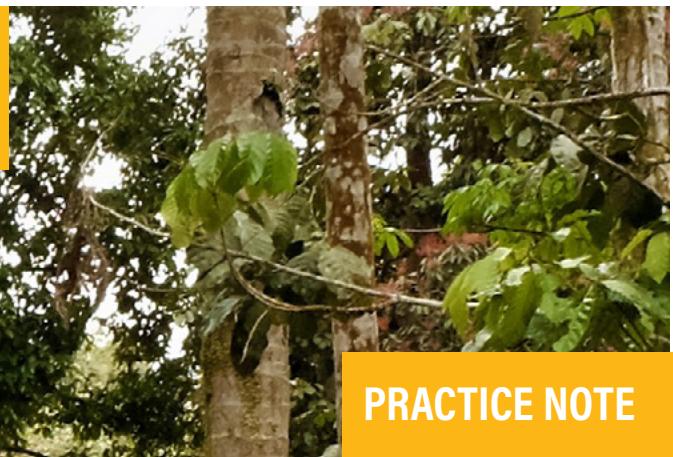




WRI INDONESIA



PRACTICE NOTE

# IMPROVING THE LIVES OF INDIGENOUS COMMUNITIES THROUGH MAPPING: A CASE STUDY FROM INDONESIA



*Practice notes provide rapid analysis of experiences related to a particular project. The analysis and recommendations are limited to the specific context presented in the note and should not be construed to apply more broadly.*

**wri-indonesia.org**

## CONTENTS

Executive Summary .....	3
Abbreviations .....	8
1. Introduction .....	9
Problem: Overlapping Land Use, Tenurial Uncertainties, and Poor Land Governance .....	9
Potential Solution: Better Mapping .....	10
The Theoretical Foundations of ITUPEDE .....	11
Case Study .....	12
Research Objectives .....	17
2. Approach and Methodology .....	17
Data Collection and Analyses .....	17
3. Results, Findings, and Discussions .....	20
Natural Resource Management in Gajah Bertalut .....	20
ITUPEDE Improved Natural Resource Management in Gajah Bertalut.....	21
ITUPEDE Enhanced the Community's Negotiating Power over Land Rights, but Legal Constraint Remains .	24
ITUPEDE's Next Steps and Areas for Improvement.....	25
Opportunities for Expanding the Approach.....	26
4. Conclusions .....	26
Endnotes .....	28
References .....	30

---

### Authors

Dwiki Ridhwan, Carolina Astri, Alif Azadi Taufik, Dean Affandi, Muis Fajar, and Julius Lawalata

---

December 2020

---

**Suggested citation:** D. Ridhwan, C. Astri, A.A. Taufik, D. Affandi, M. Fajar, and J. Lawalata, 2020. "Improving the Lives of Indigenous Communities through Mapping: A Case Study from Indonesia." Practice Note. Jakarta, Indonesia: WRI Indonesia. Available online at: [www.wri-indonesia.org/en/publication/Improving-the-Lives-of-Indigenous-Communities](http://www.wri-indonesia.org/en/publication/Improving-the-Lives-of-Indigenous-Communities).

# EXECUTIVE SUMMARY

## HIGHLIGHTS

- Overlapping land use and tenure uncertainties are prevalent in Indonesia. This situation has created adverse consequences for environmental protection as well as the negotiating power of indigenous communities over land rights. The establishment of the Rimbang Baling Wildlife Reserve partly on land settled by the Gajah Bertalut indigenous community reflects this problem—and the country's chronically poor forest and land governance system.
- The One Map Initiative at the Village Level (Inisiatif Satu Peta di Tingkat Desa; ITUPEDE) supports Indonesia's One Map Policy to address the land governance problems, primarily through participatory mapping.
- ITUPEDE helped the Gajah Bertalut indigenous community to map its territories and improve land-use planning based on local wisdom. It helped make land boundaries clearer and mapped more inclusively. Agreements restricting deforestation in specified areas were enacted and adequately implemented.
- The spatial evidence and documentation collected by ITUPEDE increased the subnational government's acceptance of the Gajah Bertalut indigenous community, which led it to rescind its earlier decisions limiting the community's rights. However, for the national government to officially recognize the community, a local regulation (*peraturan daerah*; PERDA) must first be issued by the local parliament.

## Background: Indonesia's One Map Policy

### Overlapping land use and tenurial uncertainties continue to hamper progress in forest and land governance in Indonesia.

The problem is caused, in part, by inaccurate, outdated, and overlapping geospatial data and information. These factors result in ineffective land-use policymaking, an inefficient land-use sector, and land conflicts.<sup>1</sup>

**Overlapping land use and tenurial uncertainties have adverse consequences for the environment and for the land rights of indigenous communities.** Many stakeholders abuse the land-use and tenure situation by circumventing social safeguards and exploit natural resources. Land conflicts can lead to ecological destruction in some cases, such as human-induced fires (Harwell 2000). Furthermore, in this situation, indigenous communities struggle to obtain the spatial evidence required to make a convincing claim to land rights. Land rights are essential to protect the communities from encroachment and occupation by other stakeholders (UNEP 2017). The situation makes it difficult for them to prove that their traditional ways of managing natural resources are environmentally friendly; they struggle to respond to narratives that exclude them from environmental conservation (Dowie 2009).

**The One Map Policy is a nationwide government-led effort to improve land use and tenurial certainties** (Joko Widodo 2016). It is expected to create a unified, standardized, and shared map, enabling the government to settle land conflicts. As a result, the government published the One Map Policy Geoportal in late 2018, which had compiled and integrated all targeted thematic maps, except the village boundary map (Cabinet Secretariat 2018). The process is deemed incomplete and partial, particularly in addressing conflicts at the local level, such as village and indigenous lands (Pradana 2018). As of June 2020, the government had reported 484 cases of tenurial conflict in state forests (PKTHA n.d.).

### ITUPEDE

ITUPEDE was developed by World Resources Institute (WRI) Indonesia and supports the One Map Policy implementation at the local level. The approach is underpinned by the principles of community-based natural resource management, participatory mapping, and land-use planning. The approach uses these principles to resolve land conflicts, empower local communities in managing natural resources

sustainably, and recognize the rights of marginalized people, including women and indigenous rights. WRI Indonesia collaborates with key government agencies and local civil society organizations as facilitators for all stakeholders in its ITUPEDE approach in the Riau, South Sumatra, Papua, and West Papua provinces. Since 2017, WRI Indonesia and local partners have been advocating for land recognition for indigenous communities. Their efforts led to the Gajah Bertalut indigenous community, located in the Kampar district of Riau, becoming a pilot community for the initiative.

#### Case Study: The ITUPEDE Pilot Project in the Gajah Bertalut Indigenous Community

**The Gajah Bertalut and neighboring indigenous communities have long been in dispute with the state-owned Rimbang Baling Wildlife Reserve over land claims.** The reserve covers 141,226 hectares, making it the sixth-largest conservation area in Sumatra. Map ES-1, created

through participatory mapping, shows that the Gajah Bertalut and neighboring indigenous communities overlap nearly 40 percent of the reserve.

**The ITUPEDE team recommended that the Gajah Bertalut indigenous community undergo the *adat*<sup>2</sup> forest recognition process within the government's social forestry scheme.** The scheme was considered capable of settling the land conflict because the community lived in the area long before the government designated it as a reserve, thus embodying the idea of the One Map Policy. The ITUPEDE team assisted the community with the *adat* forest registration process. This facilitation included identifying land boundaries, developing spatial planning, establishing an indigenous forest committee, and coordinating with government representatives. In the process, a three-dimensional physical model of the community's territories was created, followed by written agreements on land-use planning.

Map ES-1. | **Gajah Bertalut and Neighboring Indigenous Territories in the Rimbang Baling Wildlife Reserve**



Source: Based on data from the participatory mapping process, the Indigenous Territory Registration Agency, the Ministry of Environment and Forestry, and the Geospatial Information Agency.

## Research Objectives

**This practice note investigates the impact of ITUPEDE on how the Gajah Bertalut indigenous community manages natural resources and negotiates for land and resource rights recognition** within the context of land conflict with the Rimbang Baling Wildlife Reserve. This note is the first research publication assessing the impact of ITUPEDE. The findings are limited to the ITUPEDE implementation from July 2017 to August 2020.

## Results and Findings

**Our findings show that the traditional land management practices of the Gajah Bertalut**

**indigenous community emphasize forest protection.** Based on our field observations, we found that the community has been accused of illegal logging, which caused some government representatives to be skeptical of recognizing the community's land rights. We investigated the community's local wisdom regarding land management to better understand the situation. We found that, although the community does, in fact, log trees within its territory, it is guided by local wisdom that emphasizes sustainability in forest management practices and promotes elements of common property. This local wisdom is expressed by the imbo, or zoning, system (see Table ES-1).

Table ES-1. | *Imbo (Zoning) Used by the Gajah Bertalut Indigenous Community*

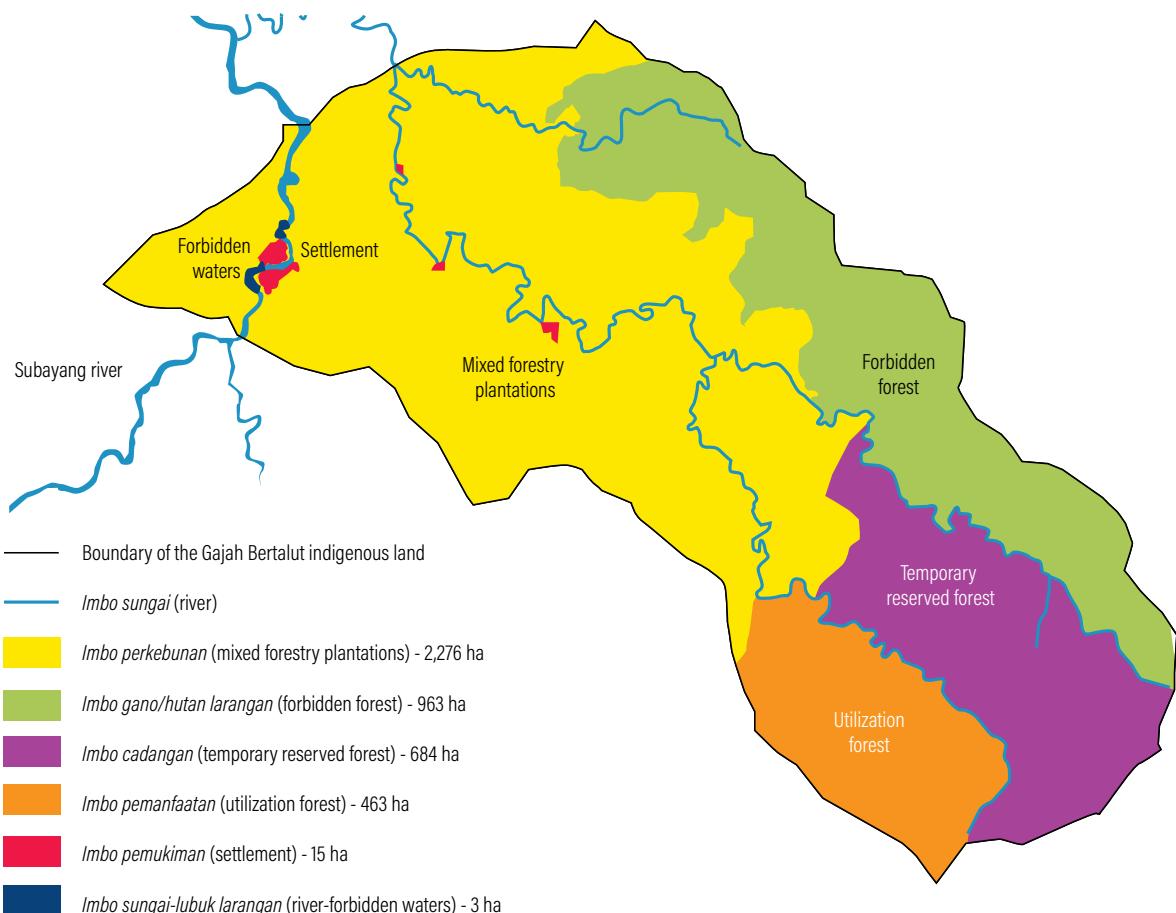
IMBO TYPE	DEFINITION	FUNCTION
<i>Imbo gano or hutan larangan</i>	Forbidden forests (mostly covered by primary forests)	Undisturbed forest lands to conserve the ecosystem and limited resource extractions
<i>Imbo perkebunan</i>	Mixed forestry plantations (mostly covered by rubber forests mixed with secondary forests)	Lands for forestry plantations or mixed with agricultural commodities production
<i>Imbo pemukiman</i>	Settlements	Human habitation; constructed area
<i>Imbo sungai</i>	Rivers	Rivers for fish production and transportation
<i>Imbo sungai-lubuk larangan</i>	Forbidden waters (selected waters of the river area where fishing is prohibited)	Periodically undisturbed river aims to keep fish production sustainable

Source: Authors' analysis.

**Based on our observation, ITUPEDE helped the Gajah Bertalut indigenous community map its territories and improve land-use planning.** By facilitating the communities through participatory mapping, land boundaries became more evident, and the process was partially inclusive. As shown in Map ES-2, this outcome led to community agreements that stipulated complete prohibitions on deforestation in *imbo gano* (forbidden forest

zones) and partial prohibitions in specific new zones, such as in *imbo pemanfaatan* (utilization forest zones) and *imbo cadangan* (temporary reserved forest zones). In both of these new zones, resource extraction is allowed—including tree harvesting for noncommercial purposes—but it requires the permission of the indigenous elders. Areas considered to be *imbo cadangan*, in particular, are reserved for the community's future generations.

## Map ES-2. | Spatial Planning in Gajah Bertalut Resulted from ITUPEDe's Participatory Land-Use Planning

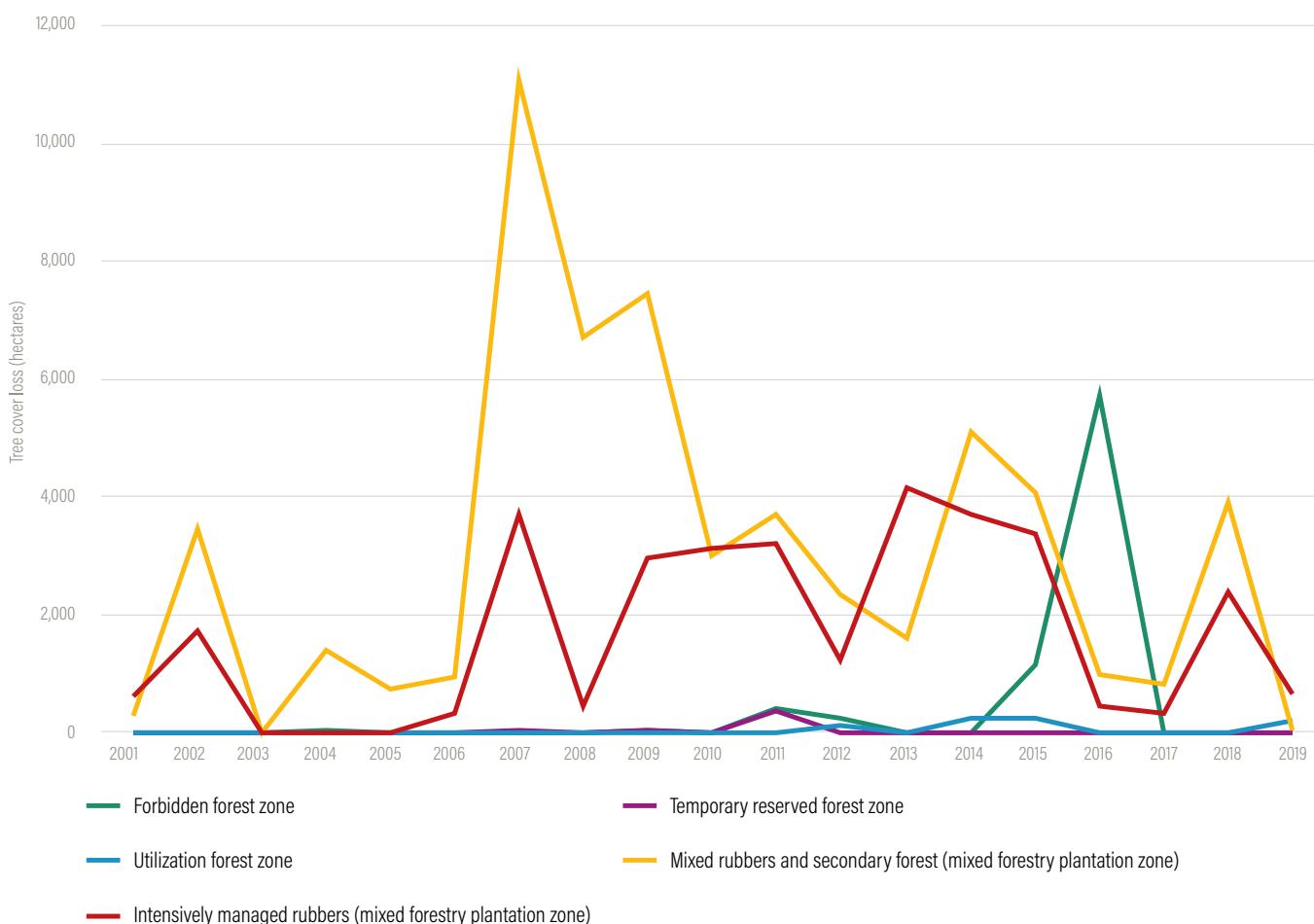


Source: Based on data from the participatory mapping process, the Geospatial Information Agency, and the U.S. Geological Survey.

**We found that the community had consistently restricted deforestation per its local wisdom from 2001 to 2020**, based on analysis of tree cover loss data and Global Land Analysis and Discovery (GLAD) alerts from Global Forest Watch's data set. This finding reveals that local wisdom has reliably guided forest protection in the area long before ITUPEDe. Figure ES-1 shows the tree cover loss trend in different zones of Gajah Bertalut. In 2001–19, tree cover loss primarily

occurred in *imbo perkebunan* (mixed forestry plantations). This zone had 10 loss alerts detected in 2020, which are still classified as “probable loss.” The relatively more restricted zones, such as forbidden forests, temporary reserved forests, and utilization forests, experienced less to no tree cover loss. The ITUPEDe team validated that the loss in forbidden forests in 2015–16 was caused by forest wildfires, not by the community.

Figure ES-1. | Trends of Tree Cover Loss in Gajah Bertalut from 2001 to 2019



Source: Authors' analysis based on data from Hansen et al. (2013, 2016).

**Our findings indicate that, with the spatial evidence collected through ITUPEDE, the community improved its negotiations for land rights recognition.** The district government became more receptive to the community and rescinded previous decisions that had limited the community's rights, particularly by issuing a regent decree in late 2018 that recognized the Gajah Bertalut indigenous community and its lands. Therefore, we believe that the materials produced through the ITUPEDE process, such as maps, served as an entry point to establish a common language between stakeholders, to begin indigenous forest recognition by the government, and to strengthen the implementation of the One Map Policy.

**We found that the community requires further negotiation to address legal constraints over indigenous forest rights.** Despite the district government's recognition, the Ministry of Environment and Forestry stated that the Gajah Bertalut indigenous community would need to be recognized under PERDA before the indigenous forest could be legitimized. Such legislation is politically challenging because it requires the local parliament's approval.

## Recommendations to Improve and Scale ITUPEDE

**Longer-term intervention and monitoring are required to reach the expected outcome of ITUPEDE**, especially to continue its sustainable livelihood development and to improve social inclusion for women, youth, and people from lower social classes. In addition, because Gajah Bertalut's landscape is interconnected with the other neighboring indigenous communities, it would be helpful for ITUPEDE to incorporate an integrated landscape approach.

**We believe ITUPEDE has the potential to be scaled to other communities.** Because it was designed as an approach rather than as a single methodological program for participatory mapping or land-use planning, it can be adjusted to meet the needs of other local communities. ITUPEDE is currently being implemented at other locations (8 villages in other districts in Riau, 2 villages in South Sumatra, and 23 villages in Papua). The key to scaling up the approach is getting local institutions to participate in the process. Thus, it may be challenging to replicate ITUPEDE in areas with poor local institution participation.

### LIST OF KEY ABBREVIATIONS

<b>AMAN</b>	Aliansi Masyarakat Adat Nusantara (Indigenous Peoples' Alliance of the Archipelago)
<b>BRWA</b>	Badan Registrasi Wilayah Adat (Indigenous Territory Registration Agency)
<b>CBNRM</b>	community-based natural resource management
<b>CSO</b>	civil society organizations
<b>FGD</b>	focus group discussion
<b>FPIC</b>	free, prior, and informed consent
<b>GIS</b>	geographic information system
<b>GLAD</b>	Global Land Analysis and Discovery
<b>ITUPEDE</b>	Inisiatif Satu Peta di Tingkat Desa (One Map Initiative at the Village Level)
<b>KKMA</b>	Kawasan Konservasi Masyarakat Adat (Adat Community Conservation Area)
<b>MoEF</b>	Ministry of Environment and Forestry
<b>PASA</b>	Perkumpulan Alam Sumatera
<b>PERDA</b>	<i>peraturan daerah</i> (local regulation)
<b>PKTHA</b>	Penanganan Konflik Tenurial dan Hutan Adat (the government office charged with handling tenurial and <i>adat</i> forest conflicts)
<b>WRI</b>	World Resources Institute

# 1. INTRODUCTION

## Problem: Overlapping Land Use, Tenurial Uncertainties, and Poor Land Governance

Forest and land-use governance in Indonesia has been deemed ineffective and inefficient (Fay and Sirait 2002; Toumbourou 2018; Winoto 2009). This issue relates to the emergence of tenurial uncertainties and land conflicts (Lucas and Warren 2013; Tjondronegoro 2006). The problem has led to land management that inadequately protects the environment and insufficiently recognizes local communities' rights to land and resources (Earth Innovation Institute 2015; Gaveau et al. 2016; Naylor et al. 2019).

One of the main concerns relates to multiple land-use designations in a single area, which leads to overlapping land use and tenurial uncertainties.<sup>3</sup> Following the 1998 Indonesian decentralization, local governments (34 provinces, 416 districts, and 98 cities) were given the authority to map their territories and issue licenses for land-based industries, including plantations, logging, and mining (Barr et al. 2006; Kuncoro 2002; Resosudarmo 2004). However, national ministries have created their own maps that are not synchronized with other ministries and local government bodies (OBG 2020). The unclear authorities among government entities created legal uncertainty regarding spatial planning (Moeliono 2011).

A 2018 report recorded 410 land-conflict cases in Indonesia, covering more than 800,000 hectares (ha) of land (KPA 2018). As of June 2020, the government office charged with handling tenurial and *adat*<sup>4</sup> forest conflicts (Penanganan Konflik Tenurial dan Hutan Adat; PKTHA) reported 484 cases of tenurial conflict in state forests (PKTHA n.d.). However, this figure is possibly underestimated because many cases are not reported (VOA 2018).

### The Effects on the Environment

Overlapping land use and tenurial uncertainties have significant negative consequences for environmental protection. Some actors abuse the lack of standardized mapping to circumvent social safeguards and exploit natural resources. Several

government agencies in natural resource sectors (e.g., mining, plantations, logging) have benefited from overlapping land use and tenurial uncertainties, such as issuing licenses to extractors of natural resources to enhance local revenue and for rent-seeking (Kurniawan 2016). Large-scale plantations (e.g., oil palm, timber) have been driving deforestation in Indonesia, contributing more than 40 percent of nationwide deforestation between 2001 and 2016 (Austin et al. 2019). A 2014 report found 14.7 million ha of overlapping land licenses among logging, timber, and mining concessions (Purba et al. 2014).

Land-use change, such as deforestation, contributes 48 percent of Indonesia's greenhouse gases (Wijaya et al. 2017), emitting more than any other sector. It has led to Indonesia ranking as the world's fifth-highest emitter of greenhouse gases in 2016 (CAIT Climate Data Explorer 2019). Land conflicts within these areas can be ecologically devastating, especially when clashes between communities and corporations lead to physical violence and arson fires in forests (Harwell 2000). Research indicates that the underlying causes of Indonesia's deforestation include land clearing by large-scale plantations (Austin et al. 2019), the lack of lands available for smallholders due to inequitable land tenure (Ridhwan and Bagja 2019), and a weak, inequitable licensing system that enables tenurial conflicts (Barr et al. 2006).

### The Effects on Indigenous Communities' Ability to Negotiate for the Recognition of Their Land and Resource Rights

The recognition of rights to land and resources is a significant concern for indigenous communities. Without it, they are vulnerable to encroachments and outsider occupation (UNEP 2017), which increases the risk of forest degradation and fires (Samadhi 2015). There have been conflicts between plantation companies and the indigenous communities who inhabit those licensed areas but are not formally recognized (Saturi 2012).

Overlapping land use and tenurial uncertainties increase the complexity of negotiating for land rights recognition. Politics and unfavorable policies often cause delays or a complete shutdown of the land titling required to provide land rights to indigenous communities (UN DESA Indigenous Peoples n.d.). Indonesian government officials who are bureaucratic

in their approach often request maps from claimants when adjudicating land requests. Maps are often inaccessible for many indigenous people who lack the knowledge, competencies, and technology to map their lands using conventional methods. This situation means that they are denied access to an essential tool to negotiate their rights within a mazelike land-use bureaucracy. In some instances, nonindigenous stakeholders are the primary actors mapping indigenous areas, creating unrepresentative maps (Eghenter 2006; Fay and Denduangrudee 2016) that do not consider the indigenous communities' understanding and use of their land.

There are two opposing narratives regarding indigenous communities' roles in environmental conservation. Some stakeholders fear that indigenous traditions could be ecologically destructive (Dowie 2009). These narratives often argue that indigenous communities are partly responsible for environmental degradation, such as illegal logging and the poaching of endangered animals. The government and conservation organizations often exclude local communities in their conservation attempts (Eghenter 2019). Some argue that the devolution of land governance to indigenous communities would endanger ecosystems, and they prefer conventional conservation approaches (Alcorn 2010; Dowie 2011; Raygorodetsky 2018; Sneed 2019).

Others argue that a greater understanding of traditional knowledge is crucial for addressing environmental problems (Fitzgerald and Mahoney 2019). Advocates of limiting the role of indigenous communities in conservation are accused of supporting forms of "green colonialism," a term used to describe instances where state-sanctioned conservation zones result in conflict with the indigenous communities who inhabit the areas (Zaitchik 2018). In some cases, conservation areas have prohibited indigenous communities from accessing sources of livelihood, such as fishing (Coulson-Drasner 2018). New conservation models have been developed, such as "inclusive conservation" (Eghenter 2019) and "rights-based conservation" (Reed 2019). These approaches argue that successful conservation should draw upon traditional knowledge and requires full cooperation with local communities. For example, lessons can be learned from the First Nations living in present-day Canada, who have an excellent appreciation for the environment. They

have restored ecological landscapes, have participated in international forums to tackle climate change, and have significantly reduced deforestation rates, especially when compared to conventional forest areas (Askew and Napoleon 2019; Henderson 2019; Reed 2019; UNEP 2017). Similar conservation traditions with indigenous communities in Indonesia have been documented in Papua (Alcorn 2010) and for the Kenyah people in West Kalimantan (Eghenter 2019).

## Potential Solution: Better Mapping

### The One Map Policy

In response to unclear regulations for land-use management, President Susilo Bambang Yudhoyono first enacted the One Map Policy through Presidential Instruction Number 10/2010 (Yudhoyono 2011). The urgent need to overcome development problems prompted his successor, President Joko Widodo, to issue Presidential Regulation Number 9/2016 to expedite the policy implementation and accelerate the One Map Policy (Joko Widodo 2016). This expedition was conducted partly by mandating the Geospatial Information Agency (Badan Informasi Geospasial) to lead its implementation team. In short, the One Map Policy is a nationwide government-led effort to improve land-use governance through the compilation, integration, and synchronization of maps across the country.

As a result, the government launched the One Map Policy Geoportal in December 2018 that compiled and integrated 84 out of the targeted 85 thematic maps in a unified and standardized database (Cabinet Secretariat 2018). Though the government has touted its One Map Policy Geoportal, the endeavor has yet to complete village boundary maps and incorporate indigenous territory maps, smallholder plantation maps, and social forestry maps, which makes it difficult for the One Map Policy to address conflicts on the village and indigenous community levels (Pradana 2018).

### The One Map Initiative at the Village Level

At the beginning of 2017, World Resources Institute (WRI) Indonesia designed the One Map Initiative at the Village Level<sup>5</sup> (Inisiatif Satu Peta di Tingkat Desa; ITUPEDE) to support the national One Map Policy. Through ITUPEDE, WRI Indonesia is developing strategies for implementing the One Map Policy on a subnational level through its operationalization at the site level. WRI Indonesia collaborates with

key government agencies and local civil society organizations (CSOs) as facilitators for all stakeholders in its ITUPEDE approach in the Riau, South Sumatra, Papua, and West Papua provinces. The approach is a bottom-up land governance model based on the principles of accountability, inclusivity, and sustainability of land-use management. This approach aims to enhance the participation of local people in governing land use in their own living spaces, especially those living in rural areas where the organization may be complicated but has lacked attention. This focus includes indigenous communities.

ITUPEDE uses participatory mapping to engage stakeholders to better manage land use at the local level. One component of this approach involves resolving land conflicts, empowering local or indigenous communities to create land-use planning, strengthening local participation in natural resource management, and recognizing rights for marginalized people, including indigenous communities, women, and youth. Livelihood development is a subsequent step, after participatory mapping and land-use planning, intended to encourage the community to sustainably manage the natural resources in its living space. This may include developing environment-friendly livelihood models that are designed in accordance with the biophysical and socioeconomic characteristics of the intervention area. ITUPEDE was designed as an approach, not as a single methodology for participatory mapping, land-use planning, and natural resource management. It does not impose rigid methods on a site; instead, it investigates whether its inhabitants share the primary concern of the One Map Policy and sustainable natural resources.

## The Theoretical Foundations of ITUPEDE

The ITUPEDE approach draws upon the principles of community-based natural resource management (CBNRM) and incorporates participatory mapping and land-use planning as its core activities.

### Community-Based Natural Resource Management

CBNRM promotes the management of natural resources by, for, and of local communities. It has three objectives (Adhikari 2001):

- Improving the welfare and lives of local people
- Enhancing the conservation of natural resources
- Empowering local communities

The sustainability of CBNRM depends on the willing participation of local communities, which must be actively involved. As such, a crucial component of CBNRM involves understanding the local knowledge of local communities to generate the motivation for conservation and activate local organizations. The role played by local people is essential: local knowledge leads to greater efficiency in natural resource management, increased cost savings, and better decisions by internalizing social and environmental costs; thus, reliance on the local community and its detailed knowledge of the land and its unique ecological dynamics can effectively inform pressure groups and sanctions that further promote the conservation of natural resources (Adhikari 2001).

In Indonesia, the Kasepuhan indigenous community in Banten, who live inside state-owned Mount Halimun–Salak National Park, have similar CBNRM practices. Affandi (2017) shows that the communities manage the forest by representing the land and forest as a “mother” who should not be forced to endure labor more than once a year. The community managed to map and reclaim its territory, covering most of the national park area and beyond.

ITUPEDE supports communities that use the forest and land to survive, trade, and make a living; those communities’ land must be mapped. Experience from Cambodia reveals that CBNRM is typically well-intentioned, creative, and wise in its attempts to manage natural resources (Hall et al. 2011). CBNRM also protects the natural landscape and surrounding organisms that communities depend on by limiting access from potentially exploitative practices.

### Participatory Mapping

The allocation of land tends to be a political exercise (Jones 1945; Srebro and Shoshani 2007). Thus, rather than top-down decision-making, the participatory mapping method is increasingly being adopted to support and promote community engagement in mapping (Corbett et al. 2009). These participatory methods provide opportunities to prevent boundary conflicts and disputes (Sumaryo 2017).

Participatory mapping has long been a tool for empowering and recognizing indigenous communities. Following European colonization and the advent of the nation-state, indigenous

leaders began to realize that maps were being used to formalize claims over their lands and became interested in developing their own maps (Herlihy and Knapp 2003). Geographers and anthropologists worked with indigenous communities to “remap” their lands through participatory methods using technology that could produce maps that rivaled “official maps” (Poole and Biodiversity Support Program 1995). Participatory mapping has also been referred to as “community mapping,” “ethno-cartography,” “counter-mapping,” “power mapping,” “social mapping,” and “self-demarcation” (Chapin et al. 2005, 623; Herlihy and Knapp 2003, 303). Indonesian CSOs are common facilitators of participatory mapping.

### Land-Use Planning

Land-use planning is an approach used to improve the sustainability of existing conditions by strengthening environmental protections, social welfare, and economic opportunities (Wrachien 2001). At its core is the dialogue between participants to reach consensual decisions. The process of consensus building is performed to motivate participants, especially those directly affected, to conciliate interests in land resources and the types and extent of land use (Amler et al. 1999). Land-use planning is a tool for dealing with conflicts between different kinds of land use by resolving conflicts among stakeholders and requires collaborative and participatory processes (Zhang et al. 2012).

Land-use planning at the local level produces documentation on land regulations, guides for development, and maps showing boundaries and the allocation of resources (Wrachien 2001). It is vital that when the effects of planning measures are considered, at any level, attention is paid to socially vulnerable parties to ensure their participation in the process (Amler et al. 1999).

### Case Study

The Gajah Bertalut Indigenous Community  
In partnership with the Indigenous Peoples’ Alliance of the Archipelago (Aliansi Masyarakat Adat Nusantara; AMAN), the Indigenous Territory

Registration Agency (Badan Registrasi Wilayah Adat; BRWA), and local CSOs, WRI Indonesia began to push for land recognition for indigenous communities.<sup>6</sup> In early 2017, its efforts led to the implementation of ITUPED, which was piloted with the cooperation of the Gajah Bertalut indigenous community.

Gajah Bertalut is located along the central-eastern coast of Sumatra. The indigenous community is estimated to have migrated from Pagaruyung, West Sumatra, during the 1600s (Wahyudi et al. 2017). Since 2005, the government has declared the area administratively as a village in Kampar, Riau. Our field survey indicated that in 2019 its population included approximately 109 households comprising 416 people. According to customary law, the Gajah Beralut territory is a *kanagarian*,<sup>7</sup> part of the greater Batu Sanggan Caliphate (Kekhalifahan Batu Sanggan), which consists of five other *kanagarian(s)*: the Aur Kuning, Batu Sanggan, Malako Kociak, Terusan, and Pangkalan Serai. These territories surround the large Subayang River, which is used for transportation, fishing, and other daily life support.

Gajah Bertalut and all the neighboring indigenous communities are situated in the state-owned Rimbang Baling Wildlife Reserve. Although the government designated the area as a wildlife reserve in 1982, the indigenous communities have historically occupied these areas and continue to do so. The reserve’s primary purpose is to conserve the area’s unique animal species. Thus, habitat management is prioritized to ensure the continued existence of these species. One of the area’s flagship species is the Sumatran tiger, which is critically endangered. At 141,226 ha, the reserve is the sixth-largest conservation forest in Sumatra and meets many indicators of a High Conservation Value area.<sup>8</sup> Consequently, no human settlement is legally allowed to exist within the reserve. The situation has led to the long unresolved dispute between the indigenous communities and the state over land claims. The communities believe their lands are an inseparable part of their identity as *adat* communities. They believe that acquiring legal recognition of land rights would concretize their claim over rights to resources, including access to forest resources.

*We have lived in this forest since before this nation was established. I only knew that I lived in a conservation area when some forest rangers came to our village and told us how to run our lives. As long as we can govern our forest area, we are ready to follow the necessary government regulations and steps. However, we need some guidance.*

—Ilyas, 64, one of the elders in Gajah Bertalut

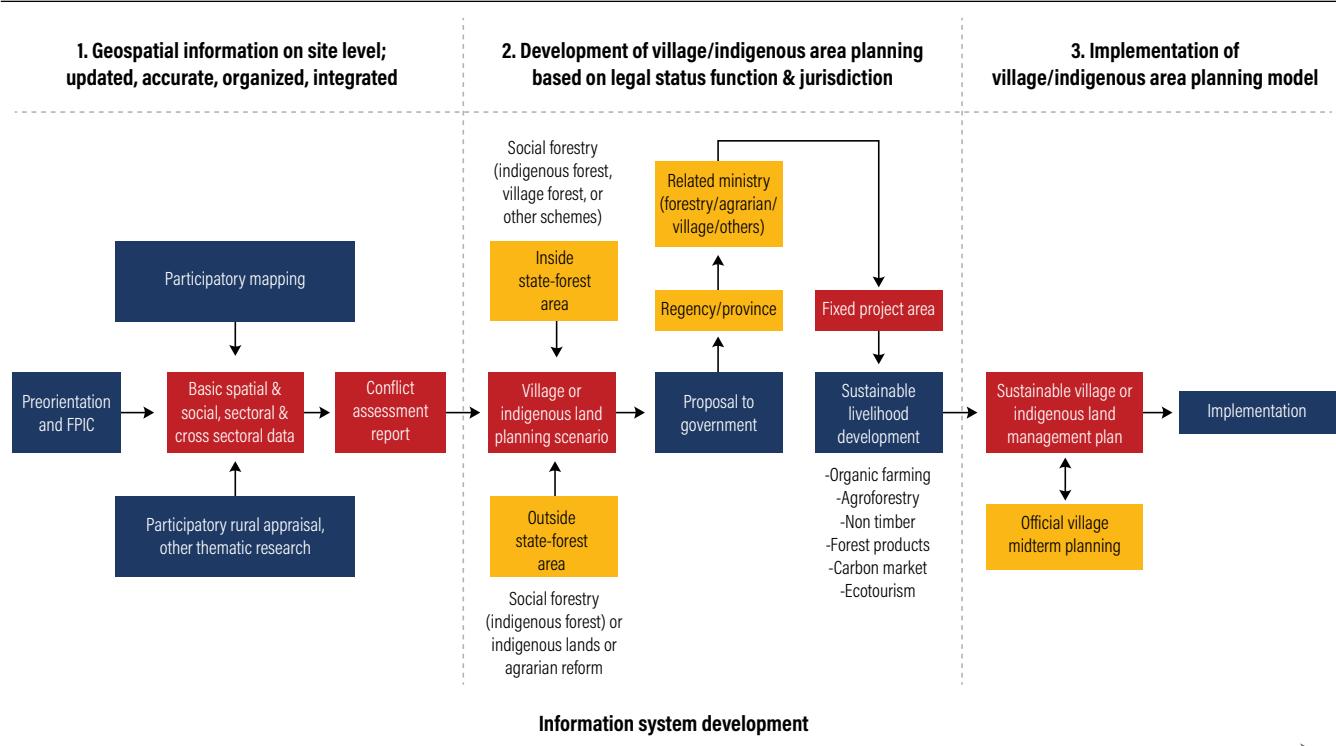
The Gajah Bertalut indigenous community primarily nurtures rubber forests as a source of income. Each household typically manages around one to two hectares of rubber, with some households extracting forest commodities for additional income. Fish and forest animals are the primary sources of food, and drinking water is obtained from nearby rivers. Like other neighboring indigenous communities, the Gajah Bertalut indigenous community continues to practice its indigenous traditions. The community does not adhere to the concept of private property ownership. Though individuals have the right to manage and use specific plots of land, no land can be sold to outsiders

without the consent of the adat representatives, and transactions within and between indigenous communities are recognized through customary laws. The government, however, does not legally recognize their alternative property ownership system.

### ITUPEDE Implementation in Gajah Bertalut

The general implementation strategy of ITUPEDE consists of three stages, as outlined in Figure 1. Stage 1 is the preliminary data collection and analysis stage, designed to generate a conflict assessment report for the selected site through participatory mapping. The report determines the specific goals of ITUPEDE's implementation at the site. Stage 2 focuses on planning and developing the village or indigenous area. This stage begins with a land-use planning process, which is the basis for proposing that the government recognize the community and its territories within a wildlife reserve. Next, the community develops a sustainable livelihood plan compatible with this unique settlement situation. Finally, Stage 3 primarily focuses on how ITUPEDE helps the local community to implement sustainable livelihoods on the ground, integrated with the village government's planning.

Figure 1 | General Implementation Strategy of ITUPEDE



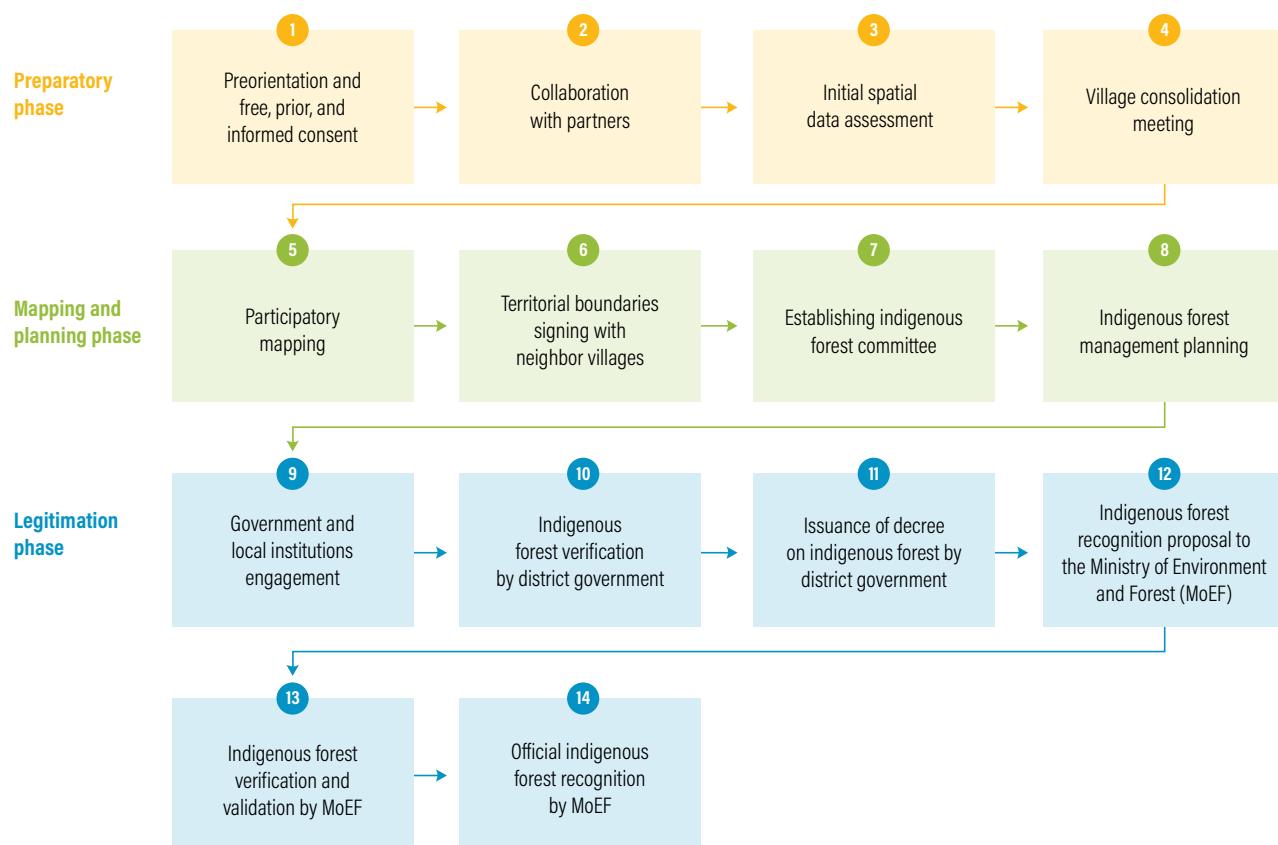
Note: FPIC = free, prior, and informed consent.

Source: ITUPEDE implementation team.

As of this writing, ITUPEDE is in the sustainable livelihood development phase of Stage 2. The scope of this research is specific to the early steps of ITUPEDE implementation in Gajah Bertalut, which

starts with preorientation in Stage 1 to a proposal for the government in Stage 2, as elaborated in detail in Figure 2.

**Figure 2. | Detailed Steps in Implementing ITUPEDE in Gajah Bertalut at the Time of This Research (Stage 1 to Early Phase of Stage 2)**



Source: ITUPEDE implementation team.

The first phase of ITUPEDE in Gajah Bertalut began with preorientation in mid-2017. Free, prior, and informed consent (FPIC)<sup>9</sup> can be obtained through various forms, and ITUPEDE obtained it through various stages, beginning with its partnership with the BRWA and AMAN. Both groups had already been working with the community through informal agreements with indigenous leaders and formally during the coronation ceremony for the indigenous community leader, which included the village women and youth rather than just the local elites and village authorities. Afterward, this phase assessed the knowledge and resource gaps among local people, local governments, and other stakeholders regarding

the One Map Policy. Next, an initial spatial data assessment was conducted to ascertain the physical and legal statuses of the Gajah Bertalut area to determine the geographical characteristics and detect any overlapping land use. This phase was completed by a consolidation meeting in which the assessment was disseminated.

The guiding framework of ITUPEDE is to develop methods to synergize with government policies. Hence, the ITUPEDE team considered numerous solutions, including the *adat* forest<sup>10</sup> within the government's social forestry program, other social forestry schemes, the Adat Community Conservation

Area (Kawasan Konservasi Masyarakat Adat; KKMA)<sup>11</sup> within the reserve's designation, and resettlement. The team recommended that the Gajah Bertalut indigenous community undergo a process to be recognized as an *adat* forest. That solution best met three indicators:

- Sociocultural needs
- Political clarity and feasibility
- Fit with existing community practices

Based on Presidential Regulation Number 88/2017, the *adat* forest was considered adequate to settle land conflicts between the community and the reserve because the community had long been living on the land before the government designated it as a reserve, thus embodying the idea of the One Map Policy.

The next phase began with the participatory mapping process, which involved identifying territorial

boundaries and creating a three-dimensional physical model of the Gajah Bertalut territory. This step took place from September to October 2017. ITUPEDE used a geographic information system (GIS) to process spatial data in a digital format. The digital map was later projected onto a three-dimensional model to make it easier for the community to visualize the landscape.<sup>12</sup> The women in Gajah Bertalut created the model out of cardboard and plaster made from flour (Photograph 1). The three-dimensional map was used to validate spatial assessments by asking the community questions, such as "Does the village boundary and land-use shown here match the indicated hills and rivers?" The ITUPEDE team then conducted ground surveys to verify the land boundaries, partnering with youth, knowledgeable community members, who served as navigators, and representatives of neighboring indigenous regions, as to prevent conflicting mapping.

Photograph 1. | Three-Dimensional Modeling of Indigenous Land in Gajah Bertalut

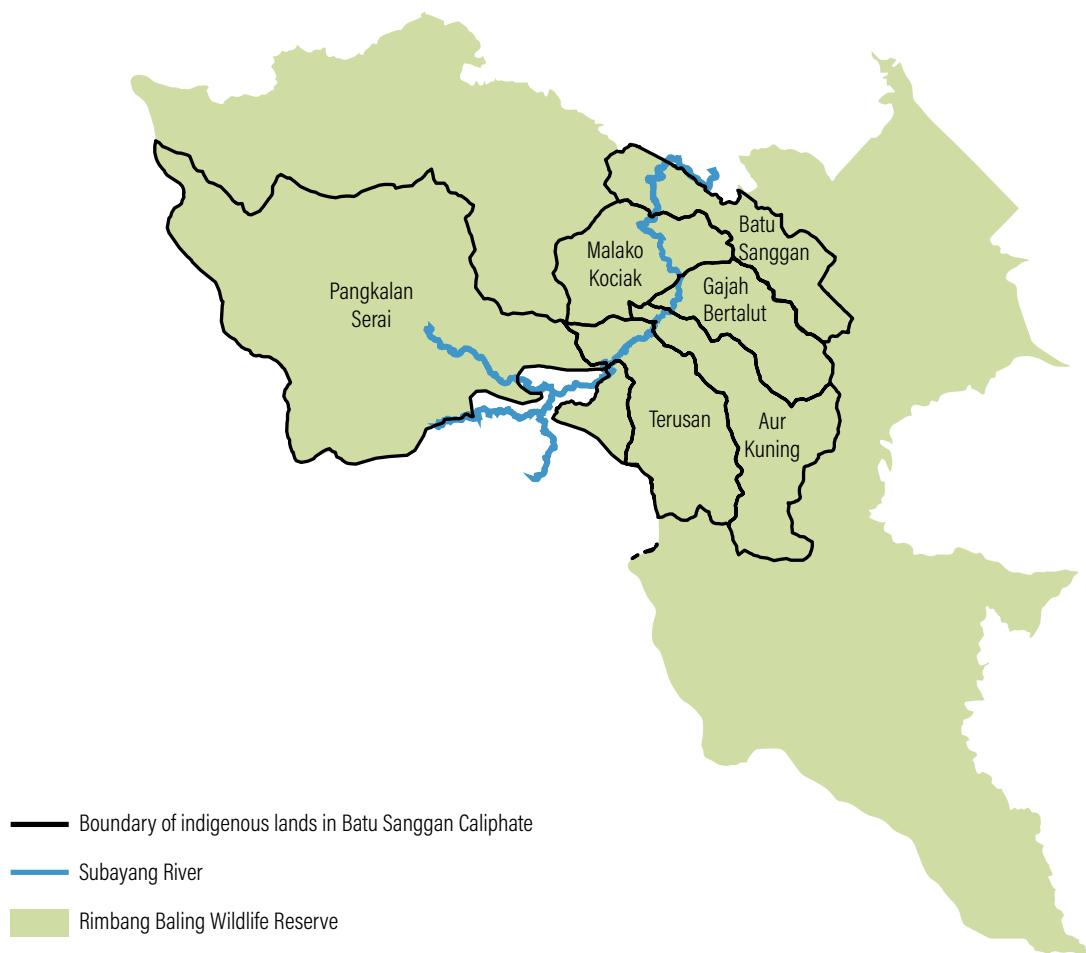


The participatory mapping process found that the Gajah Bertalut indigenous territory covers 4,414 ha, accounting for 3 percent of the Rimbang Baling area. The entire indigenous caliphate in the Rimbang Baling Wildlife Reserve covers approximately 55,714 ha, nearly 40 percent of the reserve (Map 1). The process also found that the government had no definitive village administration boundary yet,



providing an opportunity for this participatory map to be a potential reference. However, though the map was produced on a scale of 1:50,000, which meets the standard of the One Map Policy for an *adat* forest map, village administration boundary maps require a scale of 1:10,000.

Map 1. | Six Indigenous Territories (Batu Sanggan Caliphate) in the Rimbang Baling Wildlife Reserve



Source: FPIC = Based on data from the participatory mapping process, the Indigenous Territory Registration Agency, the Ministry of Environment and Forestry, and the Geospatial Information Agency.

From November to December 2017, the ITUPEDE team assisted the community in establishing the Indigenous Forest Committee to fill gaps in the technical coordination of designating the area as an *adat* forest. The committee is managed by the community leader (*datuk pucuk*), religious leaders, indigenous elders, a representative of the village government, and the indigenous caliphate leader (*datuk godang khalifah*). The committee is tasked with making decisions regarding land-use planning throughout the Gajah Bertalut landscape, considering the local wisdom for land-use planning as core values.

Two agreements were formalized to address the details of the final land boundaries and the redesigned land-use planning.<sup>13</sup> Everyone was invited to attend the Internal Agreement Meeting to learn and correct any mistakes in the drafts. The agreement

drafts were finalized after obtaining the community's approval. The finalized agreements fulfilled the administrative requirements for registering Gajah Bertalut as an *adat* forest with the Kampar district government. Afterward, the district government conducted a field verification process in April 2018. The verification team claimed that Gajah Bertalut fulfilled the criteria of an *adat* forest, which enabled the district regent to issue a decree four months later recognizing the Gajah Bertalut indigenous community and its lands (Kampar Regent Decree 660-489/X/2018). That process was ITUPEDE's final stage in the recognition process at the subnational level. The *adat* forest registration process then continued with the Ministry of Environment and Forestry (MoEF), which currently remains in progress due to the dynamics in its negotiation process.

## Research Objectives

This practice note investigates the implementation of ITUPEDE in Gajah Bertalut and its impacts on how the community manages natural resources and negotiates to recognize its land and resource rights within the context of the land conflict with the Rimbang Baling Wildlife Reserve. Due to the dynamic nature of the intervention, ITUPEDE in Gajah Bertalut is ongoing. This practice note assesses the project's progress from July 2017 to August 2020. It is the first research publication examining the impact of ITUPEDE's first project and should be of interest to land management reformers in the government and CSOs.

## 2. APPROACH AND METHODOLOGY

The WRI Indonesia research team consisted of six researchers with various backgrounds, including experts in GIS, anthropology, management, and forestry. Our research team worked with the ITUPEDE implementation team<sup>14</sup> to conduct 15 field visits to Gajah Bertalut between April 2017 and March 2019. Our primary role was to document and analyze the processes (although a few team members played minor roles in implementation). We spent roughly two to three weeks per visit in groups of four to five researchers, and the implementation team periodically stayed in the village for a couple of months to facilitate various activities.

### Data Collection and Analyses

Data collection was conducted using ethnographic data collection methods and incorporated participant observations, in-depth interviews, and focus group discussions (FGDs). A wealth classification method was deemed necessary to identify groups of individuals who were less privileged and who might not actively participate in the project without active encouragement. For our wealth classification, we followed the example of Li (2000) and consulted the village leader and his wife to help us develop parameters that would ensure community representativeness.<sup>15</sup>

The village leader and his wife, acting as village representatives, were asked to develop parameters for the wealth classification. After being presented with triggering and probing questions related to land use, land distribution, housing assets, and transportation assets, they decided that education levels, debt to middlemen, and division of labor in the local economy would serve as the main parameters to classify villagers into the upper, middle, or lower classes. Afterward, the couple was asked to list the heads of households and employ the wealth classification parameters. They narrowed down the list to five heads per class, giving us a sample of families in the community.

Using the names identified in the wealth classification, we selected three informants from each class to participate in in-depth interviews and FGDs. Interviewed participants were asked about their perceptions of various stakeholders, including the general community, indigenous leaders, the local government, ITUPEDE, and how ITUPEDE could involve them. Three FGDs were held with a total of 18 participants. Nine of the participants were those previously interviewed, and the other 9 participants were selected due to their participation in ITUPEDE's three-dimensional mapping or ground survey. They helped us verify information already collected and further the understanding of the community's nuanced history, local wisdom, and their livelihoods, especially concerning rubber forests and natural resource extraction, household tenure rights, access to common property resources, and the decision-making process that typically unfolds in the community. Also, we conducted participant observations by following and documenting the daily activities of the community to capture the social systems of the village holistically, such as observing and participating in rubber tapping, grocery purchasing, fishing, trekking into the forest, living in forest huts, and observing the negotiation process between the community and the Kampar district government.

We used GIS to measure and visualize specific spatial data associated with implementing ITUPEDE and managing natural resources in Gajah Bertalut. In the process, we examined open-source spatial data, field observation data collected while implementing ITUPEDE, and the data generated from some analyses

and modeling, as explained in Table 1. We also used GIS to assess the impact of ITUPEDE on natural resource management, particularly the analysis of annual tree cover loss and deforestation alerts from the Global Land Analysis and Discovery (GLAD) laboratory as determined by data from Hansen et al. (2013, 2016). We analyzed the tree cover loss data from 2001 to 2019, and the alerts received from January to August 2020. The period used for this analysis enabled us to monitor whether ITUPEDE’s land-use planning—processed in late 2017—was truly effective

by comparing the trends before and after, according to the most updated available and relevant GIS data sets. We also analyzed tree cover loss in the Rimbang Baling Wildlife Reserve and other neighboring indigenous areas, which allowed us to compare the loss between the “indigenous-managed” and the “state-managed” forest. This analysis provides an investigation into the “sustainable indigenous-managed forest” narrative that opened up the opportunity for the Gajah Bertalut indigenous community to be recognized by the district government.

Table 1. | **Spatial Data Sources**

Spatial Data	Description	Year	Source or Method of Acquisition
Base map of Rupabumi Indonesia (RBI)	Indonesia’s official base map used to assess administration boundaries, river networks, and road networks in Gajah Bertalut and Rimbang Baling.	2016	Geospatial Information Agency (n.d.)
Digital elevation model–Shuttle Radar Topography Mission	30-meter resolution relief map used to analyze elevation, slope, and hill shade in Gajah Bertalut.	2017	U.S. Geological Survey (n.d.)
Rimbang Baling Wildlife Reserve area	Land boundaries of Rimbang Baling Wildlife Reserve designated by the Ministry of Environment and Forestry	2014	Ministry of Environment and Forestry (n.d.)
Zoning in Rimbang Baling Wildlife Reserve	Zoning of Rimbang Baling Wildlife Reserve designed by the Ministry of Environment and Forestry	2017	Ministry of Environment and Forestry (n.d.)
Indigenous territories	Land boundaries of indigenous territories in Rimbang Baling Wildlife Reserve, generated from ITUPEDE’s participatory mapping	2017	Indigenous Territory Registration Agency (n.d.) and field observation (ethnographic activities)
Land cover	Land cover in the Gajah Bertalut indigenous territories	2017	Satellite imagery interpreted by the authors, using Landsat 8 Operational Land Imager (imagery date: July 6, 2017) from the U.S. Geological Survey (n.d.) through unsupervised classification method for land cover classification, and WorldView-2 (imagery date: June 15, 2017, copyright DigitalGlobe 2017) through manual classification method for delineating settlements and specific boundaries
Landmarks and natural resources	Physical objects (e.g., hills, rivers, artificial objects) or natural resources distribution (e.g., rubber forest, logging spots, nontimber forest product spots) in Gajah Bertalut	2017 and 2018	Field observation (ethnographic activities) and species distribution modeling <sup>a</sup> using maximum entropy by authors

Table 1. | Spatial Data Sources (Cont'd)

Spatial Data	Description	Year	Source or Method of Acquisition
Spatial planning in Gajah Bertalut	Land use or forest zoning in Gajah Bertalut resulted from ITUPEDe's participatory land-use planning	2017	Field observation (ethnographic activities)
Tree cover loss	The complete removal of tree cover canopy at a 30-meter resolution that supports data from the Global Forest Watch website used to measure annual tree cover loss in Gajah Bertalut and Rimbang Baling	2001-19	Analyses using data from Hansen et al. (2013)
GLAD alerts	A weekly warning system of deforestation provided on the Global Forest Watch website used to count forest loss alerts in Gajah Bertalut and Rimbang Baling, categorized as either probable or confirmed loss	January-August 2020	Analyses using data from Hansen et al. (2016)

Note: a. There is no existing map of rubber forests in Gajah Bertalut, and the satellite imagery analysis is not possible to map them reliably. Therefore, we employed maximum entropy modeling for species geographic distribution. The model utilizes presence-only species data as training samples and a set of environmental variables to run its algorithm. In this case, we obtained smallholder rubber species from field surveys as training samples ( $n = 88$ ) and prepared some environmental data through ArcGIS prior to the modeling process, which are (i) distance to river, (ii) distance to settlement, (iii) normalized difference vegetation index, (iv) slope, (v) elevation, and (vi) soil type. Assumptions and parameters were set at a probability value threshold of rubber presence  $> 0.70$ , random test percentage = 10%, replications = 10 times (cross-validate), and maximum iterations = 500. For model validation, the result of AUC (area under the curve) value = 0.9299 ( $\geq 0.5$  means the model is better than random prediction). Software: Phillips et al. n.d.

### 3. RESULTS, FINDINGS, AND DISCUSSIONS

#### Natural Resource Management in Gajah Bertalut

Local wisdom in Gajah Bertalut echoes concepts of environmental sustainability. Based on FGDs, some community members analogize the forest as “a [source of] life for each face who is born onto the earth,” and they say that if their forests are destroyed, the community and next generations will suffer. They value the conservation of natural resources, describing forest animals and water as essential for continuing their livelihoods.

In contrast, there have been claims of deforestation and forest degradation activities in the reserve. The activities were believed to be practiced by some members of the communities through encroachment and illegal logging. This situation ultimately caused

some government representatives to be skeptical of recognizing the community’s territories. Based on our observation in a hut deep inside the forest, deforestation and forest degradation occurred because of logging and bird poaching. The community logs trees using a selective logging method, which differs from the clear-cut logging used in large-scale plantations. According to the community loggers, they log about 25 cubic meters of timber—equivalent to 25 trees with diameters of 60–80 centimeters—at maximum during the rainy season, when rubber is in its low productivity phase.

To better understand the situation, we investigated the local wisdom related to resource extraction. Based on interviews with the caliphate leader and three community members who frequently trek into the forest, their local wisdom regarding natural resource management is expressed by the imbo, or zoning, system (Table 2). Areas known as *imbo gano* or *hutan larangan* are forbidden forest zones, where resource extraction for personal gain is prohibited. *Lubuk larangan* are zones for sacred territorial waters, where fishing is prohibited unless the elders open it up by conducting traditional rituals. The *imbo* system serves as a collective action that sustains the management of common property resources in the forest.

Table 2. | Forest Zoning Used by the Gajah Bertalut Indigenous Community

IMBO TYPE	DEFINITION	FUNCTION
<i>Imbo gano or hutan larangan</i>	Forbidden forests (mostly covered by primary forests)	Undisturbed forest lands to conserve the ecosystem and limited resource extractions
<i>Imbo perkebunan</i>	Mixed forestry plantations (mostly covered by rubber forests mixed with secondary forests)	Lands for forestry plantations or mixed with agricultural commodities production
<i>Imbo pemukiman</i>	Settlements	Human habitation; constructed area
<i>Imbo sungai</i>	Rivers	Rivers for fish production and transportation
<i>Imbo sungai-lubuk larangan</i>	Forbidden waters (selected waters of the river area where fishing is prohibited)	Periodically undisturbed river aims to keep fish production sustainable

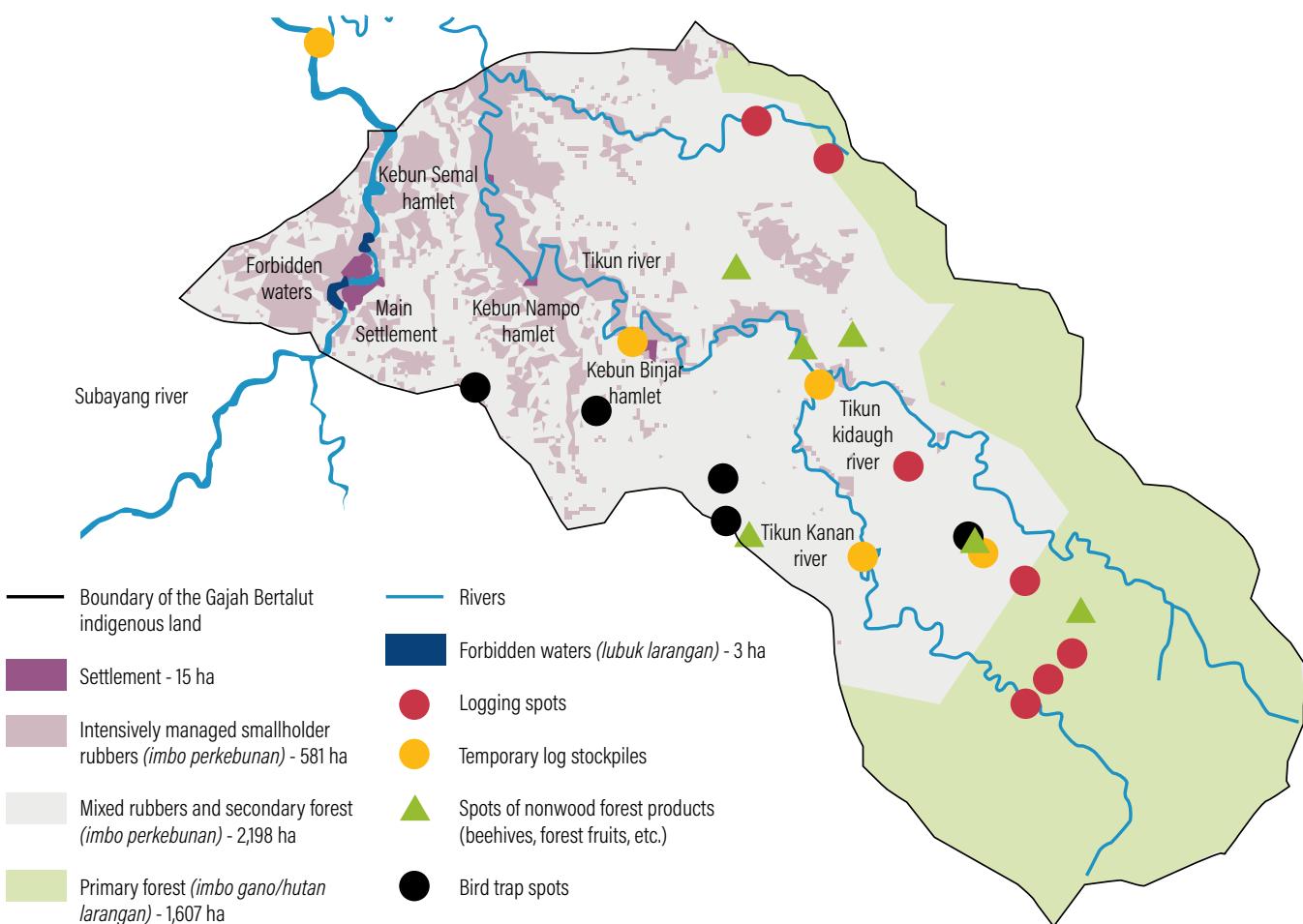
Source: Authors' analysis.

FGDs informed us that another aspect of local wisdom is the relationship between the community and animals. The community lives alongside the roaming Sumatran tiger population and does not engage in extermination. Thus, the extraction of forest products is kept in control by the threat of tigers. Local wisdom also prohibits the logging of sialang trees because of their essential role for honeybee habitat. The community believes that the presence of beehives is integral for a healthy forest and thus conserve the bee population.

## ITUPEDE Improved Natural Resource Management in Gajah Bertalut

During our participant observation process, ITUPEDE began improving natural resource management in the entire 4,414 ha of Gajah Bertalut by mapping the *imbo* system and forest resource distribution by using open-source satellite imagery and ground surveys. The resulting map served as a baseline for subsequent land-use planning. Our analysis, as illustrated in Map 2, found that mixed forestry plantations cover 62 percent of the entire area and consist of two kinds of land management: intensively managed rubber forests, which belong to individual smallholders (13 percent); and the less-productive, less-managed communal rubber forests mixed with secondary forests (49 percent).

Map 2. | Land Cover and Locations for Extracting Forest Products in Gajah Bertalut

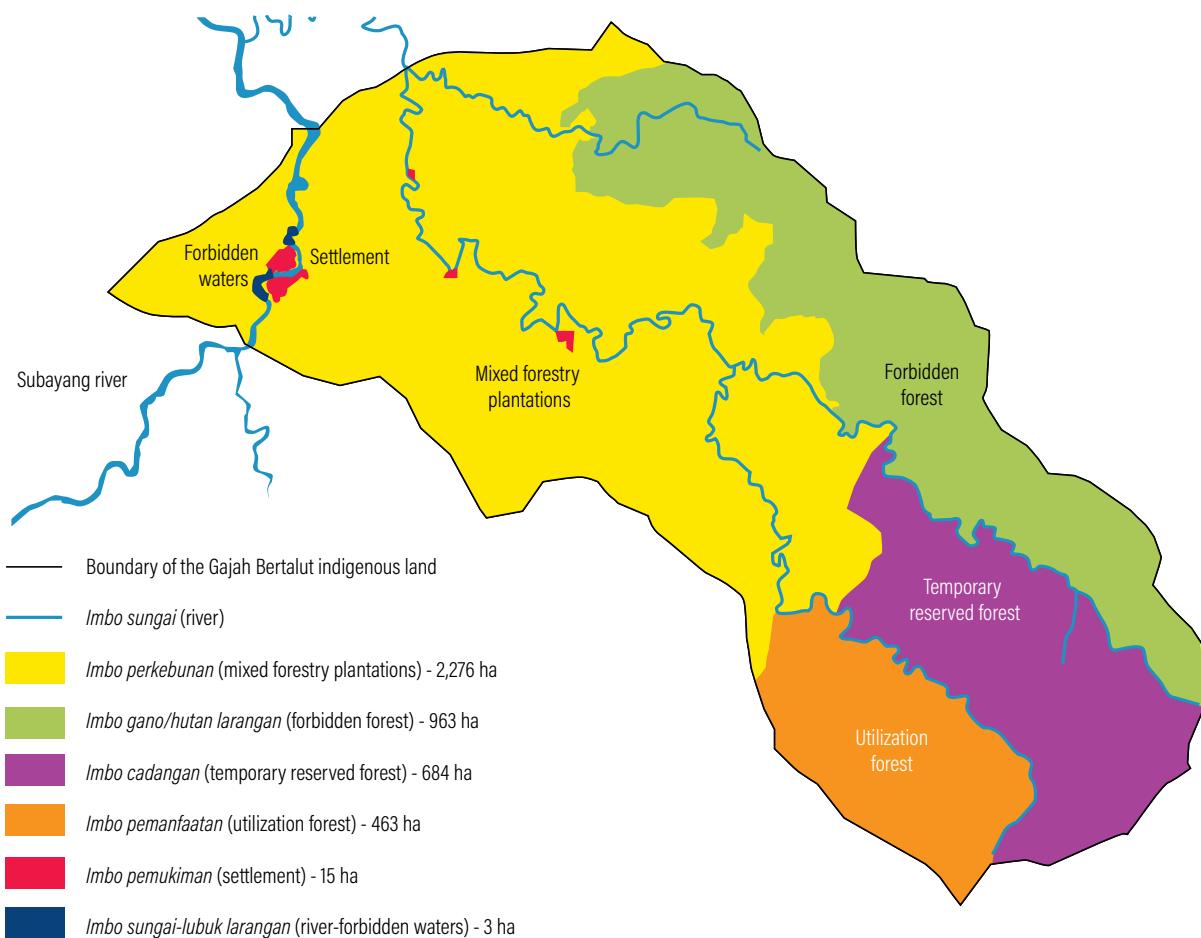


Source: Based on field observations; satellite imagery interpretations from WorldView-2 (imagery date: June 15, 2017) and Landsat 8 Operational Land Imager (imagery date: July 6, 2017); species distribution modeling for intensively managed smallholder rubber forests using the maximum entropy approach; and data from the Geospatial Information Agency and the U.S. Geological Survey.

The community then redesigned its land-use plan with help from the ITUPEDe team. Map 3 illustrates the spatial arrangement of the redesigned land-use plan. Regulations regarding the function of each zone, such as deforestation restrictions, were written in an agreement.<sup>16</sup> The community allocated that imbo gano (forbidden forests) be strictly preserved and kept lubuk larangan (forbidden waters) to serve as periodically preserved waters. Most of the existing intensively managed smallholder rubbers and the mixed rubbers and secondary forests were allocated as imbo perkebunan (mixed forestry plantations), making it the largest zone (52 percent).

The community would diversify its commodities with other nontimber forest products, such as dragon's blood rattan, agarwood, durian, and other local trees. The community proposed adding areas for resource extraction, called imbo pemanfaatan (utilization forests) and imbo cadangan (temporary reserved forests). Imbo pemanfaatan would allow the community to cut down trees for noncommercial purposes, including to build houses or mosques, which is subject to permission from elders. Areas marked as imbo cadangan remain preserved and would only be used by the community's future generations.

Map 3. | Spatial Planning in Gajah Bertalut Resulted from ITUPEDE's Participatory Land-Use Planning



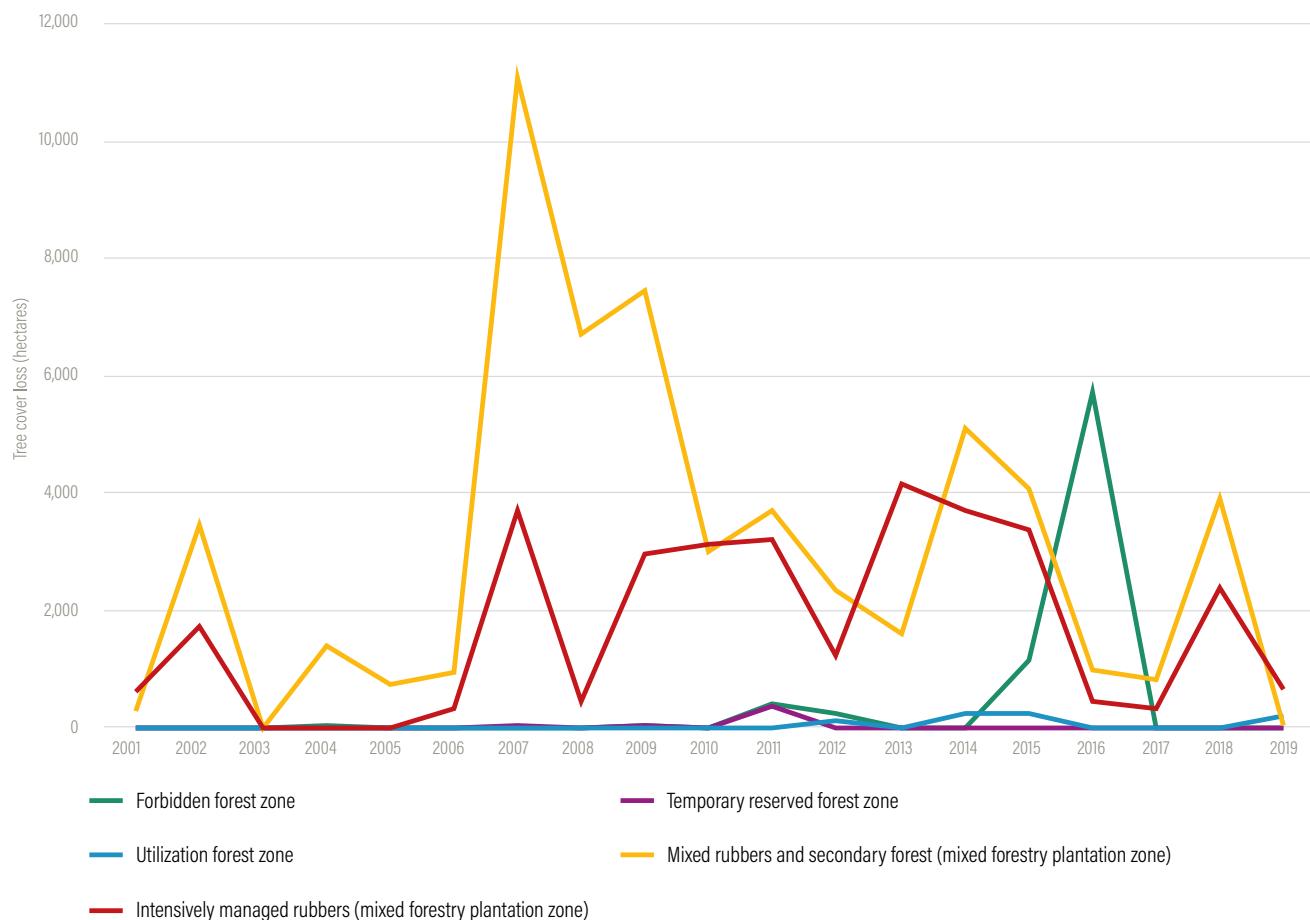
Source: Based on data from the participatory mapping process, the Geospatial Information Agency, and the U.S. Geological Survey.

We monitored whether the community adhered to ITUPEDE's redesigned land-use planning, using deforestation restrictions as an indicator. We simultaneously examined the period before ITUPEDE as a comparison to evaluate the initiative's effects. By using data from the open-source Global Forest Watch (Hansen et al. 2013, 2016), we overlaid tree cover loss data<sup>17</sup> from 2001 to 2019 and GLAD's deforestation alerts<sup>18</sup> from January to August 2020 onto ITUPEDE's spatial planning data.

We found that tree cover loss occurred continuously from 2001 to 2020; however, the loss occurred in selected locations where ITUPEDE's land-use plan permits. For example, the mixed forestry plantation zone experienced tree cover loss of approximately 1–15 ha per year, or an average of 4.74 ha per year, in 2001–19 and had 10 probable loss alerts in January–August 2020. The community tends to cut down its

old, unproductive rubber trees and repurposes them for household and commercial logging purposes. In contrast, the relatively restricted zones, such as the forbidden forests, temporary reserved forests, and utilization forests, had significantly less to no annual loss, with only 0.16 ha per year on average, and 1 probable loss alert in the temporary reserved forest zone. Despite an abrupt loss of up to 7 ha in the forbidden forest zone in 2015–16, the ITUPEDE team later verified that a prolonged drought season had caused forest wildfires in the area, which similarly occurred in most areas of Sumatra during the same period. Figure 3 shows the tree cover loss in different zones of Gajah Bertalut over time. This finding implies that, in terms of deforestation, the land-use plan corresponded well with local wisdom. However, this finding also reveals that local wisdom had been guiding deforestation restrictions long before ITUPEDE.

Figure 3. | Trends of Tree Cover Loss in Gajah Bertalut from 2001 to 2019



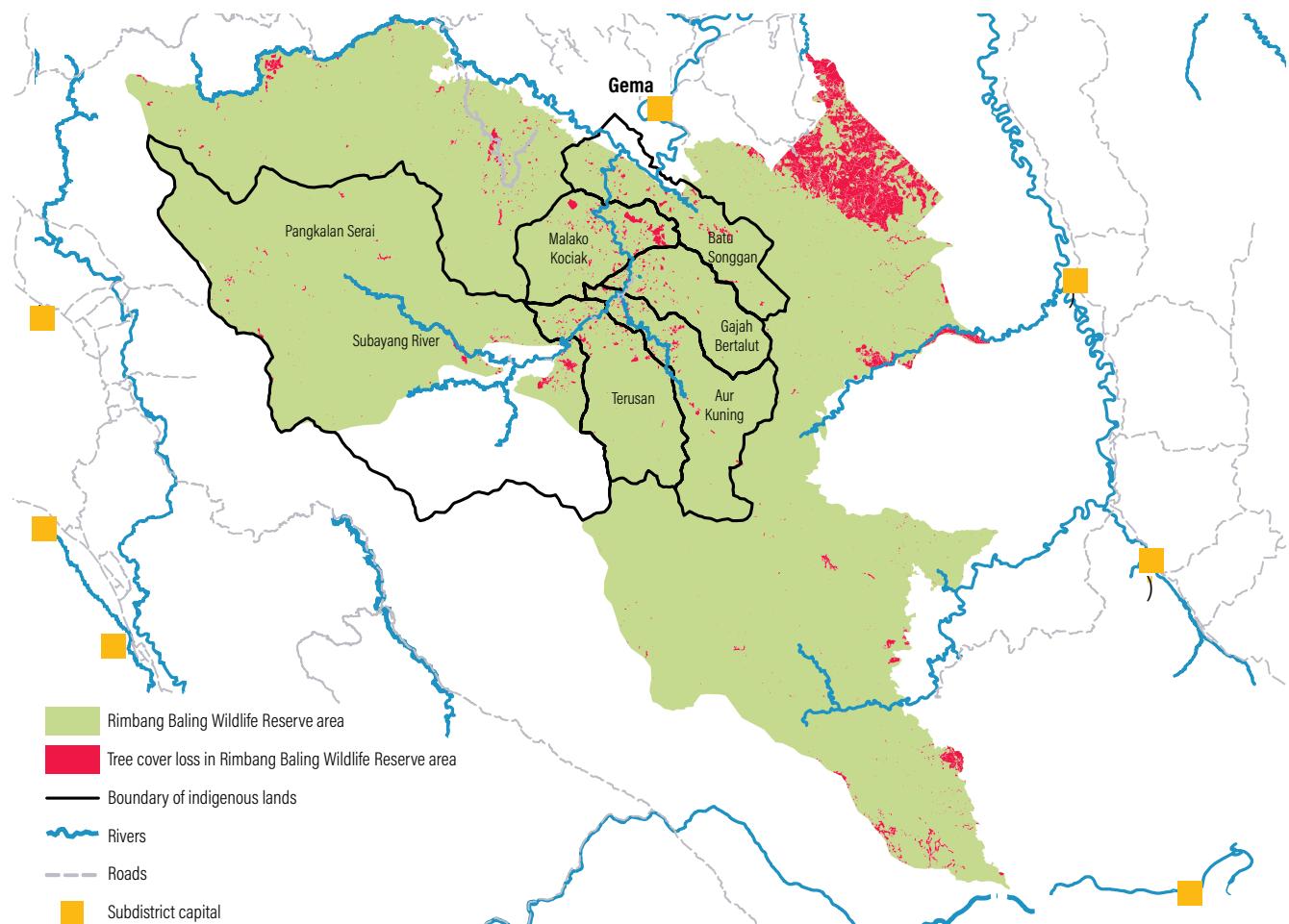
Source: Authors' analysis based on data from Hansen et al. (2013, 2016).

## ITUPED Enhanced the Community's Negotiating Power over Land Rights, but Legal Constraint Remains

Our analysis found more significant tree cover loss in the Rimbang Baling Wildlife Reserve than in Gajah Bertalut from 2001 to 2019. Whereas approximately 3 percent (132 ha) of tree cover loss occurred in Gajah Bertalut, the reserve experienced 5 percent (6,186 ha), excluding Gajah Bertalut. A similar difference in tree cover loss occurs when comparing the entire indigenous lands (2 percent; 1,127 ha) with the rest of the reserve (6 percent; 5,192 ha). We found that the annual rate of tree cover loss in the reserve, outside of the indigenous lands, is significantly greater than in the indigenous lands (two-tailed p-value of

0.0003). However, tree cover loss in the reserve is concentrated near Gema, the capital of the Kampar Kiri Hulu subdistrict. Illegal oil palm plantations, mining, and road infrastructure are expanding there (Map 4). When excluding areas around Gema and the indigenous lands, the reserve only lost 1.7 percent (1,322 ha) of tree cover. In that case, there is no significant difference between the annual tree cover loss rates of the reserve and the indigenous lands (two tailed p-value of 0.41). This means that the indigenous lands were able to maintain virtually identical annual rates of tree cover loss as the rest of the reserve, excluding areas around Gema. The situation around Gema raises concerns about the reserve's vulnerability to deforestation, particularly in the areas outside of indigenous control.

Map 4. | Tree Cover Loss in the Rimbang Baling Wildlife Reserve Area between 2001 and 2019



Source: Based on data from the Ministry of Environment and Forestry, the Geospatial Information Agency, and the Indigenous Territory Registration Agency. Tree cover loss analysis based on Hansen et al. (2013, 2016).

The district government, particularly the Kampar regency, enlightened with the spatial evidence, thereby agreed with the initiative offered by the Gajah Bertalut indigenous community. During the regent's visit to Gajah Bertalut in April 2018, we observed the regent state that he would issue a decree in October 2018 that would recognize the communities and their lands and create a long-term term plan to accommodate the entire indigenous lands in Kampar. Furthermore, at the time of writing this publication, the indigenous territorial maps were in the process of being integrated into the Regional Geospatial Information Network in Kampar as part of the nationwide One Map Policy at the subnational level.

We found that ITUPEDE successfully resolved a significant problem faced by the Gajah Bertalut indigenous community, notably writing the formal and legal documents necessary for its indigenous institutions to do well in the mapping process. ITUPEDE facilitated mapping at the local level and prepared legal codifications of the community's territory that represented its indigenous values. While formalizing the natural resource management rules and recognition of land rights, the ITUPEDE team and the community combined indigenous terminologies with conventional terminologies for formal law and forest management. The incorporation of indigenous wisdom on forest management permitted a more innate understanding. It increased

the legitimacy of improved forest management methods in the eyes of the community by framing those improvements within the community's foundational sociocultural norms. Although these legal framings are not seen as significant from the perspective of formal law, they have a substantial impact on spreading and replicating improvements in forest management and land rights recognition to neighboring indigenous villages.

After the district government's recognition, the next step is to register with MoEF. The MoEF team undertook a field verification process in December 2018. However, it stated that legitimizing the Gajah Bertalut indigenous community's proposal required recognition as indigenous people under the local regulation (*peraturan daerah*; PERDA). Such recognition comes from the district or provincial government, and this legislation is politically challenging because it requires the local parliament's approval. According to the law, a PERDA from the Kampar district concerning indigenous land rights enacted in 1999 (PERDA 12/1999 *tentang Hak Tanah Ulayat*) is insufficient. The process of PERDA negotiations remains ongoing at this time.

Furthermore, our analysis uncovered that reserve officials had applied a zoning system<sup>19</sup> according to a decree enacted in December 2017 (MoEF 2017). This decree signified the zoning was designed at the same time as ITUPEDE's participatory land use planning, but each was processed separately without consolidation. The reserve's zoning map situates the Gajah Bertalut indigenous territories in three types of zones:

- 60 percent in a protected zone (*blok perlindungan*)
- 1 percent in a utilization zone (*blok pemanfaatan*)
- 39 percent in a 'special use' zone (*blok khusus*)

For ecosystem protection purposes, the protected zone avoids any anthropogenic activities, but it overlaps Gajah Bertalut's mixed forestry plantation zone (27 percent), utilization forest zone (100 percent), and temporary reserved forest zone (100 percent). The utilization zone is entirely located within the Subayang River and is designed for river-based ecotourism, but it has yet to be implemented. The 'special use' zone provides living space for the local communities that have inhabited the area long before the government designation of the reserve, mostly in rubber forests and settlement areas. Negotiations with the reserve

to adopt a zoning design that accommodates the traditional land-use planning of the Gajah Bertalut indigenous community is currently ongoing.

## ITUPEDE's Next Steps and Areas for Improvement

In terms of inclusivity, active steps were taken by the ITUPEDE team to encourage the participation of commonly marginalized groups, such as women, youth, and members of the lower class. These steps included open public discussions and assigning specific tasks during participatory mapping. We observed that the group were less spontaneous in their participation and were involved only when assigned a task.

Based on all interviews with both women and men, tradition dictates that each plot of land is inherited matrilineally, from mother to daughter. This tradition indicates that women have authority over lands, particularly rubber forests covering up to 62 percent of the Gajah Bertalut territories. However, those who participated in ITUPEDE's land-use planning were primarily the village elite. Married men among the elites dominated most of the process. In addition, although women traditionally have had great persuasive power over the head of the household and there were no taboos against youth speaking up in the community, social and cultural norms restricted their expressions primarily to the family setting.

While writing this publication, ITUPEDE is currently facilitating the development of alternative livelihoods in Gajah Bertalut, such as organizing local enterprise and assessing potential nontimber forest products. ITUPEDE is planning to apply these developments not only in Gajah Bertalut, but also to the neighboring indigenous communities as well. We consider this step to be the key to maintaining the sustainability of natural resource management.

Since the entire area of Gajah Bertalut and the other indigenous territories are interconnected and critical for the sustainability of ecosystem services, ITUPEDE will need to consider an integrated landscape approach. The resulting participatory maps and land-use plans would be essential elements for the integrated landscape approach. This approach can be used in different settings; it provides a useful framework for integrating multiple objectives for

a landscape scaled in an orderly manner, ensuring the best possible outcome for the society (Baral and Holmgren 2015; Reed et al. 2017). Accordingly, ITUPEDE should conduct additional research to determine how much space would be required for an indigenous territory based on population density and livelihood sources. A hydrological assessment would be notable since the entire indigenous area plays a vital role as an ecoregion of the Subayang River, which inevitably contributes upstream to the Kampar watershed. ITUPEDE should also incorporate wildlife distribution patterns in the landscape across all indigenous lands, such as the Sumatran tiger.

## Opportunities for Expanding the Approach

The opportunity to concretize the Gajah Bertalut indigenous community's claims to its lands has triggered neighboring villages and villages in other areas to try to do the same. As of 2020, the ITUPEDE approach had been expanded into 3 other villages in the Kampar district, 8 villages in other districts in Riau, 2 villages in South Sumatra, and 23 villages in Papua. Since ITUPEDE was designed as an approach, not as a single methodological program to participatory mapping or land-use planning, it can be adjusted to meet the needs of other local communities. The key to scaling up the approach is working with local institutions in the process. However, replicating ITUPEDE may be challenging in areas with poor local institution participation.

## 4. CONCLUSIONS

Through ethnographic activities and GIS analyses, we found that the Gajah Bertalut indigenous community has a rich set of norms and traditions that emphasize sustainability. This set of norms and traditions includes elements of common property use and restricted resource extraction. For example, the imbo system serves as a traditional form of zoning, with each imbo having its own rules and functions. Although our analysis covers the period 2001–2020, our finding reveals that local wisdom had been guiding deforestation restrictions in specified areas long before ITUPEDE. These specified areas account for 48 percent of Gajah Bertalut, consist of forbidden forest, temporary reserved forest, and utilization forest (please see the area of each zone in Map 3).

We concluded that ITUPEDE has successfully helped members of the community to clarify land boundaries and improve land-use planning. The initiative increased the receptivity of the district government to the community and caused it to rescind earlier decisions that limited the community's rights. The maps produced by the initiative thus served to establish a common language between stakeholders, enhance community land rights, and strengthen the implementation of the One Map Policy. Nonetheless, we found that the community requires further negotiations to deal with the skepticism of some other government representatives, mainly to address legal constraints and political challenges over indigenous forest rights. Legitimizing the community's forest rights requires a legal standing that recognizes the indigenous community as a legal entity.

These findings weaken the notion that conventional conservation approaches are the only appropriate methods. Although our findings cannot be generalized to all indigenous communities, they support the viability of an inclusive approach to conservation or, at the very least, a case-by-case approach to forest protection. For instance, the tree cover loss in the state-owned wildlife reserve was proportionally more than triple the rate in Gajah Bertalut and the neighboring indigenous territories during the same period.

However, though many advocates claim that indigenous communities manage natural resources sustainably, such as in Gajah Bertalut, like other communities, their relationship with the environment is dynamic. It would be an oversimplification to generalize this nuanced and complex issue. Thus, although we find that indigenous communities have the potential to manage natural resources sustainably, we caution against giving land rights only when such communities are capable of sustainable management. Regardless, stakeholders should continuously engage with indigenous communities.

Lastly, we recommend ITUPEDE to conduct longer-term monitoring and intervention to continue its sustainable livelihood development and to support inclusivity and implementation of the integrated landscape approach. We suggest that future projects focus on improving social inclusion for women, youth, and people from lower social classes. We also suggest incorporating integrated landscape design within ITUPEDE's conceptual framework. This would recognize that the Gajah Bertalut area and the neighboring indigenous communities are interconnected to sustain numerous ecosystem services.

## ENDNOTES

- 1 These concerns were discussed at the National Coordinating Meeting on Accelerating the Implementation of the One Map Policy, "One Map for National Development 2017" (Rapat Koordinasi Nasional Percepatan Pelaksanaan Kebijakan Satu Peta, "Satu Peta Untuk Pembangunan Nasional 2017"), which was held in Jakarta in 2017.
- 2 *Adat* is an Indonesian term that refers to communities that adhere to customary laws, traditions, and values. Indigenous communities referred in this paper are *adat* communities. We use the term *adat* when referring to official documents or government bodies that use that term, but have chosen to use the word *indigenous* in all other instances for sake of clarity and convenience.
- 3 These concerns were discussed at the National Coordinating Meeting on Accelerating the Implementation of the One Map Policy, "One Map for National Development 2017" (Rapat Koordinasi Nasional Percepatan Pelaksanaan Kebijakan Satu Peta, "Satu Peta Untuk Pembangunan Nasional 2017"), which was held in Jakarta in 2017.
- 4 *Adat* is an Indonesian term that refers to communities that adhere to customary laws, traditions, and values. Indigenous communities referred in this paper are *adat* communities. We use the term *adat* when referring to official documents or government bodies that use that term, but have chosen to use the word *indigenous* in all other instances for sake of clarity and convenience.
- 5 The term *village* does not limit ITUPEDE's approach to only villages; it can also be applied to other similar levels, such as indigenous territories and other areas in site level.
- 6 During 2016–17, WRI Indonesia established friendly contacts with community leaders and activists of the indigenous movements in the district of Kampar, Riau. These interactions were facilitated by AMAN, which has local chapters in almost every province in Indonesia. AMAN is an influential national association of indigenous communities and has been spearheading the registration and mapping of indigenous communities.
- 7 The root of *kanagarian* is *nagari*. According to Davidson and Henley (2007, 204), "Nagari is the indigenous Minangkabau unit best described as a village, or a conglomeration of villages or settlements. It has often been seen as an autonomous 'village republic'; the content and extent of this autonomy is debated."
- 8 See Konsorsium Revisi HCV Toolkit Indonesia (2008) for the full list of indicators.
- 9 FPIC is required by law. However, there are no standards on how to obtain FPIC
- 10 Social forestry schemes are based on Regulation Number 83/2016 of the Ministry of Environment and Forestry (MoEF 2016) that granted the management of state forests to local communities. The program consists of five schemes: village forest, community forest, community production forest, *adat* forest, and forest partnerships. Social forestry schemes are a compromise between the government and conflicting local communities that enables the communities to gain access to state forests (Fisher et al. 2018). The *adat* forest scheme is unlike other social forestry schemes. The Indonesian Constitutional Court ruled in 2012 that forestlands belonging to indigenous communities must not be classified as state forests (Constitutional Court, 2013, Putusan Mahkamah Konstitusi Republik Indonesia Nomor 35/PUU-X/2012). Owing to this ruling, all indigenous territories in state forests were officially recognized as private forestlands, explicitly *adat* forest. Because one purpose of social forestry schemes is to develop better maintenance of forests and prevent future escalation of tenurial conflicts across Indonesia (Wiratno 2017), the ITUPEDE team found the *adat* forest scheme suitable for achieving the goals of environmental protection and the recognition of community land and resource rights in Gajah Bertalut.
- 11 The KKMA is an approach designed under Directorate General of Natural Resources and Ecosystem Conservation Regulation Number P.6/2018 (Directorate General of Natural Resources and Ecosystem Conservation 2018) to promote comanagement of state-owned conservation areas between the state and local communities. This allows local communities to have specific resource extraction or ecosystem rehabilitation activities in particular zones inside conservation areas. Before the regent of Kampar had issued a decree recognizing the Gajah Bertalut indigenous community in October 2018, the ITUPEDE team had raised the KKMA, when it was just recently issued in June 2018, as another alternative for the community to consider. However, the community rejected the alternative because it felt the KKMA did not provide tenurial rights and limited the land-use activities within the area.

12 A three-dimensional model is a tangible landscape that is physically sculpted, can be felt, and is overlaid with a digital project (NCSU GeoForAll Lab n.d.). A three-dimensional map provides practical support for participatory mapping because it is more understandable for locals. It facilitates better community map reading skills. For this project, cardboard contour layers were first stacked; then a plaster, made of flour, was applied; and, lastly, it was painted to indicate land zoning.

13 They were entitled "The Decision of the Indigenous Institution on the Protection and the Management of Gajah Bertalut Indigenous Forests" and "The Agreement Charter among the Indigenous Institutions, Village Administration, and the Religious Leaders of Gajah Bertalut on the Protection and Management of Gajah Bertalut Indigenous Forests."

14 This includes WRI Indonesia and local CSO partners: AMAN, BRWA, Pelopor, Scale-Up, Bahtera Alam, Mitra Aksi, Perkumpulan Alam Sumatera (PASA), and Green Radio.

15 It is advantageous to classify the parameters based on the community's perspective because it avoids imposing the researchers' concept of wealth onto the community, who may have different understandings and concepts regarding wealth. This advantage is particularly relevant when dealing with indigenous communities, where traditions and differences in culture may result in significantly different worldviews between the community and the researchers.

16 The agreement is titled "The Agreement Charter among the Indigenous Institutions, Village Administration, and the Religious Leaders of Gajah Bertalut on the Protection and Management of Gajah Bertalut Indigenous Forests."

17 Tree cover loss is not necessarily deforestation. According to Global Forest Watch data terminology, *tree cover loss* refers to a disturbance of woody vegetation over five meters in height despite whether that is in mature primary forests, secondary forests recovering from past disturbance, or tree plantations. For more details, please refer to Global Forest Watch data cautions (Hansen et al. 2013).

18 Each alert indicates a 30-by-30-meter pixel resolution of forest loss. However, the alert is not recommended to be used for area calculation (Weisse and Pickens 2020). Tree cover loss is considered better to estimate area, but the data was currently only available for 2001–19. For 2020, we simply counted the number of alerts received in the analysis area.

19 According to MoEF Regulation Number 76/2015 (MoEF 2015), spatial planning in conservation areas establishes zones based on the resource potential and the priority of area management. The zoning system depends on the type of the conservation area and includes a protected zone, utilization zone, and several other zones. As per article number 22, the zoning design must be discussed through a public consultation process involving the local community.

## REFERENCES

- Adhikari, J.R. 2001. "Community Based Natural Resource Management in Nepal with Reference to Community Forestry: A Gender Perspective." *Journal of Environment* 6 (7): 9–22. <http://hdl.handle.net/10919/67269>.
- Affandi, D.Y. 2017. "The Struggle over Adat Forest Rights in Upland Banten, Indonesia." PhD thesis, Monash University. <https://doi.org/10.4225/03/58f81930bcb17>.
- Alcorn, J.B. 2010. "Indigenous Peoples and Conservation." White Paper. Chicago: MacArthur Foundation. [https://www.macfound.org/media/files/CSD\\_Indigenous\\_Peoples\\_White\\_Paper.pdf](https://www.macfound.org/media/files/CSD_Indigenous_Peoples_White_Paper.pdf).
- Ammer, B., D. Betke, and H. Eger, A. Kohler, A. Kutter, A. von Lossau, U. Müller, S. Seidemann, R. Steurer, and W. Zimmermann. 1999. *Land Use Planning: Methods, Strategies and Tools*. Eschborn, Germany: Deutsche Gesellschaft für Technische Zusammenarbeit. <http://www.meso-nrw.de/toolkit/Downloads/gtz-lup.pdf>
- Askew, H., and B. Napoleon. 2019. "The Caribou Are Our Four-Legged Cousins." Centre for International Governance Innovation, June 27. <https://www.cigionline.org/articles/caribou-are-our-four-legged-cousins>.
- Austin, K.G., A. Schwantes, Y. Gu, and P.S. Kasibhatla. 2019. "What Causes Deforestation in Indonesia?" *Environmental Research Letters* 14 (2): 024007. <https://doi.org/10.1088/1748-9326/aaf6db>.
- Baral, H., and P. Holmgren. 2015. "A Framework for Measuring Sustainability Outcomes for Landscape Investments." Working Paper 195. Bogor: Center for International Forestry Research. <https://doi.org/10.17528/cifor/005761>.
- Barr, C., I.A.P. Resosudarmo, A. Dermawan, J. McCarthy, M. Moeliono, and B. Setiono, eds. 2006. *Decentralization of Forest Administration in Indonesia: Implications for Forest Sustainability, Economic Development and Community Livelihoods*. Bogor, Indonesia: Center for International Forestry Research. <https://doi.org/10.17528/cifor/002113>.
- Cabinet Secretariat. 2018. "Launching of the One Map Policy Geoportal and the 2018 National Infrastructure Progress Book, 11 December 2018, at Birawa Room, Bidakara Hotel, Jakarta." December 11. <https://setkab.go.id/peluncuran-geoportal-kebijakan-satu-peta-dan-buku-kemajuan-infrastruktur-nasional-tahun-2018-11-desember-2018-di-ruang-birawa-hotel-bidakara-jakarta/>.
- CAIT Climate Data Explorer. 2019. "CAIT Country Greenhouse Gas Emissions Data (1990–2016)." Washington, DC: World Resources Institute. [https://www.climatewatchdata.org/ghg-emissions?end\\_year=2016&regions=T0P%2CBRA%2CCHN%2CIND%2CIDN%2CJPN%2CRUS%2CUS%2CEUU&start\\_year=1990](https://www.climatewatchdata.org/ghg-emissions?end_year=2016&regions=T0P%2CBRA%2CCHN%2CIND%2CIDN%2CJPN%2CRUS%2CUS%2CEUU&start_year=1990).
- Chapin, M., Z. Lamb, and B. Threlkeld. 2005. "Mapping Indigenous Lands." *Annual Review of Anthropology* 34 (1): 619–38. <https://doi.org/10.1146/annurev.anthro.34.081804.120429>.
- Corbett, J., S. Devos, S. Di Gessa, K. Fara, I. Firmian, H. Liversage, M. Mangiafico, et al. 2009. *Good Practices in Participatory Mapping: A Review Prepared for the International Fund for Agricultural Development (IFAD)*. Rome: International Fund for Agricultural Development. [https://www.ifad.org/documents/38714170/39144386/PM\\_web.pdf/7c1eda69-8205-4c31-8912-3c25d6f90055](https://www.ifad.org/documents/38714170/39144386/PM_web.pdf/7c1eda69-8205-4c31-8912-3c25d6f90055).
- Coulson-Drasner, A. 2018. "Land Loss Threatens Indigenous Communities Worldwide." Deutsche Welle, August 9. <https://www.dw.com/en/land-loss-threatens-indigenous-communities-worldwide/a-44997211-0>.
- Davidson, J., and D. Henley, eds. 2007. *The Revival of Tradition in Indonesian Politics: The Deployment of Adat from Colonialism to Indigenism*. New York: Routledge.
- Direktorat General of Natural Resources and Ecosystem Conservation. 2018. *Regulation of the Director General of Natural Resources and Ecosystem Conservation Number P.6/KSDAE/SET/Kum.1/6/2018 concerning Technical Guidelines for Conservation Partnerships in Nature Reserves and Nature Conservation Areas*. Jakarta: Directorate General of Natural Resources and Ecosystem Conservation, Ministry of Environment and Forestry, Government of Indonesia. <http://ksdae.menlhk.go.id/assets/news/peraturan/Perdirjen%20No%206%20Tahun%202018%20tentang%20Juknis%20Kemitraan%20Konservasi.pdf>.
- Dowie, M. 2009. "Clash of Cultures: The Conflict between Conservation and Indigenous People in Wild Landscapes." *The Guardian*, June 2. <https://www.theguardian.com/environment/2009/jun/03/yosemite-conservation-indigenous-people>.
- Dowie, M. 2011. *Conservation Refugees: The Hundred-Year Conflict between Global Conservation and Native Peoples*. Cambridge, MA: MIT Press.

- Earth Innovation Institute. 2015. *Central Kalimantan Land Governance Assessment*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/28514>.
- Eghenter, C. 2006. "Conserving Nature in Culture. Case Studies from Southeast Asia, Michael R. Dove, Percy E. Sajise, & Amity A. Doolittle (Eds)." Book review. *Moussons* (9–10): 360–62. <https://doi.org/10.4000/moussons.1921>.
- Eghenter, C. 2019. "Learning Conservation from Indigenous People." World Wide Fund for Nature, August 9. [https://wwf.panda.org/knowledge\\_hub/where\\_we\\_work/borneo\\_forests/?351390/Learning-Conservation-from-Indigenous-People](https://wwf.panda.org/knowledge_hub/where_we_work/borneo_forests/?351390/Learning-Conservation-from-Indigenous-People).
- Fay, C., and H.M.S. Denduangrudee. 2016. "Emerging Options for the Recognition and Protection of Indigenous Community Rights in Indonesia." In *Land and Development in Indonesia: Searching for the People's Sovereignty*, edited by J.F. McCarthy and K. Robinson, 91–112. Singapore: Institute of Southeast Asian Studies–Yusok Ishak Institute. <https://bookshop.iseas.edu.sg/publication/2155>.
- Fay, C., and M. Sirait. 2002. "Reforming the Reformists in Post-Soeharto Indonesia." In *Which Way Forward: People, Forests, and Policymaking in Indonesia*, edited by C.J.P. Colfer and I.A.P. Resosudarmo, 126–43. New York: Routledge. <https://doi.org/10.4324/9781936331772>.
- Fisher, M.R., M. Moeliono, A. Mulyana, E.L. Yuliani, A. Adriadi, Kamaluddin, J. Judda, and M.A.K. Sahide. 2018. "Assessing the New Social Forestry Project in Indonesia: Recognition, Livelihood and Conservation?" *International Forestry Review* 20 (3): 346–61. <https://doi.org/10.1505/146554818824063014>.
- Fitzgerald, O.E., and K. Mahoney. 2019. "Environmental Challenges on Indigenous Lands." Centre for International Governance Innovation, June 27. <https://www.cigionline.org/articles/environmental-challenges-indigenous-lands>.
- Gaveau, D.L.A., D. Sheil, H. Mohammad A. Salim, S. Arjasakusuma, M. Ancrenaz, P. Pacheco, and E. Meijaard. 2016. "Rapid Conversions and Avoided Deforestation: Examining Four Decades of Industrial Plantation Expansion in Borneo." *Scientific Reports* 6 (1): 32017. <https://doi.org/10.1038/srep32017>.
- Geospatial Information Agency, n.d. (Database). "Indonesia Rupabumi Base Map." <https://tanahair.indonesia.go.id/portal-web/inageoportal/#/>. Accessed December 2017.
- Hall, D., P. Hirsch, and T.M. Li. 2011. *Powers of Exclusion: Land Dilemmas in Southeast Asia*. Honolulu: University of Hawaii Press.
- Hansen, M., A. Krylov, A. Tyukavina, P.V. Potapov, S. Turubanova, B. Zutta, S. Ifo, B. Margono, F. Stolle, and R. Moore. 2016. "Humid Tropical Forest Disturbance Alerts Using Landsat Data." *Environmental Research Letters* 11 (3): 034008. <https://doi.org/10.1088/1748-9326/11/3/034008>.
- Hansen, M., P.V. Potapov, R. Moore, M. Hancher, S.A. Turubanova, A. Tyukavina, D. Thau, et al. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science* 342 (6160): 850–53. <https://doi.org/10.1126/science.1244693>.
- Harwell, E. 2000. "Remote Sensibilities: Discourses of Technology and the Making of Indonesia's Natural Disaster." *Development and Change* 31 (1): 307–40. <https://doi.org/10.1111/1467-7660.00156>.
- Henderson, J.Y. 2019. "Wild Buffalo Recovery and Ecological Restoration of the Grasslands." Centre for International Governance Innovation, June 27. <https://www.cigionline.org/articles/wild-buffalo-recovery-and-ecological-restoration-grasslands>.
- Herlihy, P.H., and G. Knapp. 2003. "Maps of, by, and for the Peoples of Latin America." *Human Organization* 62 (4): 303–14. <http://www.jstor.org/stable/44127812>.
- Indigenous Territory Registration Agency. n.d. (Database). "GIS-BRWA." <https://brwa.or.id/sig/>. Accessed September 2017.
- Joko Widodo. 2016. *Presidential Regulation of the Republic of Indonesia Number 9 of 2016 concerning the Acceleration of Implementation of the One Map Policy at the Level of Map Accuracy Scale 1: 50,000*. Jakarta: President of the Republic of Indonesia.
- Jones, S.B. 1945. *Boundary-Making: A Handbook for Statesmen, Treaty Editors, and Boundary Commissioners*. Washington, DC: Carnegie Endowment for International Peace, Division of International Law.
- Konsorsium Revisi HCV Toolkit Indonesia. 2008. *Panduan Identifikasi: Kawasan Bernilai Konservasi Tinggi di Indonesia*. Balikpapan: Tropenbos International Indonesia Programme.
- KPA (Konsorsium Pembaruan Agraria). 2018. *Masa Depan Reforma Agraria Melampaui Tahun Politik: Catatan Akhir Tahun 2018*. South Jakarta: KPA. [http://kpa.or.id/assets/uploads/files/publikasi/4ae36-catahu-2018-kpa-edisi-peluncuran\\_.pdf](http://kpa.or.id/assets/uploads/files/publikasi/4ae36-catahu-2018-kpa-edisi-peluncuran_.pdf).
- Kuncoro, A. 2002. "The New Laws of Decentralization and Corruption in Indonesia: Examination of Provincial and District Data." *ERSA Conference Papers*. Louvain-la-Neuve, Belgium: European Regional Science Association. <https://ideas.repec.org/p/wiw/wiwsa/ersa02p053.html>.

- Kurniawan, N.I. 2016. "Getting the One Map Policy Right." *Indonesia at Melbourne* (blog), May 11. <https://indonesiaatmelbourne.unimelb.edu.au/getting-one-map-policy-right/>.
- Li, T.M. 2000. "Articulating Indigenous Identity in Indonesia: Resource Politics and the Tribal Slot." *Comparative Studies in Society and History* 42 (1): 149–79. <https://doi.org/10.1017/S0010417500002632>.
- Lucas, A., and C. Warren. 2013. "The Land, the Law, and the People." In *Land for the People: The State and Agrarian Conflict in Indonesia*, edited by Anton Lucas and Carol Warren, 1–41. Athens: Ohio University Press.
- MoEF (Ministry of Environment and Forestry). 2015. *Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor P.76/Menlhk/Setjen/2015 tentang Kriteria Zona Pengelolaan Taman Nasional dan Blok Pengelolaan Cagar Alam, Suaka Margasatwa, Taman Hutan Raya dan Taman Wisata Alam*. Jakarta: MoEF, Government of Indonesia. <http://pika.ksdae.menlhk.go.id/assets/pdf/PERMEN%20LHK%20N0%20P%2076%20TAHUN%202015%20%20tentang%20kriteria%20zona%20dan%20blok%20tn%20ca%20sm%20tahura%20twa.pdf>.
- MoEF. 2016. *Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor P.83/Menlhk/Setjen/Kum.1/10/2016 tentang Perhutanan Sosial*. Jakarta: MoEF, Government of Indonesia. <http://pika.ksdae.menlhk.go.id/assets/news/peraturan/PERMENLHK-No-83-Tentang-Perhutanan-Sosial.pdf>
- MoEF. 2017. *Keputusan Direktur Jenderal Konservasi Sumber Daya Alam dan Ekosistem Nomor SK.439/KSDAE/SET/KSA.0/12/2017 tentang Pengesahan Blok Pengelolaan Kawasan Suaka Margasatwa Bukit Rimbang Bukit Baling*. Jakarta: MoEF, Government of Indonesia. [http://pika.ksdae.menlhk.go.id/assets/publikasi/zona\\_dan\\_bloc\\_dengan\\_sk\\_.pdf](http://pika.ksdae.menlhk.go.id/assets/publikasi/zona_dan_bloc_dengan_sk_.pdf)
- MoEF. n.d. (Database). "ArcGIS REST Services Directory: KLHK." <http://geoportal.menlhk.go.id/arcgis/rest/services/KLHK>. Accessed January 2020.
- Moeliono, T.P. 2011. "Spatial Management in Indonesia: From Planning to Implementation—Cases from West Java and Bandung: A Socio-Legal Study." PhD thesis, Leiden University. <http://hdl.handle.net/1887/18242>.
- Naylor, R.L., M.M. Higgins, R.B. Edwards, and W.P. Falcon. 2019. "Decentralization and the Environment: Assessing Smallholder Oil Palm Development in Indonesia." *Ambio* 48 (10): 1195–1208. <https://doi.org/10.1007/s13280-018-1135-7>.
- NCSU (North Carolina State University) GeoForAll Lab. n.d. "Tangible Landscape." <https://tangible-landscape.github.io/>. Accessed March 16, 2020.
- OBG (Oxford Business Group). 2020. "Indonesia Introduces One Map Policy as a Solution to Overlapping Land Claims." <https://oxfordbusinessgroup.com/overview/indonesia-introduces-one-map-policy-solution-overlapping-land-claims>.
- Phillips, S.J., M. Dudik, and R.E. Schapire. n.d. *Maxent Software for Modeling Species Niches and Distributions (Version 3.4.1)*. American Museum of Natural History. [https://biodiversityinformatics.amnh.org/open\\_source/maxent/](https://biodiversityinformatics.amnh.org/open_source/maxent/). Accessed October 8, 2020.
- PKTHA (Penanganan Konflik Tenurial dan Hutan Adat). n.d. "Statistik Penanganan Pengaduan & Pengusulan." <http://pskl.menlhk.go.id/pktha/>. Accessed January 20, 2020.
- Poole, P., and Biodiversity Support Program. 1995. *Indigenous Peoples, Mapping & Biodiversity Conservation: An Analysis of Current Activities and Opportunities for Applying Geomatics Technologies*. Landover, MD: Biodiversity Support Program.
- Pradana, A. 2018. "Three Strategies Government Should Do following the Launch of One Map Geoportal." *WRI Insights* (blog). December 14. <https://wri-indonesia.org/en/blog/three-strategies-government-should-do-following-launch-one-map-geoportal>.
- Purba, C.P.P., S.G. Nanggara, M. Ratriyono, I. Apriani, L. Rosalina, N.A. Sari, and A.H. Meridian. 2014. *Potret Keadaan Hutan Indonesia Periode 2009–2013*. Bogor, Indonesia: Forest Watch Indonesia. [https://fwi.or.id/wp-content/uploads/2015/05/PKHI-2009-2013\\_update\\_sz.pdf](https://fwi.or.id/wp-content/uploads/2015/05/PKHI-2009-2013_update_sz.pdf).
- Raygorodetsky, G. 2018. "Indigenous Peoples Defend Earth's Biodiversity—but They're in Danger." *National Geographic*, November 16. <https://www.nationalgeographic.com/environment/2018/11/can-indigenous-land-stewardship-protect-biodiversity-/>.
- Reed, G. 2019. "Connecting the Local Communities and Indigenous Peoples Platform to Domestic Climate Challenges in Canada." Centre for International Governance Innovation, July 4. <https://www.cigionline.org/articles/connecting-local-communities-and-indigenous-peoples-platform-domestic-climate-challenges>.
- Reed, J., J. van Vianen, J. Barlow, and T. Sunderland. 2017. "Have Integrated Landscape Approaches Reconciled Societal and Environmental Issues in the Tropics?" *Land Use Policy* 63 (April): 481–92. <https://doi.org/10.1016/j.landusepol.2017.02.021>.
- Resosudarmo, I.A.P. 2004. "Closer to People and Trees: Will Decentralisation Work for the People and the Forests of Indonesia?" *European Journal of Development Research* 16 (1): 110–32. <https://doi.org/10.1080/0957881041001688761>.
- Ridhwan, D., and B. Bagja. 2019. "Understanding the Causes and Solutions of Forest Enroachment in Riau." *WRI Insights* (blog). December 18. <https://wri-indonesia.org/en/blog/understanding-causes-and-solutions-forest-enroachment-riau>.
- Samadhi, T.N. 2015. "New Forest Fires Threaten Indonesia's Protected Areas." *Jakarta Post*, July 30. <https://www.thejakartapost.com/news/2015/07/30/new-forest-fires-threaten-indonesia-s-protected-areas.html>.

- Saturi, S. 2012. "Konflik Sawit Menggunung, GAPKI Bilang Masih Kecil." Mongabay, December 24. <https://www.mongabay.co.id/2012/12/24/konflik-sawit-menggunung-gapki-bilang-masih-kecil/>.
- Sneed, A. 2019. "What Conservation Efforts Can Learn from Indigenous Communities." *Scientific American*, May 29. <https://www.scientificamerican.com/article/what-conservation-efforts-can-learn-from-indigenous-communities/>.
- Srebro, H., and M. Shoshani. 2007. "The Order of Precedence of Boundary Delimitations." Paper presented at "FIG Working Week 2007," International Federation of Surveyors, Hong Kong, May 13–17. [https://www.fig.net/resources/proceedings/fig\\_proceedings/fig2007/papers/ts\\_1g/ts01g\\_01\\_srebro\\_shoshani\\_1295.pdf](https://www.fig.net/resources/proceedings/fig_proceedings/fig2007/papers/ts_1g/ts01g_01_srebro_shoshani_1295.pdf).
- Sumaryo. 2017. "Penetapan Dan Penegasan Batas Desa, Teori Dan Praktek." Presented at the Rapat Koordinasi Nasional Percepatan Kebijakan Satu Peta, Jakarta.
- Tjondronegoro, S.M.P. 2006. "Land Policies in Indonesia." Working Paper 37435. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/777651468260378738/Land-policies-in-Indonesia>.
- Toumbourou, T. 2018. "Using a Delphi Approach to Identify the Most Efficacious Interventions to Improve Indonesia's Forest and Land Governance." *Land Use Policy* (March): 102768. <https://doi.org/10.1016/j.landusepol.2017.05.017>.
- UN DESA (United Nations Department of Economic and Social Affairs) Indigenous Peoples. n.d. "Environment." <https://www.un.org/development/desa indigenouspeoples/mandated-areas1/environment.html>. Accessed February 11, 2020.
- UNEP (United Nations Environment Programme). 2017. "Indigenous People and Nature: A Tradition of Conservation." July 21. <http://www.unenvironment.org/news-and-stories/story/indigenous-people-and-nature-tradition-conservation>.
- U.S. Geological Survey. n.d. (Database). *EarthExplorer*. <https://earthexplorer.usgs.gov/>. Accessed December 2017.
- VOA (Voice of America). 2018. "Indonesia Reforms Seek to Solve Decades of Land Conflict." December 11. <https://www.voanews.com/east-asia-pacific/indonesia-reforms-seek-solve-decades-land-conflict>.
- Wahyudi, H., L. Supartmanono, E. Jusman, A.A. Ilyas, et al. 2017. "Profil Masyarakat Adat Kekhalifahan Batu Sanggan Kampar-Riau." Kampar, Indonesia: Aliansi Masyarakat Adat Nusantara Kampar.
- Weisse, M., and A. Pickens. 2020. "GLAD Deforestation Alerts, Explained." *Global Forest Watch Blog*, September 2. <https://blog.globalforestwatch.org/data-and-research/glad-deforestation-alerts>.
- Wijaya, A., H. Chrysolite, M. Ge, C.K. Wibowo, A. Pradana, A.F. Utami, and K. Austin. 2017. "How Can Indonesia Achieve Its Climate Change Mitigation Goal? An Analysis of Potential Emissions Reductions from Energy and Land-Use Policies." Working Paper. Jakarta: World Resources Institute. [https://files.wri.org/s3fs-public/how-can-indonesia-achieve-its-climate-change-mitigation-goal-analysis-potential-emissions-reductions-from-energy-land-use-policies\\_0.pdf](https://files.wri.org/s3fs-public/how-can-indonesia-achieve-its-climate-change-mitigation-goal-analysis-potential-emissions-reductions-from-energy-land-use-policies_0.pdf).
- Winoto, J. 2009. "Taking Land Policy and Administration in Indonesia to the Next Stage and National Land Agency's Strategic Plan." Paper prepared for the Workshop in International Federation of Surveyors' Forum, Washington DC, March. [https://fig.net/resources/proceedings/2009/fig\\_wb\\_2009/papers/country/country\\_winoto.pdf](https://fig.net/resources/proceedings/2009/fig_wb_2009/papers/country/country_winoto.pdf).
- Wiratno. 2017. *"Perebutan" Ruang Kelola: Refleksi Perjuangan dan Masa Depan Perhutanan Sosial di Indonesia*. Pidato Dies Natalis Fakultas Kehutanan Universitas Gadjah Mada Ke 54. Yogyakarta, Indonesia: Universitas Gadjah Mada. [https://www.bksdabengkulu.id/assets/filepublikasi/1/dokpublik\\_1525669376.pdf](https://www.bksdabengkulu.id/assets/filepublikasi/1/dokpublik_1525669376.pdf).
- Wrachien, D. 2001. "Land Use Planning: A Key to Sustainable Agriculture." In *Conservation Agriculture*, edited by L. García-Torres, J. Benites, A. Martínez-Vilela, and A. Holgado-Cabrera, 471–82. Dordrecht, Netherlands: Springer. <https://doi.org/10.1007/978-94-017-1143-2>.
- Yudhoyono, S.B. 2011. *Presidential Instruction of the Republic of Indonesia Number 10 of 2011 concerning Postponement of Granting New Licenses and Improving Management of Primary Natural Forests and Peatlands*. Jakarta: President of the Republic of Indonesia.
- Zaitchik, A. 2018. "From Conservation to Colonization." *Foreign Policy* (blog), July 16. <https://foreignpolicy.com/2018/07/16/how-conservation-became-colonialism-environment-indigenous-people-ecuador-mining>.
- Zhang, Y.J., A.J. Li, and T. Fung. 2012. "Using GIS and Multi-criteria Decision Analysis for Conflict Resolution in Land Use Planning," in "18th Biennial ISEM Conference on Ecological Modelling for Global Change and Coupled Human and Natural System," edited by Z. Yang and B. Chen, special issue, *Procedia Environmental Sciences* 13 (January): 2264–73. <https://doi.org/10.1016/j.proenv.2012.01.215>.

## ACKNOWLEDGMENTS

We are pleased to acknowledge the Royal Norwegian Embassy for funding WRI Indonesia's One Map Initiative projects.

We express sincere gratitude to the Gajah Bertalut community and the entire Batu Sanggan Caliphate for their hospitality and friendship throughout the years. We are grateful to the partners of the One Map Initiative in Riau: the Kampar Municipal Government, the Balai Besar Konservasi Sumber Daya Alam Riau, AMAN, the BRWA, Bahtera Alam, Pelopor, Scale-Up, Mitra Aksi, PASA, and Green Radio. Some of us wanted to thank WRI Indonesia in Riau who initiate the implementation of this project on the ground: Rakmat Hidayat, Julius Lawalata, Muis Fajar, Syafredo, Surta Siallagan, and Dassy. Without their relentless support, it would not have been possible to arrive here as an organization and do this important work.

We greatly appreciate our external reviewers, whose time and thoughtful inputs helped elevate this practice note: Barbara Karni, Hery Santoso (Java Learning Center), Kasmita Widodo (BRWA), Kharil Fahmi Faisal (World Wildlife Fund), and Yuli Prasetyo (MoEF). Thank you to our colleagues at WRI who helped us throughout the process: Thiago Guimares, Hidayah Hamzah, Julia Kalmirah, Neha Lal, Emily Matthews, Adi Pradana, Akansha Saklani, Celine Salcedo-La Viña, Lauri Scherer, Nirarta Samadhi, Emilia Suarez, Gregory Taff, Sakinah Ummu Haniy and Septika Sihite.

## ABOUT THE AUTHORS

**Dwiki Ridhwan** is a Research and Forest-Based Livelihood Analyst with WRI Indonesia's Forest Program—Regional Riau.  
Contact: [dwiki.ridhwan@wri.org](mailto:dwiki.ridhwan@wri.org)

**Carolina Astri** is a Conflict Transformation Analyst with WRI Indonesia's Forest Program. Contact: [carolina.astri@wri.org](mailto:carolina.astri@wri.org)

**Alif Azadi Taufik** is a Research Consultant with WRI Indonesia's Forest Program. Contact: [alif.taufik@wri.org](mailto:alif.taufik@wri.org)

**Dean Affandi** is WRI Indonesia's Research, Data, and Innovation Manager. Contact: [dean.affandi@wri.org](mailto:dean.affandi@wri.org)

**Muis Fajar** is WRI Indonesia's Social Forestry and Customary Forest Project Lead. Contact: [muis.fajar@wri.org](mailto:muis.fajar@wri.org)

**Julius Lawalata** was a former WRI Indonesia Field Coordinator in Riau.

## ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

### Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

### Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

### Our Approach

#### COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

#### CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

#### SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

Maps are for illustrative purposes and do not imply the expression of any opinion on the part of WRI, concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.

## ABOUT THIS PAPER

This case study captures the lessons learned from the implementation of WRI Indonesia's One Map Initiative in the Village Level (ITUPEDE). The initiative reflects an effort to help resolve the overlapping land use and tenure uncertainties in Indonesia. Through partnership with local CSOs and local government, this project made its pilot implementation in Gajah Bertalut indigenous community of Riau, an example of land dispute in site level, particularly between the indigenous territory and a state-owned Rimbang Baling Wildlife Reserve. This project began in early 2017 and remains ongoing, while this study documented the progress as far as August 2020.

The approach of the initiative drew upon the concept of community-based natural resources management, participatory mapping, and land-use planning. The purpose of this study is to investigate the impact of ITUPEDE on how the Gajah Bertalut indigenous community manages natural resources and negotiates for land and resource rights recognition within the context of land conflict with the Conservation Area. The findings of this study recommend indigenous-based land rights and forest conservation to be recognized, rather than conventional top-down land designation and conservation approaches. Although these findings cannot be generalized to all indigenous communities, they support the viability of an inclusive approach to conservation or, at the very least, a case-by-case approach to forest protection.

The authors believe this study would be an interesting reference for stakeholders focusing on the issue where indigenous communities struggling for their rights over land and forest resources, while facing the challenges in improving their forest management into a more sustainable way. This study is the first research publication of this project, which is currently expanded into other indigenous territories/villages in South Sumatra, Papua, and West Papua. The project approach is adjusted to meet local needs in each site.

### PHOTO CREDIT:

Cover Photo, pg.15 Julius Lawalata/WRI Indonesia

Maps are for illustrative purposes and do not imply the expression of any opinion on the part of WRI, concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.

Each World Resources Institute report represents a timely, scholarly treatment of a subject of public concern. WRI takes responsibility for choosing the study topics and guaranteeing its authors and researchers freedom of inquiry. It also solicits and responds to the guidance of advisory panels and expert reviewers. Unless otherwise stated, however, all the interpretation and findings set forth in WRI publications are those of the authors.



Copyright 2020 World Resources Institute. This work is licensed under the Creative Commons Attribution 4.0 International License.  
To view a copy of the license, visit <http://creativecommons.org/licenses/by/4.0/>



WRI INDONESIA

Wisma PMI 7th Floor  
Jalan Wijaya I no. 63  
Kebayoran Baru,  
Jakarta Selatan 12170  
+62 21 22775816  
[wri-indonesia.org](http://wri-indonesia.org)