

## Community land occupation in limited production forests: Spatially verified evidence from Popayato and its implications for tenure resolution under the Tora framework

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### Abstract

Community occupation of land within state-designated forest areas remains a central issue in forest governance, particularly where long-standing local practices intersect with formal forest boundaries. This study aims to assess the condition of land occupied by communities within the Limited Production Forest in Popayato and to identify the extent, duration, and characteristics of this occupation based on spatially verified evidence. The research employed field verification, household interviews, documentary review, and analysis of land-cover changes to classify occupied parcels and establish their historical continuity. Findings show that community occupation is extensive and deeply rooted, covering approximately 176.90 hectares across two villages. The analysis indicates that 94.37 percent of this area has been continuously occupied for more than twenty years, demonstrating strong intergenerational tenure and local legitimacy. Land-use patterns, dominated by dryland farming and perennial crops, reflect long-term adaptation to ecological conditions and sustained livelihood dependence. These results confirm that occupation predates formal forest designation and cannot be understood solely through legal classifications. The study highlights the importance of recognizing historical occupation and social legitimacy in addressing tenure issues. Its findings contribute to ongoing discussions on equitable forest governance and emphasize the need for policy frameworks that align with local realities and long-term community stewardship.

**Keywords:** Land Occupation; Community Tenure; Limited Production Forest; Long-Term Land Use; Tenure Legitimacy; Forest Communities; Land-Use Continuity

### 1. Introduction

Tenure conflict in forest areas has long been recognized as one of the most persistent and complex challenges in natural resource governance in Indonesia. These conflicts arise when claims to land ownership, control, or use overlap between the state, private actors, and local communities who have historically inhabited or depended on forest landscapes. As Sinabutar (2015) notes, land claims in forest zones often rely on locally accepted norms—such as first clearing or ancestral inheritance—rather than legally recognized documentation, resulting in a profound discrepancy between local tenure systems and formal state law. This tension is not only juridical but also social, ecological, and economic, influencing the livelihood security of local communities, the integrity of forest ecosystems, and the effectiveness of state forest administration. Furthermore, national land and forestry policies have undergone rapid transformations over the past decades, causing renewed debates about the legitimacy of state forest boundaries and the recognition of customary or community rights (Syahadat, Subarudi, dan Rudiarto 2012; Ayu Nuraeny, T. D., et al, 2023). Within this broader national context, conflicts over land access in limited production forests (HPT) have intensified alongside agricultural expansion, infrastructure development, and growing pressure on forest resources.

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The Popayato Subdistrict in Pohuwato Regency exemplifies these national dynamics at a local scale. The area is dominated by landscapes classified as HPT based on SK. 325/Menhub-II/2010, yet it is simultaneously inhabited and utilized by communities whose histories of residence and land use predate formal forest designation. These communities rely heavily on forest-adjacent lands for agriculture, particularly dryland farming and mixed perennial crops, which form the backbone of local livelihoods. In recent years, expansion of agricultural frontiers and increased demand for land have contributed to escalating disputes between the state as forest administrator and residents who assert long-standing claims grounded in customary practice or continuous occupation. Studies such as Fauzi and Hartono (2016) and Forest Watch Indonesia (2025, Februari 4) underscore how pressures on coastal and upland forests in Gorontalo province have accelerated land-use change, contributing to ecological degradation and amplifying the vulnerability of communities to hazards such as flooding. These patterns reinforce the urgency of understanding the empirical conditions of land occupation in areas like Popayato, where claims to forest land reflect both historical realities and contemporary livelihood needs.

At the core of these dynamics lies the issue of unclear or contested land tenure—particularly the absence of legal recognition of land long occupied by households within forest boundaries. The primary research problem addressed in this study concerns the condition of community land occupation within the limited production forest in Popayato and the extent to which spatially verified evidence can clarify the nature, scale, and history of such occupation. The lack of clear documentation, combined with limited community awareness that their farmland falls within state forest boundaries, creates structural uncertainty and exposes communities to enforcement actions that they often perceive as abrupt or unjust. As articulated by Akhbar, M., et al. (2022), tenure conflict typically emerges when formal land classifications fail to accommodate lived realities of land use. This mismatch between regulatory frameworks and community practices results in policy implementation challenges, reduced trust in public institutions, and recurring disputes over land access and management.

The general policy solution promoted by the Government of Indonesia to address these issues has been the implementation of agrarian reform through land redistribution and the recognition of community land claims, alongside various forest management schemes intended to harmonize state regulation with local needs. The issuance of Peraturan Presiden Nomor 62 Tahun 2023 seeks to accelerate the resolution of land tenure in forest areas by providing mechanisms for verifying, acknowledging, and resolving community occupation in state forests. The regulation underscores the government's commitment to granting legal certainty to communities who have occupied forest lands, particularly when occupation is long-standing, socially legitimate, and contributes to livelihood stability. Complementary instruments, such as the Peta Indikatif Penyelesaian Penggunaan Tanah (PPTPKH) and TORA maps released under SK Menteri LHK Nomor 6132 Tahun 2024, further operationalize efforts to identify areas where community occupation is present and may be considered for boundary adjustment or other tenure resolution options.

In addition to these general frameworks, numerous empirical studies highlight more specific pathways to resolve tenure conflicts based on the duration, pattern, and socioecological context of land occupation. Luthfi et al. (2020) emphasize that long-term community occupation—particularly beyond twenty years—constitutes strong grounds for formal recognition through boundary adjustment mechanisms, as it reflects settled livelihood systems and entrenched social legitimacy. Syahadat et al. (2019) similarly identify the importance of aligning spatial planning policies with existing patterns of land use to reduce tensions between communities and the state. Moreover, Mulyana (2018) and Amran et al. (2020) stress that sustainable forest governance requires the integration of local practices and historical claims into institutional decision-making, recognizing that communities often act as *de facto* stewards of forest landscapes despite lacking formal rights. These studies collectively propose that aligning legal recognition with empirical evidence of long-term occupation is not only a matter of social justice but also an essential component of effective forest management.

A second stream of literature provides practical insights into pathways for assessing and confirming community occupation. Ekawati et al. (2019) highlight the value of participatory mapping and field verification to document local claims and establish clarity regarding land boundaries. Their work demonstrates that involving communities directly in documenting land occupation strengthens administrative accuracy and enhances community trust in the process of tenure resolution. Alentadu (2020) further emphasizes that legal protection for communities in forest zones depends on rigorous verification of occupation histories and a clear understanding of how communities rely on these lands. These studies reveal that documenting the duration, nature, and socioecological implications of land use is fundamental to determining appropriate and just solutions under agrarian reform policy.

Despite these existing contributions, several gaps remain that limit the development of fair and context-sensitive tenure resolution pathways in forest areas such as Popayato. While previous research provides conceptual and procedural frameworks, there is limited empirical work detailing the specific conditions of land occupation in HPT areas of Gorontalo Province, particularly in relation to the historical depth of occupation, land-use patterns, and spatial

distribution of community claims. Studies such as those by Syahadat et al. (2012; 2019), Ayu Nuraeny, T. D., et al (2023), and Fauzi & Hartono (2016) outline national and regional patterns of tenure conflict but do not provide localized, fine-grained assessments of how community occupation unfolds within specific forest classifications. This gap is significant because policy recommendations, including eligibility for forest boundary adjustment or other tenure recognition pathways, require accurate, site-specific information on community land occupation and its socioecological context.

The present study addresses this gap by examining the conditions of community land occupation within the limited production forest of Popayato based on spatially verified evidence of land use history, extent, and distribution. The study contributes novel empirical insights by providing a detailed assessment of the magnitude of community occupation, distinguishing between long-term and recent occupation, and identifying the patterns of land use that structure community interactions with forest landscapes. By grounding the analysis in verified field data and documented occupation histories, this study offers a more accurate basis for evaluating the legitimacy and continuity of local claims. Furthermore, the research enhances understanding of how longstanding community-land relationships intersect with forest governance policies. The scope of the study is delimited to assessing the conditions of community occupation—its extent, history, characteristics, and spatial pattern—within the HPT zone of Popayato, thereby informing national and regional efforts to implement equitable and evidence-based tenure resolution.

## 2. Methodology

The study employed a mixed-methods approach to examine the condition of community land occupation within the Limited Production Forest (HPT) of Popayato, Pohuwato Regency. The research was carried out in the villages of Dambalo and Tunas Harapan, selected due to their documented history of long-term cultivation within forest boundaries established under SK. 325/Menhet-II/2010 and their inclusion in the Indicative PPTPKH and TORA Realization Map (SK Menteri LHK Nomor 6132 Tahun 2024). Data collection combined field verification through transect observations, semi-structured interviews, and review of local documentation to identify land parcels occupied by communities and to establish the duration, continuity, and patterns of land use. Respondents were selected purposively, including farmers, long-term residents, and village leaders with knowledge of land histories. Observations focused on physical indicators of occupation—crop composition, boundary markers, and evidence of continuous use—while interviews captured acquisition modes, intergenerational transfer, livelihood dependence, and occupation-related experiences, consistent with the tenure dynamics described by Sinabutar (2015) and Syahadat et al. (2012). Land-cover information from 2000 and 2023 supported classification of long-term ( $>20$  years) and recent ( $<20$  years) occupation, following criteria discussed by Luthfi et al. (2020). Qualitative data were analyzed thematically, and findings were integrated with spatially delineated parcel information to produce a consolidated profile of community occupation within the HPT. This procedure generated outputs on the total occupied area, distribution across villages, duration categories, and characteristic land-use patterns, supporting the assessment of community tenure conditions within the Popayato forest landscape.

## 3. Results and Discussion

### 3.1. Overview of the Study Area and Context of Land Occupation

Popayato Subdistrict, located in the western part of Pohuwato Regency, comprises a mosaic of rural settlements, agricultural fields, and state-designated forest lands. The majority of the study area falls within the classification of Limited Production Forest (HPT) as stipulated under SK. 325/Menhet-II/2010. For communities residing in villages such as Dambalo and Tunas Harapan, the forest landscape has been an integral part of their livelihood strategies for generations. Agriculture—particularly dryland farming and mixed perennial cropping—constitutes the principal economic activity, reflecting a long-standing dependence on forest-adjacent lands. The Indicative PPTPKH and TORA Realization Map (SK Menteri LHK Nomor 6132 Tahun 2024) identifies approximately 176.90 hectares of land within the HPT area that are currently occupied and utilized by community members. Understanding the characteristics, distribution, and historical continuity of these occupied areas is essential for interpreting tenure dynamics and informing efforts to resolve land-related issues.

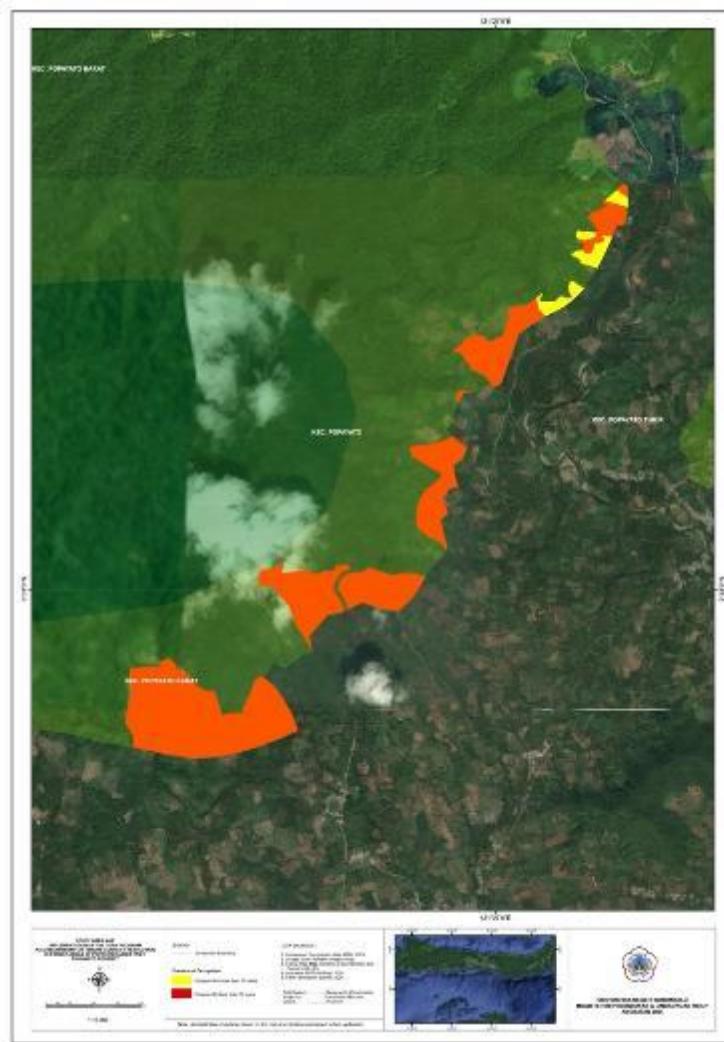
### 3.2. Extent and Distribution of Community-Occupied Land

The spatial delineation of occupied land reveals that a total of  $\pm 176.90$  hectares within the HPT zone are actively controlled and utilized by local households. These areas are distributed across two villages:  $\pm 118.47$  hectares in Dambalo and  $\pm 58.43$  hectares in Tunas Harapan. The occupied parcels are arranged in a pattern that follows accessible terrain, particularly near settlement clusters, agricultural paths, and river corridors. The distribution exhibits a linear tendency along rural road networks, indicating that land clearing and agricultural expansion have historically been

shaped by ease of access rather than by state-imposed forest boundaries. This spatial pattern aligns with the broader observation that communities often cultivate land without knowledge of its formal designation as part of the forest estate, as described by Sinabutar (2015).

### 3.3. Historical Continuity of Occupation

A central finding of the study concerns the duration of occupation. Evidence from interviews, field indicators, and comparative land-cover analysis shows that approximately 94.37% of the occupied land—equivalent to  $\pm 166.94$  hectares—has been under continuous community control for more than 20 years. Only 5.63% ( $\pm 9.96$  hectares) represents more recent occupation of less than 20 years. This distribution underscores the predominance of intergenerational land-use practices, confirming that for most households, occupation occurred long before the boundaries of the HPT were formalized. Many respondents stated that their land had been inherited from parents or grandparents, while others recalled clearing the land in the 1990s when the area was characterized by shrubland or mixed vegetation. These findings validate the notion of long-term *de facto* tenure embedded in local social norms, consistent with the argument of Syahadat et al. (2012) that local tenure systems operate parallel to, and sometimes in contradiction with, formal legal frameworks.



**Figure 1** Spatial distribution of community land occupation by duration within the Limited Production Forest (HPT) of Popayato Subdistrict

The persistence of land occupation across several decades contributes to a form of social legitimacy that Suchman (1995) defines as both “pragmatic” and “moral,” arising from community recognition, subsistence needs, and the cumulative investment in land through cultivation and stewardship. This legitimacy is reflected not only in historical narratives but also in the visible agricultural landscapes that have evolved over time—from initial clearings to mature perennial crops.

### **3.4. Land-Use Characteristics of Occupied Areas**

The land-use profile of the occupied areas demonstrates a predominance of agricultural activity. In Dambalo, cultivated parcels include mixed dryland fields, perennial crops such as coconut and cocoa, and areas transitioning from shrubs to cultivated plots. The land-cover trajectory between 2000 and 2023 indicates stable or expanding agricultural use across the majority of parcels classified as more than 20 years old. Similarly, in Tunas Harapan, the occupied land consists largely of dryland agricultural fields, although a small portion ( $\pm 9.96$  hectares) shows newer cultivation that began within the past two decades.

Table-based evidence from the study area confirms these observations. For instance, land classified as "Perkebunan" in 2000 persists as "Pertanian Lahan Kering Bercampur Semak" in 2023, reflecting continuous cultivation. Other areas originally categorized as shrubland ("Semak/Belukar") have been consistently utilized for dryland agriculture for over 20 years. These land-use patterns support the conclusion that community occupation is neither sporadic nor opportunistic; rather, it represents long-term livelihood systems adapted to local ecological conditions, which aligns with findings reported by Fauzi, Rio M., et al. (2016).

### **3.5. Social and Economic Factors Supporting Long-Term Occupation**

The dominance of long-term occupation is closely linked to the socio-economic realities of the community. Most households rely on land within the HPT for subsistence and economic stability. Crops such as maize, banana, cassava, coconut, cocoa, and other perennial species provide continuous income streams that support household needs. The fields also serve as an inherited asset that secures economic resilience across generations. Interviews reveal that many respondents view their cultivation rights as legitimate, grounded in family history, labor investment, and community acknowledgment. This perspective reflects the principle articulated by Sinabutar (2015), where the first individual to open and cultivate land is recognized socially as the rightful occupant, regardless of whether the land lies within formal forest boundaries.

### **3.6. Alignment Between Occupation Patterns and Ecological Conditions**

Environmental assessments within the study area indicate that the majority of occupied land falls within zones with moderate levels of ecological sensitivity. Slope analysis shows that approximately 63.53% of the land has a scoring value  $\leq 124$ , corresponding to areas suitable for production forest or mixed-use cultivation. The remaining 36.47% falls within steeper terrain but still exhibits active agricultural use. The environmental risk assessment found that land in the occupied area had varying susceptibility to landslides:  $\pm 65.16$  hectares categorized as low risk,  $\pm 54.88$  hectares as moderate, and  $\pm 56.87$  hectares as high. Notably, flood risk is absent across the entire occupied area, suggesting that cultivation practices have developed in ecologically compatible zones.

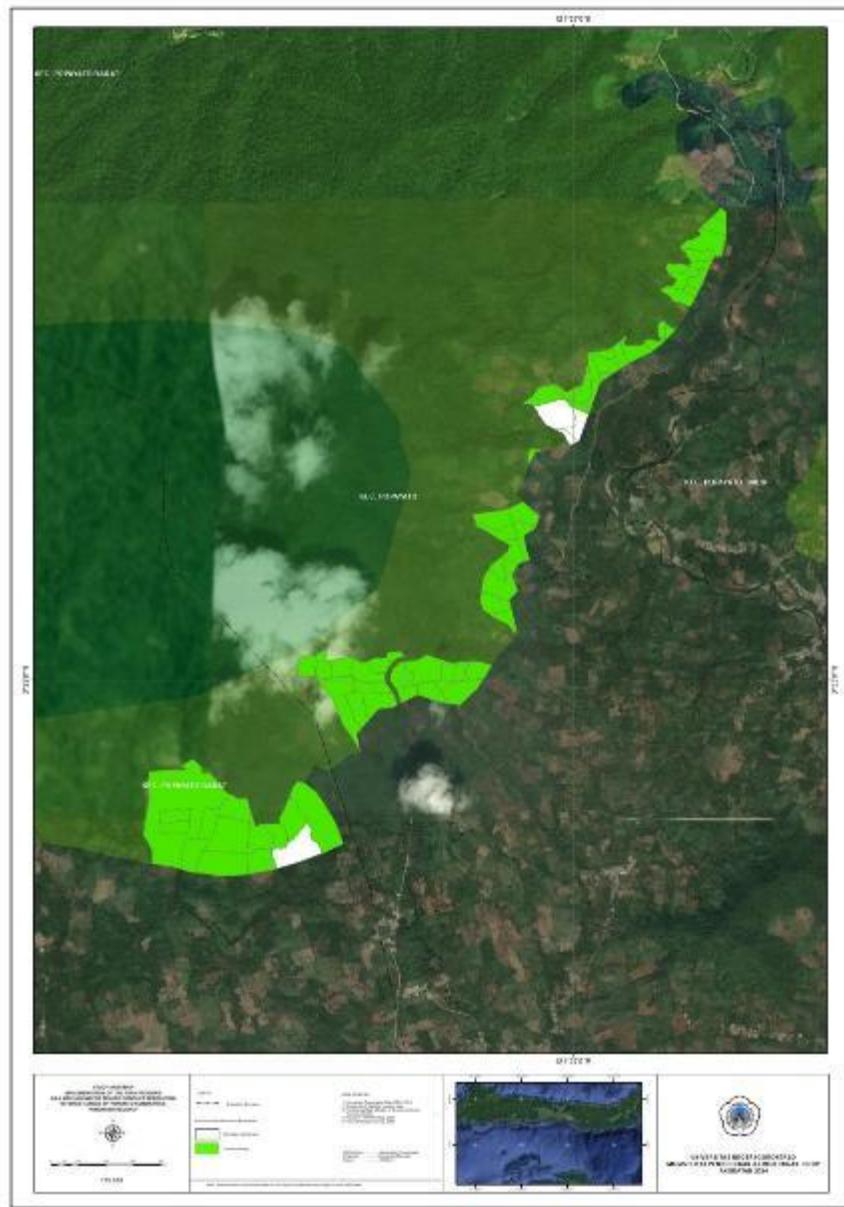
These findings imply that long-term cultivation has largely conformed to ecological constraints, as households typically avoided highly unstable slopes for permanent agricultural fields. This behavior corresponds to earlier observations by Mulyana (2018), who notes that communities operating within forest margins often develop farming strategies that balance livelihood needs with ecological conditions.

The predominance of long-term occupation substantiates claims of social legitimacy within the HPT area. Many of the parcels have undergone decades of continuous cropping, investment in perennial plants, and intergenerational transfer—elements commonly recognized in tenure studies as indicators of stable occupation. Under regulatory frameworks such as PermenLHK No. 7 Tahun 2021, land occupied for more than 20 consecutive years may be considered for boundary adjustment, reflecting acknowledgment of sustained community presence. From a theoretical standpoint, Suchman's (1995) legitimacy framework applies directly: occupation is legitimized through long-term practical utility and conformity to local norms of rightful landholding.

Long-term occupation also reflects the broader trend observed in forest areas across Indonesia, where communities have inhabited and cultivated land long before formal forest zoning was established (Syahadat, Subarudi, dan Rudiarto 2012). Hence, the situation in Popayato aligns with national patterns, reinforcing the need to recognize local tenure histories in policy-making.

The results indicate that tenure conflict in Popayato arises not from recent encroachment but from historical discrepancies between local land-use practices and state forest boundary determination. This discrepancy affects household security, creating uncertainty regarding potential enforcement actions or restrictions. As Akhbar, M., et al. (2022) explain, conflicts often emerge when formal land classifications fail to incorporate empirical evidence of how

land is actually used. In Popayato, the near-universal presence of long-term cultivation demonstrates that community occupation is deeply rooted and cannot be understood solely through the lens of legal forest designation.



**Figure 2** Recommended tenure resolution zones based on spatial verification of community land occupation in the Limited Production Forest of Popayato

Moreover, the patterns suggest that any resolution of tenure issues must incorporate local social legitimacy, historical continuity, and livelihood dependence. This echoes the arguments of Amran et al. (2020), who advocate for integrating local realities into forest management policies as part of promoting ecological and social sustainability.

The overall results demonstrate that the condition of community land occupation within the HPT of Popayato is characterized by four defining features:

- Extensive occupation covering  $\pm 176.90$  hectares;
- Overwhelming long-term continuity ( $>20$  years) across 94.37% of parcels;
- Cultivation practices that reflect adaptive and ecologically informed land use; and
- Strong social legitimacy rooted in inheritance, local recognition, and livelihood requirements.

## 4. Conclusion

This study demonstrates that community land occupation within the Limited Production Forest (HPT) of Popayato is long-established, extensive, and rooted in intergenerational practices. Spatially verified evidence shows that  $\pm 176.90$  hectares of land are currently controlled and cultivated by local households, with 94.37% of this area having been occupied for more than 20 years. Such continuity reveals a strong form of social legitimacy, reflecting tenure arrangements grounded in inheritance, local recognition, and sustained livelihood dependence rather than in formal state documentation. The patterns of land use—dominated by dryland agriculture and perennial crops—indicate stable and adaptive management practices that have evolved in response to ecological conditions and household needs.

These findings contribute to the broader body of knowledge on tenure dynamics in Indonesia's forest areas by providing empirical insight into how long-term occupation persists despite formal forest zoning, aligning with national observations reported in studies such as Sinabutar (2015) and Syahadat et al. (2012). The study underscores the importance of incorporating historical occupation and local legitimacy into decision-making related to forest governance and tenure resolution. Future research may explore the socio-economic impacts of formal recognition processes on community livelihoods and examine how local land-use systems can be integrated into sustainable forest management frameworks.

## Compliance with ethical standards

### Disclosure of conflict of interest

No conflict of interest to be disclosed.

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