget.

A feasibility study for micro-hydro power potential in the district has identified six villages (Beralang, Kumbang Kolang, Purnama, Olung Balok, Kelapeh Baru and Tumbang Empat) and the local government has allocated a budget for developing these sites.



Desired Results

Four micro-hydro facilities effectively operating.



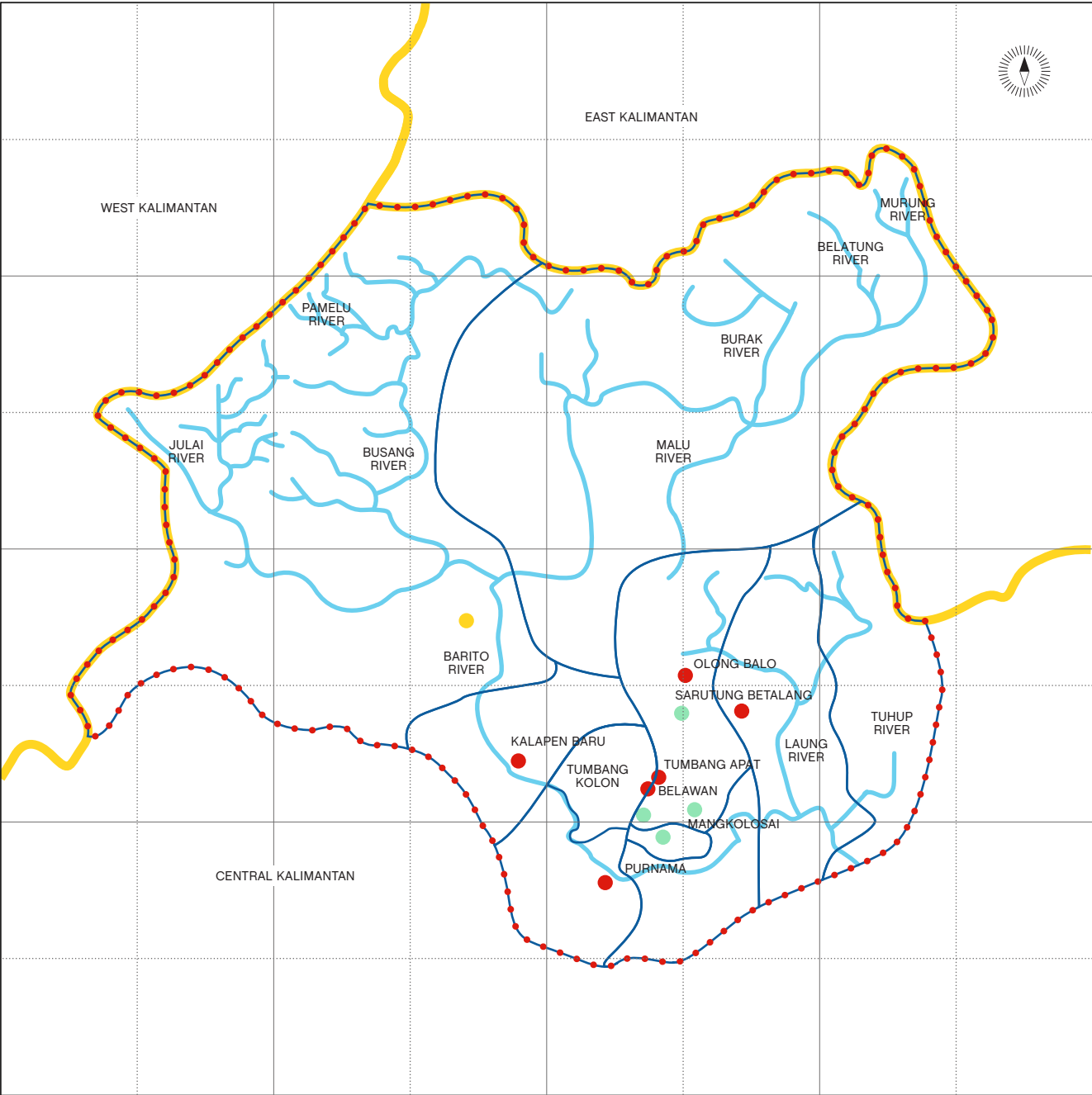
KEY ACTIONS

- 01 Carry out the necessary repairs on the micro-hydro plants that are no longer operational and ensure that effective maintenance systems are in place.
- 02 Conduct a technical hydrological assessment to identify sites with micro-hydro potential. This activity should be based on the existing data gathered by the district government and, where possible, work in partnership with the local communities to strengthen their awareness and support for the facilities.
- 03 Design the network of micro-hydro facilities at appropriate sites using the information provided from the hydrological assessment and broader socio-economic data to maximize electrification.
- 04 Identify and secure finance to construct and operate the micro-hydro facilities. This will include producing feasibility studies and a business plan for each proposed site.
- 05 Construct the micro-hydro facilities by engaging a company that specialize in BOT schemes and with suitable local knowledge of the district's context.
- 06 Create effective operations systems, including a maintenance-training program for local communities, aided by external partners and a small contingency fund to be set up in advance of any breakdown.

Identified locations for green growth interventions

The existing micro-hydro plants in Murung Raya are shown in Figure 10, along with a number of potential sites identified by the district government. The target locations for new micro-hydro facilities will be determined by the assessment of Murung Raya's hydrological resources and need for electrification, including the government's existing data. It is likely that the network of micro-hydro plants focuses on the uplands of northern Murung Raya, including Uut Murung and Seribu Riam sub-districts, which both contain abundant water resources and the most remote communities. The northern sections of Tanah Siang, Laung Tuhup and Barito Tuhup Raya sub-districts are also likely to be focus areas.

Figure 10 — Energy sector overview map



● Existing micro-hydro facilities ● Potential micro-hydro facilities ● Proposed Muara Joloi large scale hydro facilities

Key stakeholders

The planning and implementation of all the strategy's interventions will require a collaborative effort between all levels of government, private companies, communities and other stakeholders. Any changes to the level of government that is responsible for managing this sector related to Law 23/2014 will need to be considered before implementing this strategy. This section identifies the key stakeholders in the energy sector.



Public

The interventions within the energy sector will be led and coordinated by Murung Raya's Mining and Energy Agency (*Dinas Pertambangan dan Energi, DISTAMBEN*). Coordination will also be required with the provincial DISTAMBEN and the national Ministry for Energy and Mineral Resources (*Kementerian Energi dan Sumber Daya Mineral, ESDM*).



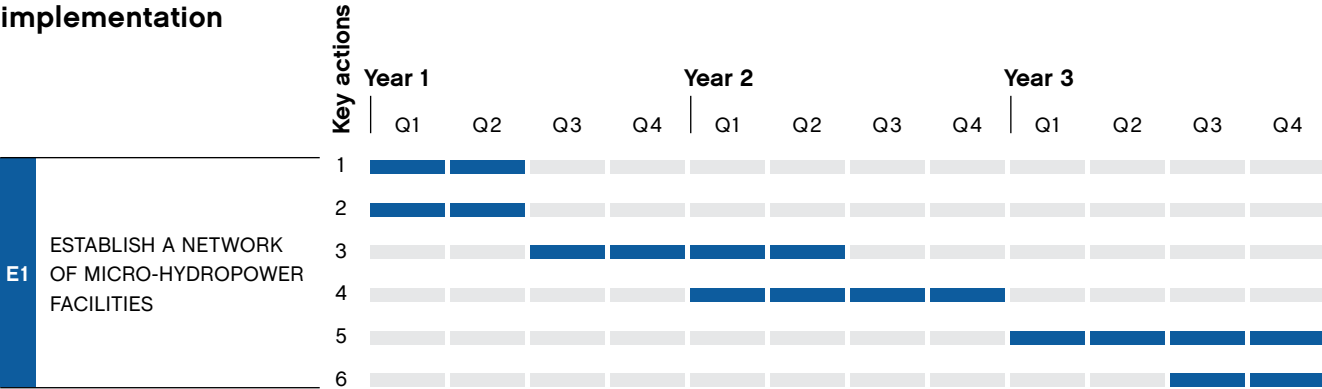
Private

A private engineering company that specializes in BOT schemes for micro-hydro facilities will need to be contracted design and construction of the network. The companies involved in the construction of the existing micro-hydros in Murung Raya should be consulted before this work commences.

Other

The primary stakeholders are the communities in which the micro-hydro facilities will be constructed, who will need to be involved from the start of the design process and must give their free, prior, informed and consent (FPIC) before any construction commences. NGOs will play a critical role in working with communities to engage them in this process. Once the micro-hydro facilities are operational, the communities will need to be trained to run a regular maintenance, aided by external partners.

Timeline for implementation



Box 2

Other renewable energy options for Murung Raya

While this strategy focuses on developing sustainable energy from the district's abundant hydrological resources, there are other renewable energy options available in Murung Raya. In particular, there are various agriculture sectors that produce waste with high calorific value that can be used as a renewable source of energy. For example, capturing biogas from livestock waste can increase access to sustainable energy, especially in rural areas, while reducing methane emissions, a potent greenhouse gas. This technology has already been trialed by a community in the transmigration area, UPT Bahitom SP1,⁷⁵ and could be scaled up to other parts of the district. Other options for Murung Raya include the production of bioethanol from cassava or using woodchips from the timber processing as an energy source.

5.5

Cross-cutting

RATIONALE

While this strategy proposes a range of a sectoral interventions, achieving green growth also requires a number of cross-cutting actions that support productive and sustainable activities in all economic sectors. Ensuring transparency and stakeholder engagement in policy and investment decisions will help establish a foundation of good governance and reduce social conflict, a significant risk to potential investors. An attractive business environment that attracts private sector investment in sustainable activities is essential for green growth. Equally, a systematic approach to integrating the value of the district's natural capital into policy and investment decision-making processes is essential to deliver economic growth that is compatible with environmental sustainability. This section outlines four cross-cutting interventions that support green growth.

Desired green growth outcomes

There are two
cross-cutting green growth outcomes

“

A transparent and investor-friendly business environment is established with reduced social conflict from overlapping or illegal concessions.

”

— Ir. Nyarutono Tundjan, MM
Head of Administration and Governance (Assistant I), Murung Raya district

“

The value of the district's natural capital and ecosystem services are integrated into policy and investment decision-making processes.

”

— Ir. Pahala Budiawan, MM
Head of Regional Development Planning Agency, Murung Raya district



© FFI



Table 7 — A dashboard of green growth performance indicators for the cross-cutting sector

No.	Indicator	No.	Indicator
RELATED TO A TRANSPARENT AND INVESTOR-FRIENDLY BUSINESS ENVIRONMENT		RELATED TO INTEGRATING THE VALUE OF NATURAL CAPITAL INTO PROCESSES	
1	Direct investment in the district (IDR)	1	Payments received by communities under PES scheme (IDR)
2	Allocations of DAK and DAU as percent of GDP (%)	OTHER INDICATORS INCLUDED ELSEWHERE:	
3	Credit growth (%)	• HCVA (ha) at the impact level	
4	Capital outflow (IDR)	• Spatial plan compliance indicators in forestry, mining and plantations sectors	
5	Incidences of tenure-related conflict (#)		



Improve the licensing system

Desired Results

All land use licenses are declared valid and free of competing claims.

Carry out a High Conservation Value (HCV) assessment

Desired Results

All new concessions avoid HCV areas and all HCV areas within existing concessions are protected.

Ecosystems provide a range of goods and services that underpin economic activity but which are not valued by market systems resulting in policy and investment decisions that degrade existing stocks of natural capital. Often it is the poorest and most vulnerable communities who depend most on ecosystem services, so they are most effected by policies that under-value natural capital. Indonesia's forests provide a range of ecosystem services, including sequestering carbon dioxide, regulating hydrological systems, maintaining soil quality, preventing erosion, hosting biodiversity, and providing timber, non-timber forest products (NTFPs) and aesthetic, cultural and spiritual values.

A first step is to recognizing the value of ecosystem services of Murung Raya is to identify areas of High Conservation Value (HCV), i.e. “a biological, ecological, social or cultural value, which is considered to be of outstanding significance or critical importance.”⁷⁶ A districtwide HCV assessment provides guidance to decision makers on appropriate locations for economic activities and supports the development of appropriate management and monitoring plans to ensure that high value areas are maintained or enhanced. Carrying out an HCV assessment can help to determine the optimal levels of economic activity in an area, including mining, forestry and plantation operations, while not exceeding an ecosystem's carrying capacity. Along with a desk study, it is important to use participatory approaches to gather site data to engage local communities in the process and strengthen their knowledge of ecosystem services. When the assessment is finished, the results should be adopted into the licensing mechanisms to ensure concessions are not issued in HCV areas.



Establish a community-based Payment for Ecosystem Services (PES) scheme

Desired Results

Communities in 10 villages
receive payments for preserving
the watershed protection services
of their forests.

Payment for Ecosystem Services (PES) schemes provide incentives to landowners to manage their land in a manner that ensures the provision of an ecological service. Establishing a community-based PES scheme requires the identification of the end users of the ecosystem service and those responsible for managing the land that provides the ecosystem service. A contractual arrangement and a payment structure will need to be established between these two groups, along with a system of monitoring, reporting and verification (MRV) the results. Alternatively, when the end users of the ecosystem service are poor, or the beneficiaries and the land managers are the same community, the government can establish a fund to provide the necessary incentives. PES schemes can only exist where land rights are clear and the community has the capacity to manage the incoming revenues;⁷ therefore, a prerequisite for such a scheme is clarity on land tenure and the existence of appropriate institutions.

One opportunity for using this mechanism in Murung Raya, which connects this strategy's forestry and energy sector interventions, is a PES scheme that rewards upstream communities for sustainably managing the forests within a watershed to ensure that an adequate quality and volume of water flows to micro-hydro facilities. Deforestation and land clearing for logging, agriculture, mining or settlements can cause erosion, landslides and floods that will interrupt the operations of micro-hydro generators and increase maintenance costs. Upstream village forest institutions can be rewarded for preserving their forests' watershed protection services, thus maintaining consistent water flows for the micro-hydro facilities and supporting rural electrification. If appropriate, this PES scheme could be expanded to include other ecosystem services, including carbon sequestration and biodiversity.

Conduct a strategic environmental impact assessment of the spatial plan

Desired Results

The spatial plan is updated to reflect the recommendations of the strategic environmental impact assessment.

The Law on the Environment (Law 32/2009) requires a strategic environmental impact assessment (*Kajian Lingkungan Hidup Strategis*, KLHS) to be conducted as a basis for all proposed development and spatial plans. The KLHS process includes analysis of the impacts of the proposed plans, considers alternatives and makes recommendations to mitigate the impacts. A KLHS should be undertaken if the policy creates risks related to climate change, loss of biodiversity, increases in intensity and areas affected by floods, landslides, draught or fires, decreases the quality and abundance of natural resources, increases in change of function of the state forest area, increases the number of people in poverty or threatens the sustainability of a group of people, or increases the risks to the health and safety of people. The Ministry of Environment issued KLHS guidelines in 2011 that emphasize the participation of stakeholders to identify key sustainable development issues related to environment, society and the economy.

In Murung Raya, a KLHS has not yet been completed for the district's spatial plan. Evaluating the environmental and social impacts of the spatial plan will assist the district government to evaluate different options and optimize outcomes based on social, environmental and economic development criteria. This will require capacity building, especially in Geospatial Information Systems (GIS) expertise to analyze the areas assigned to different land-uses. GIS is also an important technical capacity for evaluating permit request and avoiding overlaps.

06 Next steps

This strategy outlines a range of interventions that will help Murung Raya achieve inclusive green growth based on the sustainable and efficient use of its natural resources.

This strategy outlines a range of interventions that will help Murung Raya achieve inclusive green growth based on the sustainable and efficient use of its natural resources. Reaching this target will require coordinated action from the district government, private companies, local communities and non-governmental organizations. Shifting from the 'business as usual' growth pathway requires these stakeholders to establish new partnerships and institutions, apply new skills, analytical tools and technologies, create new incentives and markets, reform existing policies and ensure they are enforced in a fair and even manner. All of these actions need financial support, which must come from a range of different public and private sources. This chapter highlights the next steps for Murung Raya to implement this strategy by utilizing the district's own financial resources and by attracting investment from external sources. In addition, it proposes a monitoring and evaluation framework to review the implementation progress of the strategy.

District government budget

Indonesia's budgeting process is embedded within the planning system, so in order to receive finance from a government budget the actions in this strategy must be incorporated into the appropriate development plan. The district government budget receives revenues from a range of sources, including tax and non-tax revenue sharing, the general allocation fund (*Dana Alokasi Umum*, DAU) and the special allocation fund (*Dana Alokasi Khusus*, DAK), see Annex 2 for Murung Raya's district government revenues and expenditures. There are a number of options for 'mainstreaming' this strategy's actions into the district's development plans:

Through the annual development planning and budgeting processes

Every year the 'musrenbang' process allows local residents to meet and discuss the issues facing their communities and decide upon priority development needs. This bottom-up process presents an opportunity for the green growth actions in this strategy to be discussed within communities and, potentially, included in the list of priorities. Each communities' requests then proceed through a series of meetings at the village level (January), sub-district level (February) and district level (March). In parallel, there is forum for local government agencies (February/March), coordinated by Bappeda, which also provides a venue for discussing the strategy's green growth actions. The final development priorities are included in the district government's annual work plan (*Rencana Kerja Pemerintah Daerah*, RKPD) and the work plans for each SKPD (*Rencana Kerja*, RENJA). These plans are then used as a basis for the budget (*Anggaran Pendapatan dan Belanja Daerah*, APBD), which must be approved by the local parliament (*Dewan Perwakilan Rakyat Daerah*, DPRD).

Through the district government's budget revision process

Every three months local governments hold a meeting to track and evaluate the progress of RKPD implementation (*Rapat Koordinasi Pengendalian*, rakordal). Every August, the local government agencies can change their activities and budget allocations by submitting a document (*Dokumen Pelaksanaan Perubahan Anggaran*, DPPA) to the budget revision committee and then Bappeda. The DPPA process is an opportunity for district government agencies to support the green growth actions in this strategy by changing budget allocations or including new budget lines for activities, if necessary. Because this budget revision takes place with only five months remaining in the year, this option only provides an opportunity for funding small-scale activities, such capacity building or the purchase of low-cost equipment.

Adoption into medium-term development plans and strategic plans

When Murung Raya's next RPJMD is being developed, this strategy can be used as a basis to ensure that the district's development priorities are aligned with green growth. The green growth vision chapter and sector rationale sections outline the district's key development challenges, which should be included in the RPJMD's analysis of strategic issues. The logical framework in Annex 1 includes a number of indicators and targets that the district could adopt to measure its performance towards green growth. Finally, the strategy's interventions and actions could be included within the RPJMD's priority programs, which would then be included in future budgets. Once the RPJMD is finalized, the local government agencies, SKPD, can also use this strategy for integrating green growth indicators, targets and actions into their RENSTRA.

The mainstreaming of this strategy into these government processes will be more effective with the legal endorsement of the district head. Therefore, a Bupati's Decree (*perbup*) for the strategy should be pursued as a priority to move towards green growth implementation.

Other Sources of Finance

Achieving green growth will require financial commitment from the district government along with a range of external partners. Investment will need to be attracted from both public and private sources, both from within Indonesian and overseas. The interventions and actions from this strategy will need to be packaged into suitable business cases or proposals to attract potential investors or donors, respectively. A number of options for potential sources of finance are listed below:

International donors and development partners

Supporting green growth in developing and emerging countries is a development priority for a wide range of developed country governments. Many countries already fund development programs in Indonesia that support low-carbon activities and many are looking for new opportunities. In addition, a number of multilateral development partners support Indonesia to achieve sustainable developed by offering technical assistance, grants and loans, including the World Bank, the Asian Development Bank, the United Nations and the Global Environment Facility (GEF). There are also many international NGOs working in Indonesia on green growth-related work, including WWF and TNC. Following an assessment of the geographic and sectoral priorities of these potential partners, the green growth interventions and actions in this strategy can be packaged into program proposals and submitted to the appropriate partner. The strategy's logical framework (see Annex 1) provides a starting point for the production of operational program proposals that are ready for submission.

Private sector companies

The implementation of this strategy will require private companies operating in Murung Raya's forestry, mining, plantations and energy sectors to commit their own resources and expertise. This will only happen if the green growth opportunities present an attractive return on investment with a suitable and manageable level of risk. The district government and development partners must actively engage with private companies managing land and natural resources in Murung Raya to highlight the financial and economic benefits of adopting sustainable practices. This will require the development of feasibility studies and business cases that include market analysis, technical requirements, risk assessments and full economic cost and benefit analysis that include social and environmental factors that do not have a market value. In addition, the district government must endeavor to create an attractive investment environment, starting by ensuring clarity on land tenure (see forestry chapter) and a full license review (see cross-cutting chapter).

Provincial and national government funds

There are many opportunities within the Government of Indonesia's internal funding mechanisms to support green growth activities in Murung Raya that are outside of the district government's budget. These include the deconcentration fund (*Dana Dekonsentrasi*) and the co-administration fund (*Dana Tugas Pembantuan*, TP), which are both sourced from the national budget for regional programs. Another option is the national program for community empowerment (*Program Nasional Pemberdayaan Masyarakat*, PNPM), which awards small grants to communities to support the construction of roads, irrigation, schools, and health centers. The 'Green PNPM' supports communities understand the negative and long-term impact of their actions on the surrounding environment and natural resources, and is particularly relevant for achieving green growth.



© FFI



Monitoring and evaluation

A simple and transparent monitoring and evaluation system is a vital component to ensure that this strategy is effectively implemented. Monitoring refers to the routine collection and analysis of information to track progress against set plans and targets. Evaluation involves identification and reflection of the effects of what has been achieved and judging their worth.⁷⁸

Annex 1 of this strategy provides a logical framework that can be used as a basis of the implementation of the monitoring and evaluation process. This "log frame" includes indicators for the strategy's;

Impact

A dashboard of indicators to assess districtwide progress towards the green growth vision.

Outcomes

Indicators for each of the strategy's sectors and cross-cutting themes (both related to a transparent business environment and valuing natural capital).

Outputs

A clear target for each of the strategy's interventions and an underlying series of indicators to monitor progress for the necessary actions to achieve the desired results.

This log frame supports the implementation of the proposed interventions with precise, evidence-based reporting. It will also contribute to the SKPDs' and other stakeholders' learning and knowledge sharing. Making the district's performance against this log frame public will uphold accountability and allow for feedback from relevant stakeholder, especially targeted beneficiaries.

07 Annexes

7.1

Logical framework

OUTCOMES	① Forestry: A locally-managed and sustainable forestry sector that attracts investment, creates jobs, reduces social conflict, maintains carbon stocks and biodiversity, and has access to global markets	
Indicators (district level)	1. Annual change in forestry contribution to GDP	IDR
	2. Direct investment in the forestry sector	IDR
	3. Annual change in production levels of all forestry-related products	unit/year
	4. Jobs in the forestry sector	#
	5. Number on tenure-related conflicts in state forest area	#
	6. Annual change in area of degraded land within state forest area	ha
	7. All forestry concessions comply with spatial plan	Y/N
OUTPUTS	①.1 Community-based forest management systems established (e.g. village forests) and managed effectively	
2015-18 Target Indicators (action level)	4 village forests established and managed effectively	
	1. Area of customary forest areas mapped	ha
	2. Village forest permits approved by Ministry of Environment and Forestry	#
	3. Village forest management institutions established	#
	4. Community-based forest management plans developed	#
	5. Revenue generated by village forest from NTFPs, selective logging and ecotourism	IDR
OUTPUTS	①.2 A production forest management unit (KPH) operationalized and managed effectively	
2015-18 Target Indicators (action level)	1 production KPH operationalized and managed effectively	
	1. FMU approval received from Ministry of Environment and Forestry	(Y/N)
	2. Stakeholders participating in development of management plan	#
	3. 10-year management plan completed	#
	4. Staff recruited and completed necessary training	#
	5. Inactive concessions addressed	#
	6. Incidences of forest encroachment	#
	7. SMEs established within KPH	#
OUTPUTS	①.3 A production forest management unit (KPH) operationalized and managed effectively	
2015-18 Target Indicators (action level)	All active forest concessions meet legal and voluntary certification and at least half achieve FSC certification	
	1. Timber companies that agree to pursue certification	#
	2. Forestry Agency staff completed training in certification process	#
	3. Forest concessions that achieve PHPL/FSC certification	#
	4. Area of forest within PHPL/FSC certified forest concessions	ha
	5. Timber-related industries with 'chain of custody' certification applied	#
	6. Certified timber produced	tons

IMPACT Indicators (district level)	To contribute towards establishing a sustainable economy that delivers prosperity equitably to the people of Murung Raya while minimizing GHG emissions and maintaining natural capital stocks for future generations		1. Annual GDP growth rate (%) 2. GDP per capita (IDR) 3. Gross capital formation (IDR) 4. Employment/population ratio (%)	5. Population below the poverty line (%) 6. GINI coefficient 7. Greenhouse gas (GHG) emissions per capita (tons of CO ₂ e) 8. Net annual change in above and below ground carbon stocks (tons of CO ₂)	9. High Conservation Value Area (HCVA) (ha) 10. Environmental Quality Index (EQI) 11. Fiscal capital index 12. Household Vulnerability Index (HVI)
OUTCOMES	② Mining: A responsible mining sector that drives economic growth, minimizes its environmental and social impacts, and recognizes traditional knowledge				
Indicators (district level)	1. Annual change in mining contribution to GDP	IDR			
	2. Direct investment in the mining sector	IDR			
	3. Annual change in production levels of mining commodities	ton/year			
	4. Jobs in the mining sector	#			
	5. Number on tenure-related conflicts in mining concessions	#			
	6. Mercury pollution levels in rivers	Hg/m ³			
	7. All mining concessions comply with spatial plan	(Y/N)			
OUTPUTS	②.1 Road networks within and between mining concessions designed to minimize environment impact				
2015-18 Target Indicators (action level)	All new mining road networks constructed to minimize environmental impact				
	1. Mining companies agree to minimize environmental impact of their roads	#			
	2. People trained to use geospatial software	#			
	3. District regulation updated to make environmentally friendly road planning compulsory	Y/N			
	4. Mining and Energy Agency staff trained to ensure compliance with regulation	#			
OUTPUTS	②.2 Small-scale miners' capacity to undertake environmental measures improved				
2015-18 Target Indicators (action level)	XX% of small-scale mines adopt necessary environmental measures				
	1. Small-scale mining licenses issued	#			
	2. Small-scale miners trained on environmental measures	#			
	3. Partnerships established between large and small-scale mining operations	#			
	4. Credit provided to small-scale miners committed to strong environmental performance	IDR			
OUTPUTS	②.3 Legally required reclamation and rehabilitation after mine closure carried out				
2015-18 Target Indicators (action level)	All operating mines have developed reclamation and rehabilitation plan				
	1. Mining company employees trained in land reclamation obligations	#			
	2. Stakeholders participating in land reclamation planning process	#			
	3. Mining and Energy Agency staff trained to monitor rehabilitation activities	#			
	4. Land reclamation activities integrated into spatial plans	#			
OUTCOMES	③ Plantations: Efficient and integrated smallholder rubber plantations that produce high-quality, high-value products in a sustainable manner in appropriate locations				
Indicators (district level)	1. Annual change in plantation sector contribution to GDP	IDR			
	2. Direct investment in the plantation sector	IDR			
	3. Annual change in production levels of plantation commodities	ton/year			
	4. Jobs in the plantation sector	#			
	5. Number on tenure-related conflicts in area for other land uses	#			
	6. Annual change in area of degraded land within area for other land uses	ha			
	7. All plantation concessions comply with spatial plan	Y/N			
OUTPUTS	③.1 New rubber plantations created in environmentally and socially appropriate locations				
2015-18 Target Indicators (action level)	100,000 ha of new rubber plantations created in appropriate locations				
	1. Area of environmentally and socially appropriate land identified	ha			
	2. New rubber plantations integrated into spatial plans	#			
	3. Rubber farmers trained in sustainably establishing new plantations	#			
	4. High-quality seedlings provided for new rubber plantations	#			
OUTPUTS	③.2 Rubber farmers' capacity to apply better management practices improved				
2015-18 Target Indicators (action level)	25% of rubber farmers adopt better management practices				
	1. Completion of training needs assessment for rubber farmers	(Y/N)			
	2. Locally appropriate curriculum and training material produced	(Y/N)			
	3. Farmer field schools established	#			
	4. Rubber farmers that participate in farmer field schools	#			
	5. Meetings of rubber farmer groups	#			
OUTPUTS	③.3 Inclusive business approach adopted across the rubber value chain				
2015-18 Target Indicators (action level)	30 rubber farmer groups agree to a quality-based price mechanism with the factories				
	1. Completion of rubber value chain analysis	(Y/N)			
	2. Development of pre-feasibility study of rubber factory	(Y/N)			
	3. Rubber farmers utilizing the quality-based price mechanism	#			
	4. Rubber farmers with access to financial services	#			

OUTCOMES	④ Energy: Increased electrification of remote communities utilizing the district's extensive hydrological resources	
Indicators (district level)	1. Annual change in energy contribution to GDP	IDR
	2. Population with access to electricity	%
	3. Population with access to renewable energy	#
	4. Electricity generated using renewable energy resources	%
	5. Investments in renewable energy facilities	IDR
OUTPUTS	④.1 A network of micro-hydro facilities managed effectively	
2015-18 Target Indicators (action level)	4 micro-hydro facilities effectively operating	
	1. Repairs of existing plants completed	Y/N
	2. Completion of technical hydrological assessment	Y/N
	3. Feasibility studies of micro-hydro facilities	#
	4. Local communities trained in effective operations systems	#
	5. Electricity produced by micro-hydro facilities	KWh

70

OUTCOMES	⑤ Cross-cutting: A transparent and investor-friendly business environment is established with reduced social conflict from overlapping or illegal concessions	
Indicators (district level)	1. Direct investment in the district	IDR
	2. Allocations of DAK and DAU as percent of GDP	%
	3. Credit growth	%
	4. Capital outflow	IDR
	5. Incidences of tenure-related conflict	#
OUTPUTS	⑤.1 A transparent licensing system for all land use activities is established	
2015-18 Target Indicators (action level)	All land use licenses are declared valid and free of competing claims	
	1. Established of a publicly available licensing information management system	Y/N
	2. District government staff trained to assess concession legality	#
	3. District government staff trained to use Geospatial Information System (GIS)	#
	4. Concessions identified with competing claims	#
	5. Concessions revoked due to missing permits	#
	6. District licensing mechanism updated to improve transparency	Y/N

OUTCOMES	⑥ Cross-cutting 2: The value of the district's natural capital and ecosystem services are integrated into policy and investment decision-making process	
Indicators (district level)	1. Payments received by communities under PES scheme	IDR
	Other indicators included elsewhere:	
	• HCVA (ha) at the impact level	
	• Spatial plan compliance indicators in forestry, mining and plantations sectors	
OUTPUTS	⑥.1 Economic activity does not take place in areas of High Conservation Value (HCV)	
2015-18 Target Indicators (action level)	All new concessions avoid HCV areas and all HCV areas within existing concessions are protected	
	1. Completion of a districtwide HCV assessment	Y/N
	2. Local communities involved in the HCV assessment	#
	3. Licensing mechanisms and underlying regulations updated to recognize results of HCV assessment	Y/N
	4. Owners of existing concessions with HCV areas agree to protect these areas	#
OUTPUTS	⑥.2 A community-based Payment for Ecosystem Services (PES) scheme is established	
2015-18 Target Indicators (action level)	Communities in 10 villages receive payments for preserving the watershed protection services of their forests	
	1. End users of an ecosystem service identified	Y/N
	2. Community responsible for managing the land that provides the ecosystem service identified	Y/N
	3. People from respective groups take part in public consultation meetings	#
	4. Community institutions established to manage negotiations and benefit sharing	Y/N
	5. Contractual arrangement agreed with payment triggers, amounts and timings	Y/N
OUTPUTS	⑥.3 A strategic environmental assessment (SEA) of the district's spatial plan conducted	
2015-18 Target Indicators (action level)	The spatial plan is updated to reflect the recommendations of the strategic environmental impact assessment	
	1. SEA ToR that identifies key environmental and socio-economic issues	Y/N
	2. Collection of baseline data related to key issues	Y/N
	3. Major impacts and consequences of proposed spatial plan identified	Y/N
	4. Mitigation measures to prevent, reduce or mitigate impacts proposed	Y/N
	5. People that participate in public consultations on SEA	#
	6. Amendments to district spatial plan proposed	Y/N

71

Definition of green growth indicators

No.	Indicator	Definition
1	Annual GDP growth rate (%)	The percentage change in Gross Domestic Product (GDP) from the previous year. GDP is the monetary value of all the finished goods and services produced within a jurisdiction over a specific time period. This indicator provides insight into the general direction and magnitude of growth for the overall economy.
2	GDP per capita (IDR)	The value of the Gross Domestic Product (GDP) divided by the population. The GDP per capita is the output of a jurisdiction’s economy per person. This indicator provides insight into the average prosperity level of a jurisdiction’s population.
3	Gross capital formation (IDR)	Gross capital formation consists of expenditure on fixed assets in the jurisdiction, including land improvements (e.g. ditches and drains), machinery, the construction of roads, railways, schools, offices, hospitals, and residential, commercial and industrial buildings. This indicator shows the level of domestic public and private investment activity in an economy.
4	Employment to population ratio (%)	The employment rate of a jurisdiction is measured as the employment to population ratio. This is the percentage of the working-age population (from 15 to 64 year) that is gainfully employed. This indicator provides insight into the labor market conditions of the jurisdiction.
5	Population below the poverty line (%)	The World Bank defines ‘moderate poverty’ as an income of less than US\$ 2 per day. Based on this, the poverty rate in a jurisdiction is measured as the percentage of the population with an income of less than US\$ 2 day. This indicator provides insight into the relative size of the population living in poverty.
6	Gini coefficient	The Gini coefficient (or index) is a measure of the income distribution of a jurisdiction’s residents. The index is the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. This indicator provides insight into the inequality in a jurisdiction (0 = perfect equality and 100 = perfect inequality).
7	GHG emissions per capita (tons of CO ₂ e)	The amount of greenhouse gas (GHG) emissions produced within a jurisdiction divided by the population. GHG emissions, including carbon dioxide (CO ₂), methane (CH ₄) and fluorinated gases (e.g. HFC), contribute to climate change. This indicator is a measure of the emissions per population of a jurisdiction.
8	Net annual changes in above and below ground carbon stocks (tons of CO ₂)	The total annual changes in the terrestrial carbon stocks in a jurisdiction. This is a measure of both the additions and reductions in the carbon stored both above the ground (e.g. in forests) and below the ground (e.g. in soils). This indicator shows whether a jurisdiction is losing carbon into the atmosphere or accumulating carbon from the atmosphere, and the scale of this loss or gain.
9	High conservation value area (HCVA) (ha)	A ‘high conservation value area’ (HCVA) is a natural area with environmental, socioeconomic, biodiversity or landscape value. The HCVA approach is an important tool for responsible natural resource management. Before an assessment is carried out to identify the HCVA within a jurisdiction, an interpretation of HCV definitions in the local context is required.
10	Environmental Quality Index (EQI)	Indonesia’s Environmental Quality Index (EQI) was developed by the Ministry of Environment in 2014. The EQI monitors aspects of environmental performance and includes a framework for capturing data to inform environmental management systems. The EQI measures key environmental indicators, including water and air quality and forest cover, across industry sectors.
11	Fiscal capacity index	The fiscal capacity index is used by the Indonesian government to allocate budget expenditures to sub-national governments. It is calculated by dividing the net revenue that a government receives by the number of poor people in the jurisdiction. This indicator provides insight into the public finance resilience of a jurisdiction, as the higher the ratio, the more fiscal capacity a government has to spend on non-poverty related expenditures.
12	Household Vulnerability Index (HVI)	The Household Vulnerability Index (HVI) is a statistical index to measure household vulnerability. The index defines vulnerability as the “presence of factors that place households at risk of becoming food insecure or malnourished”. The HVI is focused on agriculture and food security, and can be used to assess a population’s resilience to external shocks.

7.2

Financial information

Government Revenues

There are three types of government revenue:



Regional real income (PAD/Pendapatan Asli Daerah)

This comprises of regional tax, retribution, revenue from regional wealth management and other PAD revenues.



Transfer fund/grants

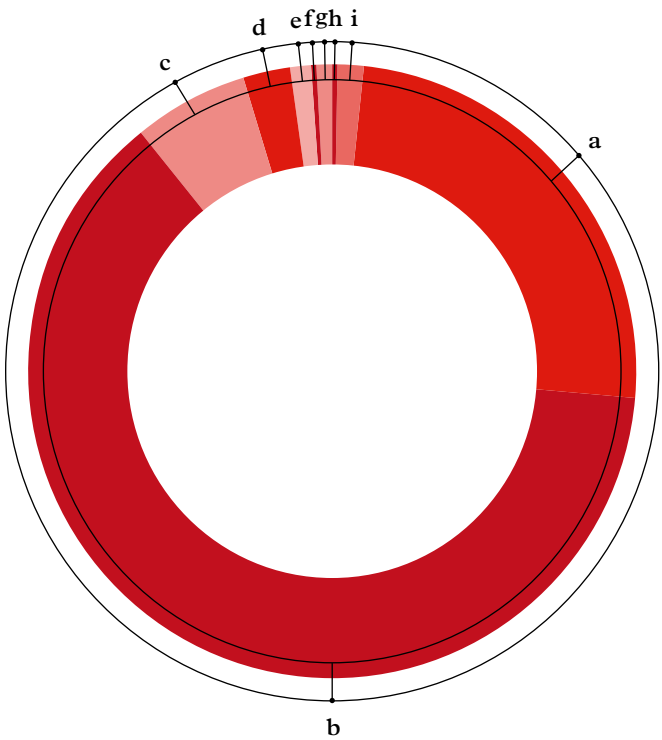
This includes tax revenue sharing/non-tax revenue sharing, the general allocation fund (*Dana Alokasi Umum*, DAU) and the special allocation fund (*Dana Alokasi Khusus*, DAK).



Other legal income

This involves tax revenue sharing from the province or other governments, adjustment fund & special autonomy fund, and financial aid from the province or other governments.

Figure 11 — Break down of Murung Raya government revenues in 2013



a	Tax revenue sharing/non-tax revenue sharing	24.53%
b	DIAU (General Allocation Fund)	62.89%
c	Tax revenue sharing from the province or other governments	6.12%
d	Adjustment fund and Special Autonomy Fund	2.53%
e	Financial aid from the province or other governments	1%
f	Regional tax	0.27%
g	Regional retribution	0.73%
h	Revenue from regional wealth management	0.32%
i	Other PAD incomes	1.62%
	DAK (Special Allocation Fund)	0%

In 2013, the total revenue of Murung Raya district government was IDR 868,135,806,000 (USD 68.4 million), which was primarily derived from transfer funds or grants (87.4% or IDR 758,909,875,000).⁷⁹ Within this category, two components contributed the largest share; the general allocation fund (DAU), which contributed 62.9% (or IDR 545,932,782,000) of tax revenue sharing/non-tax revenue sharing, which accounted for 24.5% (or IDR 212,977,093,000) of the district government's total revenue.⁸⁰

The General Allocation Fund (*Dana Alokasi Khusus*, DAU) aims to equalize the regional financial capacity to fund regional needs and implement decentralization programs.⁸¹ The DAU is a “block grant” and the sub-national government decides how it used based on an assessment of their priorities and needs. The legal basis for the DAU is the Act 33/ 2014 on Financial Balance between National and Sub-National Governments and Government Decree 55/2005 on Balance Fund. The DAU is allocated for the province and district by using a formula based on the ‘basic allocation’ (*alokasi dasa0072*) and ‘fiscal gap’ (*celah fiscal*). The DAU equals the basic allocation added to the fiscal gap. The calculations for the basic allocation and fiscal gap are specified by the two regulations mentioned above.

Government Expenditure

Meanwhile, there are two types of government expenditure:



Direct spending

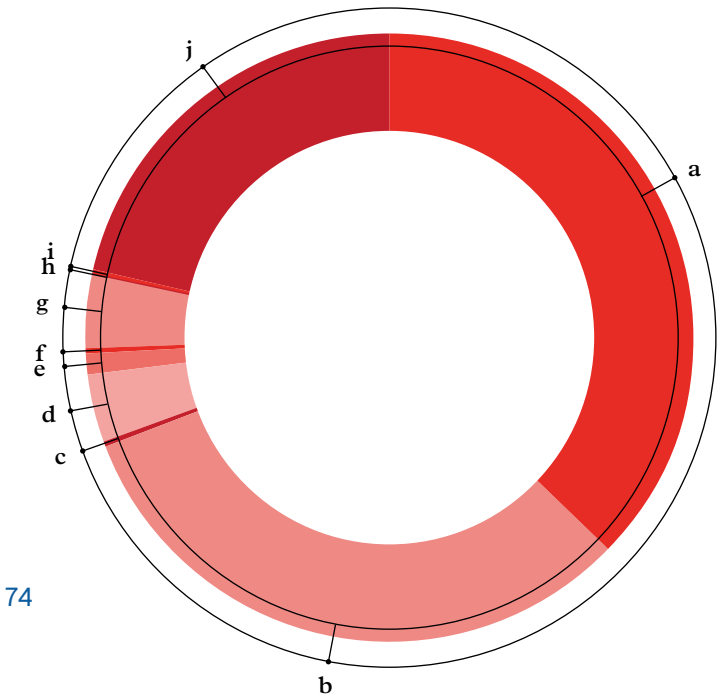
This includes expenditures on civil servants, goods and services, and capital spending.



Indirect spending

This comprises expenditures on civil servants, subsidies, grants, social aid, revenue sharing, financial aid and unexpected items.

Figure 12 — Break down of Murung Raya government spending in 2013

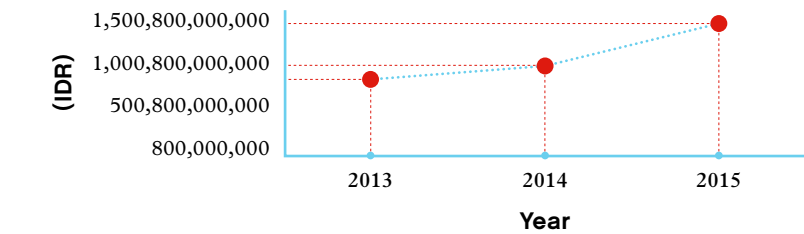


74

In 2013, the Murung Raya district government's total expenditure was IDR 805,796,601,000 (USD 63.5 million), resulting in a budget surplus of IDR 62,339,205,000 (USD 4.9 million).⁸² The direct expenditure accounted for 60.9% (or IDR 490,730,462,000) of the Murung Raya government' total spending, compared to 39.1% on indirect expenditure.⁸³ The district government's expenditure was predominantly capital spending (35.6 %), civil servant's indirect expenditure (30.2 %) and goods and services (20.1 %).⁸⁴

a	Capital spending	35.57%
b	Civil servant (indirect spending)	30.23%
c	Subsidy	0.29%
d	Grants	3.39%
e	Social aid	1.21%
f	Revenue sharing expenditure	0.1%
g	Financial aid	3.86%
h	Unexpected expenditure	0.02%
i	Civil servant (direct spending)	0.32%
j	Goods and services spending	20.1%

Figure 13 — Past nominal and projected expenditure of Murung Raya government



Between 2013 and 2014, Murung Raya government spending increased by 17.7% from IDR 805,796,601,000 (USD 63.5 million) in 2013⁸⁵ to IDR 948,579,496,340 (USD 74.7 million) in 2014.⁸⁶ This expenditure is predicted to increase by a further 45.9% to IDR 1,383,609,587,769 (USD 108.9 million) in 2015.⁸⁷ There was a similar level of direct expenditure in 2013 and 2014, 60.9% and 59.7%, respectively; however, it is expected that this will increase to almost 70% in 2015.⁸⁸

The projection for year 2015 shows that over 30% of the total government spending will be directed to Murung Raya Public Work Office.⁸⁹ This is more than twice the amount of the total spent for this sector in 2014 (IDR 161,070,405,791 or 17% of the total government expenditure). Spending for Forestry Office is predicted to account for only 1.5% of the total expenditure in 2015,⁹⁰ a much lower amount compared to the previous year (2.8% of the total spending).⁹¹ Correspondingly, the Plantation Office budget is estimated to be 1.6% of the total spending in 2015,⁹² which is similar with 2014,⁹³ even though the plantation sector is one of the main income sources for most of the district's households.⁹⁴

Table 8 — Murung Raya government estimated expenditure in 2014 and 2015 for all SKPDs

SKPD	Expenditure in 2014	% of the total gov's exp.	Estimated exp. in 2015	% of the total gov's exp.	Change in expenditure	% change in the proportion
Education office	240,381,504,332	25.34%	254,858,567,403	18.42%	14,477,063,071	-6.92%
Health office	47,741,414,541	5.03%	57,754,038,297	4.17%	10,012,623,756	-0.86%
Public work office	161,070,405,791	16.98%	466,360,000,000	33.71%	305,289,594,209	16.73%
BAPPEDA	10,643,205,456	1.12%	12,328,790,300	0.89%	1,685,584,844	-0.23%
Telecommunication and information office	11,464,305,863	1.21%	26,422,756,983	1.91%	14,958,451,120	0.70%
Environment office	7,188,565,686	0.76%	11,678,313,844	0.84%	4,489,748,158	0.09%
Population and civil registry office	7,095,321,328	0.75%	5,099,747,529	0.37%	-1,995,573,799	-0.38%
Woman empowerment and family planning office	3,461,849,281	0.36%	6,464,774,306	0.47%	3,002,925,025	0.10%
Social, labor and transmigration office	12,318,280,242	1.30%	23,425,072,410	1.69%	11,106,792,168	0.39%
Industry, trade, cooperative and sme office	5,654,468,824	0.60%	4,826,698,962	0.35%	-827,769,862	-0.25%
National unity, politics and community protection office	5,256,602,260	0.55%	8,652,235,554	0.63%	3,395,633,294	0.07%
Pamong praja police unit office	3,779,448,065	0.40%	5,398,928,375	0.39%	1,619,480,310	-0.01%
Regional secretariat	102,526,627,404	10.81%	128,309,575,698	9.27%	25,782,948,294	-1.53%
KDH and WKDH	358,188,990	0.04%	659,962,640	0.05%	301,773,650	0.01%
District parliament secretariat	18,078,505,402	1.91%	19,326,988,821	1.40%	1,248,483,419	-0.51%
District parliament	3,808,181,161	0.40%	3,692,019,289	0.27%	-116,161,872	-0.13%
Revenue, regional finance & asset mangmt office	97,713,628,114	10.30%	99,650,784,291	7.20%	1,937,156,177	-3.10%
Inspectorate	7,351,313,434	0.77%	14,009,266,006	1.01%	6,657,952,572	0.24%
Regional employment office	8,472,353,823	0.89%	12,482,926,401	0.90%	4,010,572,578	0.01%
Food resilient office	3,333,863,886	0.35%	6,025,000,000	0.44%	2,691,136,114	0.08%
Village community empowerment office	18,741,010,182	1.98%	19,045,753,230	1.38%	304,743,048	-0.60%
Agriculture, husbandry and fishery office	22,708,757,018	2.39%	15,922,770,007	1.15%	-6,785,987,011	-1.24%
Forestry office	26,598,398,919	2.80%	20,111,971,899	1.45%	-6,486,427,019	-1.35%
Plantation office	15,445,462,699	1.63%	22,213,083,769	1.61%	6,767,621,070	-0.02%
Mining and energy office	26,850,239,242	2.83%	30,000,000,000	2.17%	3,149,760,758	-0.66%
Tourism, cultural, youth and sport office	10,318,752,992	1.09%	28,205,187,464	2.04%	17,886,434,473	0.95%
Integrated licensing service office	2,656,788,108	0.28%	3,942,000,000	0.28%	1,285,211,892	0.00%

75

Footnotes

— District overview

1 Murung Raya BPS 2009, *Murung Raya in Figures*. Murung Raya BPS, Puruk Cahu.

2 Jarvis, A., Reuter, H.I., Nelson, A., Guevara, E., 2008, Hole-filled SRTM for the globe Version 4. Available from: the CGIAR-CSI SRTM 90m Database <<http://srtm.csi.cgiar.org>>.

3 Hansen, M. C. *et al.* High-resolution global maps of 21st-century forest cover change. *Science* **342**, 850–3 (2013).

4 Van Paddenburg, A, Bassi, AM, Buter, E, Cosslett, CE, Dean, A 2012, ‘Heart of Borneo: Investing in Nature for a Green Economy’, *WWF Heart of Borneo Global Initiative*. Available from: < http://awsassets.wwf.org.au/downloads/fl013_heart_of_borneo_investing_in_nature_for_a_green_economy_jan12.pdf>.

5 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, p. 258.

6 Head of BAPPEDA Murung Raya, pers. comm. 16 January 2015.

7 Murung Raya Government 2014, *Analisis Pertumbuhan Ekonomi Murung Raya 2013*. Murung Raya Government, Puruk Cahu, pp. 43-61.

8 Ministry of Finance Regulation No. 158 2007.

9 Ministry of Finance Regulation No 158 2007.

10 Murung Raya BPS 2011, *Murung Raya Dalam Angka 2010/2011*, Murung Raya BPS, Puruk Cahu, p. 61. Available from: <http://murakab.bps.go.id/data/publikasi/publikasi_2/publikasi/>.

11 Ministry of Finance Regulation No. 26 2009.

12 Murung Raya Government 2014, *Analisis Pertumbuhan Ekonomi Murung Raya 2013*. Murung Raya Government, Puruk Cahu.

13 Murung Raya District Government 2013, *Medium Term Regional Development Plan 2013 – 2018 of Murung Raya*, Murung Raya District Government, Puruk Cahu, p. II-19.

14 Uzi/Sal 2014, ‘Murung Raya Kembangkan Perkebunan Karet Rakyat [Nusantara]’, *Harian Umum Pelita* 22 December. Available from: <<http://www.pelita.or.id/baca.php?id=97522>>..

15 Murung Raya Forestry Agency 2014, Development Strategic Plan of (RENSTRA) for Forestry of Murung Raya District 2013 – 2018, Forestry Agency, Puruk Cahu.

16 Murung Raya BPS 2013, *Murung Raya in Figures*. Murung Raya BPS, Puruk Cahu.

17 Murung Raya Forestry Agency 2014, Development Strategic Plan of (RENSTRA) for Forestry of Murung Raya District 2013 – 2018, Forestry Agency, Puruk Cahu, p. II-45.

18 Murung Raya BPS 2013, *Murung Raya in Figures*. Murung Raya BPS, Puruk Cahu.

19 Murung Raya BPS 2013, *Murung Raya in Figures*. Murung Raya BPS, Puruk Cahu.

20 Central Kalimantan BPS 2014, *Garis Kemiskinan, Persentase Penduduk Miskin, dan Jumlah Penduduk Miskin Menurut Kabupaten/Kota (Rp/kapita/bulan)*. Available from: <<http://kalteng.bps.go.id/ktda-92-garis-kemiskinan-persentase-penduduk-miskin-dan-jumlah-penduduk-miskin-1.html>>. [23 December 14].

21 Central Kalimantan BPS 2014, *Banyaknya Desa Menurut Kabupaten/ Kota Serta Letak Geografisnya 2013*. Available from: <<http://kalteng.bps.go.id/ktda-36-jumlah-desa-menurut-letak-geografisnya-1.html>>. [23 December 14].

22 Murung Raya BPS 2013, Statistik Daerah Kabupaten Murung Raya 2013, Murung Raya BPS, Puruk Cahu.

— Focus sector details

Forestry

23 Hansen, M. C. *et al.* High-resolution global maps of 21st-century forest cover change. *Science* **342**, 850–3 (2013).

24 Murung Raya Forestry Agency 2014, Development Strategic Plan of (RENSTRA) for Forestry of Murung Raya District 2013 – 2018, Forestry Agency, Puruk Cahu.

25 Murung Raya Forestry Agency 2014, Development Strategic Plan of (RENSTRA) for Forestry of Murung Raya District 2013 – 2018, Forestry Agency, Puruk Cahu, pp. VI-6 – IV-7.

26 Decree P.49/Menhut-II/2008 and amended in Permenhut No. P.14/ Menhut-II/2010 and Permenhut No. P.53/Menhut-II/2011.

27 Prasetyo 2014, *Serba Serbi Hutan Desa (HD)*. Available from: <<http://bp2sdmk.dephut.go.id/emagazine/index.php/teknis/1-serba-serbi-hutan-desa.html>>.

28 FFI Field Coordinator, pers. comm., Murung Raya.

29 Teropong 2014, Dishut Propinsi Kalteng, Dishut Murung Raya dan Perhimpunan Teropong Fasilitas Pembuatan, Pembetukan Kelembagaan Hutan Desa di Murung Raya. Available from: <<http://www.teropong.org/2014/06/dishut-propinsi-kalteng-dishut-murung.html>>.

30 Matthew J. Bock, “Formalization and Community Forestry in Jambi, Indonesia: Indigenous Rights, Rural Migrants, and the Informal Divide,” *The Josef Korbel Journal of Advanced International Studies* 4 (Summer 2012): 60.

31 Ministry of National Development Planning 2014, *Rancangan Awal Rencana Pembangunan Jangka Menengah Nasional 2015 -2019*. Available from: <http://musrenbangnas.bappenas.go.id/upload/rpjmn/rancangan_awal/Buku_I_RPJMN_2015-2019.pdf>.

32 Established by Forestry Ministry Decree No SK.964/Menhut-II/2013.

33 BP REDD+ 2014, *Desa Hijau Paradigma Baru Pengelolaan SDA*. Available from: <<http://www.reddplus.go.id/berita/berita-redd/2139-desa-hijau-paradigma-baru-pengelolaan-sda>>. [23 December 14].

Mining

34 Murung Raya BPS 2011, *Murung Raya Dalam Angka 2010/2011*, Murung Raya BPS, Puruk Cahu, p. 61. Available from: <http://murakab.bps.go.id/data/publikasi/publikasi_2/publikasi/>.

35 Ministry of Finance Regulation No. 26 2009.

36 Murung Raya BPS 2011, *Murung Raya Dalam Angka 2010/2011*, Murung Raya BPS, Puruk Cahu, p. 61. Available from: <http://murakab.bps.go.id/data/publikasi/publikasi_2/publikasi/>.

37 BAPPEDA 2014, *Geospatial Dataset*, BAPPEDA, Puruk Cahu. Provided to GGGI during engagement meeting.

38 Murung Raya Mining and Energy Agency 2014, pers.comm. 19 November, Murung Raya Trip Report.

39 PT Marunda Grahamineral, PT Asmin Koalindo Tuhup, Cokal Group and PT Marunda Graha Mineral.

40 Surara Pembaharuan 2014, Harga Sawit dan Karet Anjlok, Petani Menjerit’, *Suara Pembaharuan* 12 September. Available from: <<http://sp.beritasatu.com/pages/e-paper/2014/09/12/files/assets/basic-html/page30.html>>.

41 Murung Raya Mining and Energy Agency 2014, pers.comm., Murung Raya Trip Report.

42 BAPPEDA 2014, *Geospatial Dataset*, BAPPEDA, Puruk Cahu. Provided to GGGI during engagement meeting.

43 International Institute for Environment and Development 2002, ‘Breaking New Ground: Minerals, Mining and Sustainable Development’, p. xvi.

44 IRMA 2014, *IRMA Standard for Responsible Mining (Draft 1.0) Chapter 2.9 Obtaining Community Support and Delivering Benefits*. Available from: <http://www.responsiblemining.net/irma-standard/draft_07-2014/chapter-2.9-obtaining-community-support-and-delivering-benefits/>. [23 December 14].

45 He, Y, Franklin, SE, & Guo, X 2009, ‘Narrow-Linear and Small Area Forest Disturbance Detection and Mapping from High Spatial Resolution Imagery: A Framework’, p. 1.

46 Murung Raya Mining and Energy Agency 2014, pers.comm 19 November., Murung Raya Trip Report.

47 Earthworks, *Water Quality - Poisoned Water*. Available from: <<http://nodirtygold.earthworksaction.org/impacts/water#.VJjcpsAAB>>. [23 December 14].

48 Cochrane, Joe 2014, ‘Small-Scale Gold Mining Pollutes Indonesian Lands’, The New York Times 13 January, p. B1. Available from: <http://www.nytimes.com/2014/01/03/business/international/small-scale-gold-mining-pollutes-indonesian-lands.html?_r=0>.

49 Toumbourou, Tessa 2014, ‘Indonesia Now World’s Largest Exporter for Coal Power Stations: But There Are Costs’, *Asia Foundation, In Asia*. Available from: <<http://asiafoundation.org/in-asia/2014/10/08/indonesia-now-worlds-largest-exporter-of-coal-for-power-stations-but-there-are-costs/>>.

50 Britmindo. “Mining Reclamation and PT. Britmindo Jasa Utama Commitment.” December 17, 2014. <http://britmindo.com/en/news/detail/2123/mining-reclamation-and-pt-britmindo-jasa-utama-commitment>.

51 Britmindo. “Mining Reclamation and PT. Britmindo Jasa Utama Commitment.” December 17, 2014. <http://britmindo.com/en/news/detail/2123/mining-reclamation-and-pt-britmindo-jasa-utama-commitment>.

Plantations

52 Murung Raya Government 2014, *Analisis Pertumbuhan Ekonomi Murung Raya 2013*. Murung Raya Government, Puruk Cahu.

53 Murung Raya District Government 2013, *Medium Term Regional Development Plan 2013 – 2018 of Murung Raya*, Murung Raya District Government, Puruk Cahu, p. II-19.

54 Uzi/Sal 2014, ‘Murung Raya Kembangkan Perkebunan Karet Rakyat [Nusantara]’, *Harian Umum Pelita* 22 December. Available from: <<http://www.pelita.or.id/baca.php?id=97522>>.

55 Murung Raya District Government 2013, *Medium Term Regional Development Plan 2013 – 2018 of Murung Raya*, Murung Raya District Government, Puruk Cahu, p. II-19.; Murung Raya Plantation Agency 2014, *Development Strategic Plan of (RENSTRA) for Plantation of Murung Raya District 2013 – 2018*, Plantation Agency, Puruk Cahu.

56 Uzi/Sal 2014, ‘Murung Raya Kembangkan Perkebunan Karet Rakyat [Nusantara]’, *Harian Umum Pelita* 22 December. Available from: <<http://www.pelita.or.id/baca.php?id=97522>>.

57 Murung Raya Plantation Agency 2014, pers. comm. 30 Sep & 2 Oct. *Murung Raya Trip Report*.

58 Murung Raya Government 2014, *Analisis Pertumbuhan Ekonomi Murung Raya 2013*. Murung Raya Government, Puruk Cahu.

59 Murung Raya Plantation Agency 2014, pers. comm. 30 Sep & 2 Oct. *Murung Raya Trip Report*.

60 Murung Raya Plantation Agency 2014, pers. comm. 30 Sep & 2 Oct. *Murung Raya Trip Report*.

61 Murung Raya Plantation Agency 2014, pers.comm. 30th Sep & 2 Oct, Murung Raya Trip Report.

62 Uzi 2014, ‘Karet Kualitas Baik Hanya Dihargai Rp4.500/Kg [Nusantara]’, *Harian Umum Pelita* 22 December. Available from: <<http://www.pelita.or.id/baca.php?id=64113>>.

63 Murung Raya Plantation Agency 2014, pers.comm. 30th Sep & 2 Oct, Murung Raya Trip Report.

64 Murung Raya Plantation Agency 2014, Development Strategic Plan of (RENSTRA) for Plantation of Murung Raya District 2013 – 2018, Plantation Agency, Puruk Cahu.

65 Wibawa, Gede Joshi, Laxman, Van Noordwijk, Meine & Penot, Eric Andr’e 2007, ‘Rubber based Agroforestry System (RAS) as Alternatives for Rubber Monoculture System’, IRRDB Annual Conference, 2006, Vietnam.; Wibawa, Gede Joshi, Laxman, Van Noordwijk, Meine & Penot, Eric Andr’e 2008, ‘Rubber Agroforestry System: Options for Smallholders’, International Symposium Land Use After the Tsunami – Supporting Education, Research and Development in the Aceh Region, 4-6 November 2008.

66 Murung Raya District Government 2013, Medium Term Regional Development Plan 2013 – 2018 of Murung Raya, Murung Raya District Government, Puruk Cahu, p. II-27.

67 Sarwono, P, Head of Agriculture, Husbandry, and Fishery Office. 2 October 2014. Personal Communication.

Energy

68 Murung Raya BPS 2013, Statistik Daerah Kabupaten Murung Raya 2013, Murung Raya BPS, Puruk Cahu.

69 Murung Raya Mining and Energy Agency 2014, pers.comm. 1 Oct, Murung Raya Trip Report.

70 Central Kalimantan BPS 2014, *Potret Usaha Pertanian Provinsi Kalimantan Tengah Menurut Sub Sector*, Central Kalimantan BPS, Palangkaraya, p. 28.

71 Murung Raya Mining and Energy Agency 2014, pers.comm. 1 Oct, Murung Raya Trip Report.

72 Antara News Sumbar 2010, ‘Sumbar Memiliki 100 PLTMH Melalui PNNP’, *Antara News Sumbar*. Available from: <http://www.antarasumbar.com/berita/provinsi/d/1/99865/sumbar-miliki-100-pltmh-melalui-pnpm.html>.

73 Merangin PNNP 2013, Impian Masyarakat Desa Kecamatan Tabir Menjadi Kenyaraan. 31 Augustus 2013. *Merangin PNNP*: Blog. Available from: <http://pnpmmerangin.blogspot.com/2013/08/impian-desa-telentam-akan-penerangan.html>.

74 http://www.esdm.go.id/berita/37-umum/1962-potensi-energi-baru-terbarukan-ebt-indonesia.html?tmpl=component&print=1&page=%3E.In%20June%202014,%20ESDM%20Ministry%20(Ministry%20of%20Energy%20and%20Mineral%20Resources).

75 http://www.kabmurungraya.go.id/murungrayakab//berita/46A448BOAC168DE/WARGA%20TRANSMIGRASI%20KAB%20MURUNG%20RAYA,%20KEMBANGKAN%20BIOGAS%20SEBAGAI%20ENERGI%20ALTERNATIF.htm

Cross-cutting

76 Stewart, C, George, P, Rayden, T, Nussbaum, R 2008, ‘Good Practice Guidelines for High Conservation Value Assessments’, *ProForest*, no. 5. Available from: <https://www.hcvnetwork.org/resources/folder.2006-09-29.6584228415/HCV%20good%20practice%20-%20guidance%20for%20practitioners.pdf>.

77 Wunder, Sven 2013, ‘When Payment for Ecosystem Services Will Work for Conservation’, *Conservation Letters*, vol. 6, no. 4, p. 234.

Next steps

78 IFRC 2011, Project/Program Monitoring and Evaluation (M&E) Guide, IFRC, Geneva.

Annexes

79 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

80 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

81 Act No. 33 Year 2014 on Financial Balance Between National and Sub-National Governments; Government Decree NO. 55 Year 2005 on Balance Fund.

82 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

83 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

84 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

85 Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

86 Murung Raya Evaluation and Budget Absorption Acceleration Team (TEPPA) 2014, *Anggaran Pendapatan dan Belanja Daerah Tahun 2014*, December 2014.

87 Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

88 Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

89 Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

90 Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

91 Murung Raya Evaluation and Budget Absorption Acceleration Team (TEPPA) 2014, *Anggaran Pendapatan dan Belanja Daerah Tahun 2014*, December 2014.

92 Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

93 Murung Raya Evaluation and Budget Absorption Acceleration Team (TEPPA) 2014, *Anggaran Pendapatan dan Belanja Daerah Tahun 2014*, December 2014.

94 Uzi/Sal 2014, ‘Murung Raya Kembangkan Perkebunan Karet Rakyat [Nusantara]’, *Harian Umum Pelita* 22 December. Available from: <http://www.pelita.or.id/baca.php?id=97522>.

References

Antara News Sumbar 2010, ‘Sumbar Memiliki 100 PLTMH Melalui PNNP’, *Antara News Sumbar*. Available from <http://www.antarasumbar.com/berita/provinsi/d/1/99865/sumbar-miliki-100-pltmh-melalui-pnpm.html>.

ASPAI 2013, ‘Small-scale Mining in Indonesia - Herding Wildcats’ *The Economist* 27 April. Available from <http://www.economist.com/news/asia/21576725-where-informal-economy-thrives-forest-withers-herding-wildcats>. [14 January 2015].

BAPPEDA 2014, *Geospatial Dataset*, BAPPEDA, Puruk Cahu. Provided to GGGI during engagement meeting.

BAPPENAS, MOHA & Ministry of Environment 2014, *Potret RAD-GRK in Indonesia*.

Batan, (n.d), Law No. 30 year 2007 on Energy, paragraph 20 article 20. Point 2,[online] Available from http://www.batan.go.id/ref_utama/uu_30_2007.pdf [Accessed: 6th March 2015]

Bloomberg 2014, *Rubber Glut Seen Shrinking 46% as Price Slump Slows Tree Tapping*. Available from <http://www.bloomberg.com/news/2014-08-17/rubber-glut-seen-shrinking-as-28-price-decline-deters-tapping.html>. [5 December 2014].

Bock, Matthew 2012, ‘Formalization and Community Forestry in Jambi, Indonesia: Indigenous Rights, Rural Migrants, and the Informal Divide’, *The Josef Korbel Journal of Advanced International Studies*, no. 4, pp. 48-73.

BP REDD+ 2014, *Desa Hijau Paradigma Baru Pengelolaan SDA*. Available from <http://www.reddplus.go.id/berita/berita-redd/2139-desa-hijau-paradigma-baru-pengelolaan-sda>. [23 December 14].

Budhi, GS, SA, Kuswanto, & Iqbal, Muhammad 2008, ‘Concept and Implementation of PES Program in the Cidanau Watershed: a Lesson Learned for Future Environmental Policy’, *Analisis Kebijakan Pertanian*, vol. 6, no. 1, pp. 37-55. Available from <http://pse.litbang.pertanian.go.id/ind/pdf/files/ART6-1a.pdf>. [13 January 2015].

Central Kalimantan BPS 2014, *Potret Usaha Pertanian Provinsi Kalimantan Tengah Menurut Sub Sector*, Central Kalimantan BPS, Palangkaraya, p. 28.

Central Kalimantan BPS 2014, *Banyaknya Desa Menurut Kabupaten/Kota Serta Letak Geografisnya 2013*. Available from <http://kalteng.bps.go.id/ktda-36-jumlah-desa-menurut-letak-geografisnya-1.html>. [23 December 14].

Central Kalimantan BPS 2014, *Garis Kemiskinan, Persentase Penduduk Miskin, dan Jumlah Penduduk Miskin Menurut Kabupaten/Kota (Rp/kapita/bulan)*. Available from <http://kalteng.bps.go.id/ktda-92-garis-kemiskinan-persentase-penduduk-miskin-dan-jumlah-penduduk-miskin-1.html>. [23 December 14].

Central Kalimantan GCF – Governors’ Climate & Forests Task Force 2014, Central Kalimantan GCF – Governors’ Climate & Forests Task Force. Available from <http://www.gcftaskforce-database.org/StateOverview/CentralKalimantan>. [23 December 2014].

Central Kalimantan Governor Decree No. 32/2012 about RAD GRK

Central Kalimantan Province Government 2013, *Central Kalimantan REDD+ Regional Strategy (STRADA REDD+ Kalimantan Tengah)*, Central Kalimantan Province Government, Palangkaraya.

Cochrane, Joe 2014, ‘Small-Scale Gold Mining Pollutes Indonesian Lands’, *The New York Times* 13 January, p. B1. Available from <http://www.nytimes.com/2014/01/03/business/international/small-scale-gold-mining-pollutes-indonesian-lands.html?_r=0>

Daemeter Consulting 2013, 'Situational Review of Central Kalimantan and Priority Districts'. Report prepared for GGGI.

Decree P.49/Menhut-II/2008 and amended in Permenhut No. P.14/Menhut-II/2010 and Permenhut No. P.53/Menhut-II/2011

Earthworks, *Water Quality - Poisoned Water*.
Available from <<http://nodirtygold.earthworksaction.org/impacts/water#.VJjcpsAAB>>. [23 December 14].

Ebregt & De Greve 2000, 'Policy and Best Practice for terrestrial ecosystems in developing countries', *National Reference Centre for Nature Management*, pp. 5-63.

FFI Field Coordinator, pers. comm., Murung Raya.

Hansen, M.C. et al. 2013 'High-resolution global maps of 21st-century forest cover change', *Science (New York, N.Y.)*, no. 342, pp.850–3.
Available from <<http://www.ncbi.nlm.nih.gov/pubmed/24233722>>.

He, Y, Franklin, SE, & Guo, X 2009, 'Narrow-Linear and Small Area Forest Disturbance Detection and Mapping from High Spatial Resolution Imagery: A Framework', p. 1.

IBEKA 2011, *IBEKA Principles*.
Available from <<http://ibeka.netsains.net/>>. [22 December 14].

IFRC 2011, Project/Program Monitoring and Evaluation (M&E) Guide, IFRC, Geneva.

International Institute for Environment and Development 2002, 'Breaking New Ground: Minerals, Mining and Sustainable Development', p. xvi.

IRMA 2014, *IRMA Standard for Responsible Mining (Draft 1.0) Chapter 2.9 Obtaining Community Support and Delivering Benefits*.
Available from <http://www.responsiblemining.net/irma-standard/draft_07-2014/chapter-2.9-obtaining-community-support-and-delivering-benefits/>. [23 December 14].

Jarvis, A., Reuter, H.I. Reuter, Nelson, A. Nelson, Guevara, E. Guevara, 2008, Hole-filled SRTM for the globe Version 4. A.
available from the CGIAR-CSI SRTM 90m Database <<http://srtm.csi.cgiar.org>>).

Merangin PNPM 2013, Impian Masyarakat Desa Kecamatan Tabir Menjadi Kenyaraan. 31 Agustus 2013. *Merangin PNPM: Blog*.
Available from <<http://pnpmmerangin.blogspot.com/2013/08/impian-desa-telentam-akan-penerangan.html>>.

Ministry of National Development Planning 2014, *Rancangan Awal Rencana Pembangunan Jangka Menengah Nasional 2015-2019*.
Available from <http://musrenbangnas.bappenas.go.id/upload/rpjmnrancangan_awal/Buku_I_RPJMN_2015-2019.pdf>.

Ministry of National Development Planning, Green Growth Program, *Prioritizing Investment: Delivering Green Growth*, Global Green Growth Institute.
Available from <<http://www.gggi.org>>. [28 February 2009].

Murung Raya Agriculture, Animal Husbandry and Fishery Agency 2014, *Development Strategic Plan of (RENSTRA) for Agriculture, Livestock and Fishery of Murung Raya District 2013 – 2018*, Agriculture, Animal Husbandry and Fishery Agency, Puruk Cahu.

Murung Raya Agriculture, Animal Husbandry and Fishery Agency 2014, pers.comm., Murung Raya Trip Report.

Murung Raya BPS 2009, *Murung Raya Dalam Angka 2009*, Murung Raya BPS, Puruk Cahu.

Murung Raya BPS 2011, *Murung Raya Dalam Angka 2010/2011*, Murung Raya BPS, Puruk Cahu.
Available from <http://murakab.bps.go.id/data/publikasi/publikasi_2/publikasi/>.

Murung Raya BPS 2013, *Murung Raya Dalam Angka 2013*, Murung Raya BPS, Puruk Cahu.

Murung Raya BPS 2014, *Murung Raya Dalam Angka 2014*, BPS Murung Raya, Puruk Cahu, pp.215-218.

Murung Raya District Government 2013, *Medium Term Regional Development Plan 2013 – 2018 of Murung Raya*, Murung Raya District Government, Puruk Cahu.

Murung Raya Evaluation and Budget Absorption Acceleration Team (TEPPA) 2014, *Anggaran Pendapatan dan Belanja Daerah Tahun 2014*, December 2014.

Murung Raya Forestry Agency 2014, *Development Strategic Plan of (RENSTRA) for Forestry of Murung Raya District 2013 – 2018*, Forestry Agency, Puruk Cahu.

Murung Raya Forestry Agency 2014, pers.comm., Murung Raya Trip Report.

Murung Raya Government 2014, *Analisis Pertumbuhan Ekonomi Murung Raya 2013*. Murung Raya Government, Puruk Cahu.

Murung Raya Government 2014, Ringkasan APBD Menurut Organisasi dan Urusan Pemerintahan Daerah Tahun Anggaran 2015, December 2014.

Murung Raya Government, (2012) *WARGA TRANSMIGRASI KAB MURUNG RAYA, KEMBANGKAN BIOGAS SEBAGAI ENERGI ALTERNATIF*. [Online]
Available from: <http://www.kabmurungraya.go.id/murungrayakab/berita/46A448B0AC168DE/WARGA%20TRANSMIGRASI%20KAB%20MURUNG%20RAYA,%20KEMBANGKAN%20BIOGAS%20SEBAGAI%20ENERGI%20ALTERNATIF.htm> [Accessed: 6th March 2015]

Murung Raya Mining and Energy Agency 2014, *Development Strategic Plan of (RENSTRA) for Mining and Energy of Murung Raya District 2013 – 2018*, Plantation Agency, Puruk Cahu.

Murung Raya Mining and Energy Agency 2014, pers.comm., Murung Raya Trip Report.

Murung Raya Plantation Agency 2014, *Development Strategic Plan of (RENSTRA) for Plantation of Murung Raya District 2013 – 2018*, Plantation Agency, Puruk Cahu.

Murung Raya Plantation Agency 2014, pers.comm., Murung Raya Trip Report.

Murung Raya Public Work Agency 2014, *Development Strategic Plan of (RENSTRA) for Public Work of Murung Raya District 2013 – 2018*, Plantation Agency, Puruk Cahu.

Pirard & Bille 2010, 'Payments for Environmental Services (PES): A Reality Check (Stories from Indonesia)', *IDDRI Analyses*, no. 3.
Available from <http://www.iddri.org/Publications/Collections/Analyses/AN_1003_Pirard%20Bille_PES%20Indonesia.pdf>.

Prasetyo 2014, *Serba Serbi Hutan Desa (HD)*.
Available from <<http://bp2sdmk.dephut.go.id/emagazine/index.php/teknis/1-serba-serbi-hutan-desa.html>>.

Ruesch, A & Gibbs, HK 2008, 'New IPCC Tier-1 global biomass carbon map for the year 2000'.

Stewart, C, George, P, Rayden, T, Nussbaum, R 2008, 'Good Practice Guidelines for High Conservation Value Assessments', *ProForest*, no. 5.
Available from <<https://www.hcvnetwork.org/resources/folder.2006-09-29.6584228415/HCV%20good%20practice%20-%20guidance%20for%20practitioners.pdf>>.

Surara Pembaharuan 2014, Harga Sawit dan Karet Anjlok, Petani Menjerit', *Suara Pembaharuan* 12 September.
Available from <<http://sp.beritasatu.com/pages/e-paper/2014/09/12/files/assets/basic-html/page30.html>>

Teropong 2014, *Dishut Propinsi Kalteng, Dishut Murung Raya dan Perhimpunan Teropong Fasilitas Pembuatan, Pembetukan Kelembagaan Hutan Desa di Murung Raya*.
Available from <<http://www.teropong.org/2014/06/dishut-propinsi-kalteng-dishut-murung.html>>

Toumbourou, Tessa 2014, 'Indonesia Now World's Largest Exporter for Coal Power Stations: But There Are Costs', *Asia Foundation*, In Asia.

Available from [<http://asiafoundation.org/in-asia/2014/10/08/indonesia-now-worlds-largest-exporter-of-coal-for-power-stations-but-there-are-costs/>](http://asiafoundation.org/in-asia/2014/10/08/indonesia-now-worlds-largest-exporter-of-coal-for-power-stations-but-there-are-costs/).

Uzi 2014, 'Karet Kualitas Baik Hanya Dihargai Rp4.500/Kg [Nusantara]', *Harian Umum Pelita* 22 December.

Available from [<http://www.pelita.or.id/baca.php?id=64113>](http://www.pelita.or.id/baca.php?id=64113).

Uzi/Sal 2014, 'Murung Raya Kembangkan Perkebunan Karet Rakyat [Nusantara]', *Harian Umum Pelita* 22 December.

Available from [<http://www.pelita.or.id/baca.php?id=97522>](http://www.pelita.or.id/baca.php?id=97522).

Van Paddenburg, A, Bassi, AM, Buter, E, Cosslett, CE, Dean, A 2012, 'Heart of Borneo: Investing in Nature for a Green Economy', *WWF Heart of Borneo Global Initiative*.

Available from [< http://awsassets.wwf.org.au/downloads/fl013_heart_of_borneo_investing_in_nature_for_a_green_economy_jan12.pdf>](http://awsassets.wwf.org.au/downloads/fl013_heart_of_borneo_investing_in_nature_for_a_green_economy_jan12.pdf).

Wunder, Sven 2013, 'When Payment for Ecosystem Services Will Work for Conservation', *Conservation Letters*, vol. 6, no. 4, pp. 230–237.



Global
Green Growth
Institute