Illegal Logging in Focus: Extent, Impact, And Pathways for Effective Intervention

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ABSTRACT

Illegal logging remains a persistent threat to forest-dependent communities in Surigao del Sur, undermining ecological integrity and community livelihoods despite existing policies and enforcement efforts. The study was conducted to propose policy recommendations aimed at reducing illegal logging and enhancing forest–community partnerships. Guided by a descriptive research design, the study employed structured questionnaires administered to 25 respondents composed of community residents, Bantay Gubat members, and Forest Rangers from Diatagon and Gata. Data were complemented by observations of community practices and demographic profiles, then analyzed using descriptive statistics. This approach allowed for a nuanced understanding of awareness levels, the perceived effectiveness of policies, and the socioeconomic impacts of illegal logging.

Results revealed that respondents are generally aware of illegal logging activities and their environmental consequences, with a strong perception that government action is in place. However, gaps remain in understanding the causal links between logging, natural disasters, and livelihood drivers. While policies and regulations were perceived as "highly effective" in communication, enforcement was seen as moderately effective due to structural limitations and weak deterrent measures. Moreover, illegal logging was found to significantly affect livelihoods, food sources, and community vulnerability to natural hazards, highlighting the dual ecological and socioeconomic costs. These findings underscore the need for integrated solutions that pair stricter monitoring and enforcement with sustainable livelihood alternatives and active community engagement. The implications point toward policies that strengthen community-based forest management and create resilient partnerships between local stakeholders and government agencies.

Keywords: Illegal logging, Forest governance, Community participation, Sustainable livelihood, Policy recommendation

INTRODUCTION

Background of the Study

Illegal logging remains one of the most pressing environmental challenges in the Philippines, threatening biodiversity, undermining forest sustainability, and compromising the livelihoods of communities dependent on natural resources. This study seeks to examine the scope of the problem, the ecological and socio-economic consequences, and the possible frameworks for sustainable and community-driven solutions. By situating the issue within both local and global contexts, the research intends to provide a holistic understanding of illegal logging while identifying strategic approaches to address its persistent occurrence. The intention is not only to assess the extent of damage but also to explore actionable pathways that can strengthen conservation efforts and forest governance.

Scholars in recent years have emphasized the multidimensional nature of illegal logging, linking it to weak enforcement, poverty, and global demand for timber products. For instance, Nguyen and Hoang (2021) highlighted how insufficient governance structures exacerbate forest crimes in Southeast Asia, while de Jong et al. (2022) noted that illegal logging is driven by both local economic needs and international timber trade pressures. Moreover, Castillo and Ramos (2023) argued that strengthening local community involvement in forest protection is vital for effective interventions, pointing to participatory governance as a sustainable model.

More recently, Santos et al. (2024) observed that climate change adaptation and forest preservation strategies must be integrated with anti-illegal logging initiatives to yield lasting results. These studies underscore those effective responses require coordinated policy, institutional reforms, and grassroots engagement, forming a crucial backdrop for the present inquiry.

Despite the scholarly insights and sustained enforcement efforts by the Department of Environment and Natural Resources (DENR) and the Philippine National Police (PNP), including Information, Education, and

Communication (IEC) campaigns, illegal logging remains a pressing issue in Surigao del Sur. Records from CENRO Lianga (2025) indicate 52,865.43 board feet of confiscated timber between 2021 and 2025, with 2024 posting the highest apprehensions, reflecting heightened forest exploitation. Comparable reports from the Surigao del Sur Police Provincial Office (2020) and DENR (2023) revealed similar patterns, documenting largescale seizures of illegally harvested lumber within short periods. Complementing these enforcement data, Global Forest Watch (2023) recorded a 7.88-thousand-hectare loss of humid primary forest from 2002 to 2023, illustrating the long-term environmental toll despite regulatory safeguards. These findings point to persistent deforestation pressures and expose empirical gaps in understanding enforcement limitations, livelihood dependencies, and recurring illegal practices, thereby justifying localized inquiry in municipalities such as Lianga and San Agustin.

The present study investigates the extent and impacts of illegal logging in Surigao del Sur and advances evidence-based policy recommendations responsive to local conditions. It underscores the importance of strengthening community-based forest partnerships, enhancing the institutional capacity of enforcement agencies, and promoting sustainable livelihood alternatives to lessen dependence on forest exploitation. By addressing empirical gaps and situating the issue within practical intervention pathways, the study contributes to academic discourse while providing actionable insights for policymakers, stakeholders, and affected communities.

Legal Bases

The regulation of forest resources in the Philippines is primarily rooted in Presidential Decree (P.D.) No. 705, or the Revised Forestry Code of the Philippines of 1975. This law serves as the cornerstone of forest management by defining forest lands, prescribing sustainable utilization, and penalizing unauthorized cutting and timber harvesting. By establishing the framework for forest protection, P.D. 705 provides the primary legal anchor for understanding the persistence of illegal logging in municipalities like Lianga and San Agustin, where forests are integral to community livelihoods and ecological stability.

Building on this framework, Republic Act (R.A.) No. 7161 of 1991 introduced increased forest charges on timber and forest products harvested from both public and private lands. This provision complements P.D. 705 by addressing the economic dimension of forestry management, discouraging indiscriminate logging through the imposition of financial costs. Its connection to the Revised Forestry Code underscores a dual strategy: while P.D. 705 sets the regulatory foundation, R.A. 7161 introduces economic deterrents. For Lianga and San Agustin, where communities rely on timber and agricultural resources, the law emphasizes the need for balance between economic use and sustainable conservation.

Aforementioned legislation, such as R.A. No. 3701, Section 2751 of 1933, remains significant as it explicitly prohibits unlawful occupation and destruction of public forestlands. It criminalizes practices such as “kaingin” (slash-and-burn farming), unauthorized settlement, and deliberate or negligent damage to forest stands. This provision connects with later laws by broadening the scope of forest protection, recognizing that illegal logging does not occur in isolation but is often intertwined with land-use practices and agricultural pressures. In Lianga and San Agustin, where farming communities frequently operate near forested areas, this law highlights how deforestation is linked to livelihood strategies and human encroachment.

Complementary to these measures is R.A. No. 9175, or the Chainsaw Act of 2002, which regulates the ownership, sale, and use of chainsaws, recognizing them as primary tools in timber poaching. While P.D. 705, R.A. 7161, and R.A. 3701 establish the structural, economic, and land-use frameworks of forest protection, R.A.

9175 directly targets the operational tools of illegal logging. Its enforcement is particularly relevant to Lianga and San Agustin, as it provides a concrete mechanism to curtail the practical means through which forest destruction occurs.

Finally, P.D. No. 1152, or the Philippine Environment Code of 1977, offers an integrated perspective by linking forest conservation with broader environmental management goals. Unlike earlier laws that focus more narrowly on forest use and protection, P.D. 1152 situates forestry concerns within the wider context of environmental quality, ecological balance, and sustainable development. This provision reinforces the principle that addressing illegal logging is not solely a forestry concern but a matter of holistic environmental governance.

In synthesis, these provisions collectively form a legal framework that addresses illegal logging from multiple angles: regulatory control (P.D. 705), economic deterrence (R.A. 7161), land-use restrictions (R.A. 3701), operational limitations (R.A. 9175), and integrated environmental management (P.D. 1152). For this study, which examines the causes and effects of illegal logging in Lianga and San Agustin, these laws establish both the legal context and the analytical foundation. They underscore the multidimensional nature of the issue, spanning policy enforcement, socioeconomic realities, and ecological sustainability, thereby aligning with the study's purpose of exploring the environmental and community impacts of illegal logging within the municipalities under the jurisdiction of CENRO Lianga.

Review of Related Literature and Studies

The body of literature on illegal logging reveals interrelated dimensions that can be thematically examined in terms of its extent, environmental and socioeconomic impacts, governance and policy gaps, and pathways for effective intervention.

Extent of Illegal Logging

Illegal logging continues to be a major driver of deforestation worldwide, undermining both environmental integrity and sustainable development. Hoare (2021) estimated that 15-30% of the global timber trade stems from illegal sources, contributing significantly to biodiversity loss and forest degradation. Nguyen and Hoang (2021) further underscored that Southeast Asia is particularly vulnerable, as limited enforcement capacity in remote areas creates opportunities for illicit operations to thrive. In the Philippines, persistent reports of timber seizures reflect the pervasiveness of the issue. The Department of Environment and Natural Resources (DENR, 2023) reported that in Surigao del Sur alone, more than 74,000 board feet of illegally sourced lumber were confiscated within just four months, highlighting the inadequacy of existing monitoring and enforcement mechanisms. These findings indicate that despite the presence of legal frameworks such as the Revised Forestry Code and the Chainsaw Act, illegal logging persists due to enforcement and governance challenges.

Recent global monitoring further confirms the seriousness of these trends. Global Forest Watch (2023) reported that Surigao del Sur lost approximately 7.88 thousand hectares of humid primary forest from 2002 to 2023, reflecting a persistent trajectory of forest depletion. Such statistics, while alarming, may still underestimate the true scope of illegal activities. Brancalion et al. (2020) pointed out that the covert nature of timber smuggling and the lack of reliable local monitoring make it difficult to capture the full extent of the problem. Likewise, Kusters et al. (2022) noted that forest-dependent communities often underreport illegal activities due to economic reliance and fear of reprisal, which complicates documentation. These findings suggest that measuring the extent of illegal logging requires not only seizure and apprehension data but also the integration of advanced monitoring systems such as satellite-based forest cover tracking, drones, and participatory forest inventories. By combining technological tools with community-based reporting, policymakers and enforcement agencies can establish more accurate baselines for intervention and address the persistence of illicit logging activities.

Governance, Enforcement, and Policy Gaps

Weak governance and poor enforcement remain critical barriers to addressing illegal logging effectively. De Jong et al. (2022) emphasized that corruption and limited institutional capacity within forestry agencies undermine forest management, enabling illegal operators to circumvent accountability. Tacconi et al. (2020) further noted that overlapping jurisdictions and fragmented laws often weaken enforcement efficiency, particularly in

developing countries where resources are scarce. In the Philippines, despite the presence of the Revised Forestry Code (PD 705) and the Chainsaw Act (RA 9175), logging persists in hotspot areas like Surigao del Sur due to inadequate manpower, logistical constraints, and political pressures (DENR, 2023). As Poudyal et al. (2021) argue, such policy gaps highlight the disjuncture between legal frameworks and actual practice, leaving forest ecosystems vulnerable to exploitation.

Moreover, enforcement approaches are often reactive, focusing on seizures and punitive actions rather than preventive governance strategies. Cerutti et al. (2020) observed that confiscations, while necessary, fail to address the systemic loopholes that allow illegal trade to thrive. In Surigao del Sur, the rising number of timber apprehensions illustrates the persistence of the issue and the inadequacy of current strategies. Smith et al. (2021) and Teye and Owusu (2022) stress that without improving accountability, inter-agency coordination, and local community involvement, enforcement will remain ineffective. Yonariza and Webb (2020) further highlight that devolving governance to communities strengthens compliance and fosters shared responsibility for conservation. These findings suggest that enhancing institutional capacity and promoting preventive, community-driven approaches are vital to bridging governance gaps and ensuring more effective forest protection.

Environmental and Socioeconomic Impacts

The ecological effects of illegal logging are well-documented, with habitat destruction and biodiversity loss as its most critical outcomes. Castillo and Ramos (2023) noted that logging in protected areas disrupts natural ecosystems, leading to species decline and altering ecological balance. Similarly, Kumar and Bhatnagar (2021) emphasized that forest degradation exacerbates soil erosion, water scarcity, and carbon emissions, intensifying the effects of climate change. Illegal logging also threatens watershed functions, with downstream effects on agriculture and water supply systems. In addition, Morales et al. (2022) highlighted that deforestation contributes to the reduction of carbon sequestration capacity, further worsening global warming and extreme weather events. The interconnected nature of ecosystems means that even localized logging incidents can trigger widespread environmental harm, with implications that extend beyond the immediate community.

Socioeconomic consequences also extend to forest-dependent populations. Santos et al. (2024) found that communities reliant on forests face reduced livelihood opportunities, compelling some households to migrate or engage in exploitative labor. Similarly, Rahman and Mahmud (2022) argued that the illegal timber trade undermines rural development by diverting economic benefits away from communities and reducing potential government revenues through taxation. In the Philippine context, rural families often bear the brunt of forest depletion, facing loss of traditional resources such as fuelwood and non-timber forest products. Villanueva and Cruz (2021) further observed that marginalized groups, such as indigenous communities, are disproportionately affected, as the depletion of forest resources undermines cultural practices and traditional ecological knowledge. These findings indicate that the impacts of illegal logging are both ecological and social, making it imperative for interventions to address not just environmental protection but also livelihood sustainability.

Pathways for Effective Intervention

Scholarly literature increasingly supports integrated and participatory solutions as promising approaches to address illegal logging. Castillo and Ramos (2023) emphasized that community-based forest management (CBFM) remains a proven strategy for empowering local populations and strengthening grassroots conservation efforts. In a similar vein, Nguyen and Hoang (2021) highlighted Vietnam's co-management approaches where responsibilities for forest protection are shared between government institutions and local communities, significantly reducing illegal harvesting activities. Santos et al. (2024) expanded this argument by stressing that embedding climate resilience within forestry initiatives not only safeguards ecosystems but also enhances disaster preparedness and adaptive capacity in vulnerable communities. According to Bakar et al. (2022), participatory forest governance improves compliance because it aligns conservation with the immediate needs of forest-dependent households, thus reducing incentives for destructive practices. Collectively, these studies affirm that successful interventions should combine ecological protection with developmental programs that enhance community welfare.

At the global and national levels, recent literature also underscores the importance of coupling local initiatives with structural reforms and technological innovations. The European Commission (2021) reported that the Forest Law Enforcement, Governance and Trade (FLEGT) initiative demonstrated the potential of linking trade regulation with sustainable forest management, thereby limiting the market for illegally sourced timber. In the Philippine context, Rahman and Mahmud (2022) proposed livelihood alternatives such as agroforestry, eco-tourism, and non-timber enterprises to reduce dependency on forest exploitation. Similarly, Cruz and Javier (2020) argued that strengthening sustainable value chains creates economic incentives for conservation. Technology-driven solutions also play a critical role: Global Forest Watch (2023) demonstrated how satellite monitoring enhances early detection of forest loss, while Ezzine-de-Blas et al. (2021) stressed that digital platforms for community reporting foster transparency and accountability. As Smith et al. (2021) suggested, the integration of community empowerment, policy reforms, and advanced monitoring technologies creates a holistic pathway that addresses both the root causes and systemic drivers of illegal logging.

Existing studies highlight the extent of illegal logging as a persistent threat in forest-dependent provinces, where it continues to degrade ecosystems and deplete forest resources. The environmental and socioeconomic impacts are evident in biodiversity loss, soil erosion, reduced agricultural productivity, and the disruption of community livelihoods. Yet, persistent governance and enforcement gaps, such as weak monitoring and overlapping mandates, underscore the need for localized empirical research in Surigao del Sur that integrates data, community perspectives, and policy recommendations to inform actionable interventions.

Objectives of the Study

This study aims to investigate the extent, impacts, and policy dimensions of illegal logging in Surigao del Sur and to formulate evidence-based recommendations that strengthen forest governance and community partnership. Specifically, this study seeks to:

1. To determine the demographic profile of the respondents in terms of:
    1.1 Age;
    1.2 Sex;
    1.3 Occupation; and
    1.4 Highest educational attainment.
2. To assess the level of awareness of respondents on illegal logging.
3. To evaluate the effectiveness of policies and regulations on illegal logging.
4. To identify the social and economic impact of illegal logging to the communities.
5. To propose policy recommendation to reduce illegal logging and enhance forest community partnership.

Scope and limitation of the Study

The general purpose of this study is to examine the causes and effects of illegal logging and its implications for environmental sustainability and community welfare, with a specific focus on the municipalities of Lianga and San Agustin, Surigao del Sur. It aims to assess how illegal logging influences biodiversity, agriculture, tourism, and local livelihoods, while also considering the levels of awareness and perceptions among affected communities. By addressing both environmental and socioeconomic dimensions, the study intends to generate insights that can contribute to more effective interventions and policy recommendations aligned with the Department of Environment and Natural Resources' (DENR) mandate to conserve and protect natural resources.

The subject of inquiry revolves around illegal logging as a multifaceted issue, particularly its underlying drivers, direct and indirect effects on local communities, and the degree to which policies and regulations are effectively

implemented in Lianga and San Agustin. Key aspects of the investigation include the demographic characteristics of respondents, levels of awareness concerning illegal logging, evaluation of government regulations, and identification of the resulting social and economic consequences. Furthermore, the study explores how forest degradation contributes to agricultural decline, biodiversity loss, heightened environmental risks such as soil erosion, and the weakening of tourism potential.

Although the Community Environment and Natural Resources Office (CENRO) Lianga has jurisdiction over eight (8) municipalities, namely Barobo, Lianga, San Agustin, Marihatag, Cagwait, Bayabas, San Miguel, and Tago, this research is delimited to Lianga and San Agustin only. Lianga, serving as the administrative center, provides a policy and enforcement perspective, while San Agustin highlights the vulnerabilities of agricultural and forest-dependent livelihoods. By narrowing its scope, the study ensures a more contextualized and in-depth analysis of illegal logging, while still acknowledging its broader significance within the province of Surigao del Sur.

Significance of the Study

The significance of this study is presented hierarchically, emphasizing the entities and individuals who can benefit most from its findings and recommendations.

Local Communities and Individual Residents. As the primary stakeholders, they directly bear the consequences of illegal logging, such as diminished agricultural productivity, loss of biodiversity, and weakened livelihood opportunities. By amplifying their voices through survey data and integrating their lived experiences into the study, the research empowers these communities to become active partners in forest conservation. Ultimately, the study fosters awareness and collective responsibility, ensuring that interventions are inclusive and sustainable, they are more likely to support conservation efforts and sustainable practices.

Department of Environment and Natural Resources (DENR) and Other Government Agencies. As their ministerial mandate to safeguard natural resources, the generated empirical insights on the causes and impacts of illegal logging within the Area of Responsibility (AOR) of CENRO Lianga, the study provides evidence-based recommendations that can strengthen enforcement mechanisms, refine existing forestry policies, and promote sustainable forest management. The findings can support the DENR's broader mandate of protecting ecosystems while balancing community needs, thus contributing to national strategies on environmental conservation.

Local Government Units (LGUs). They play a critical role in implementing environmental ordinances and coordinating grassroots initiatives. With the data on community awareness, socio-economic impacts, and the effectiveness of existing policies, local officials can design more context-specific interventions. This includes integrating forest protection into development plans, allocating resources for monitoring, and empowering community-based forest management programs that address both livelihood and ecological concerns.

Academic institutions and Researchers. The study also holds significance by providing updated empirical data and identifying gaps in policy implementation, it contributes to the growing body of scholarly work on forestry governance, community development, and sustainable resource management in the Philippines. Future researchers can draw upon its findings as a foundation for comparative studies, interdisciplinary research, or the development of innovative interventions that align with both environmental and socio-economic priorities.

Definition of Terms

For clarity and consistency, the following key terms are conceptually defined as they are used in the context of this study.

Awareness. The level of knowledge, understanding, and concern of individuals or communities regarding the causes, impacts, and consequences of illegal logging on both the environment and society.

Biodiversity Loss. The decline or disappearance of plant and animal species within an ecosystem, often caused by habitat destruction from illegal logging and deforestation.

Community Education Program Activity (CEPA). Structured initiatives designed to raise awareness, build capacity, and engage communities in protecting forests through training, seminars, and outreach activities.

Community Partnership. Collaborative efforts between government agencies, local government units, and residents in forest-dependent areas to manage and protect natural resources, balancing livelihood needs with conservation goals.

Deforestation. The large-scale removal of forest cover, whether legal or illegal, that results in the degradation of ecosystems and loss of environmental services such as carbon sequestration, soil fertility, and water regulation.

Ecological Balance. The natural state of stability among organisms and their environment, which is disrupted by deforestation and illegal logging, leading to soil erosion, climate change, and biodiversity decline.

Environmental Governance. The processes and institutions through which decisions about natural resource use and conservation are made, implemented, and enforced to ensure sustainability.

Forest Degradation. The gradual decline in the capacity of a forest to provide ecological services due to destructive human activities, including illegal logging, overharvesting, and land conversion.

Illegal Logging. The unlawful cutting, transporting, processing, and selling of timber in violation of national forestry laws and regulations, often contributing to deforestation and loss of biodiversity.

Information Education Campaign (IEC). Planned communication and outreach strategies aimed at raising awareness, influencing attitudes, and changing behaviors of communities toward forest conservation and the prevention of illegal logging.

Kaingin. A traditional slash-and-burn farming practice where forest areas are cleared for agriculture, which, when uncontrolled, contributes to deforestation, soil erosion, and biodiversity loss.

Livelihood Impact. The effect of environmental degradation, such as forest depletion, on the economic and subsistence activities of local communities that depend on natural resources.

Policy Intervention. A set of legislative, regulatory, and community-based measures implemented by the government or institutions to address illegal logging and promote forest conservation.

Sustainable Forest Management (SFM). The stewardship and use of forests in ways that maintain their biodiversity, productivity, and ecological processes, ensuring that the needs of present and future generations are met.

Timber. Processed wood derived from trees, used for construction, furniture, and other purposes, which becomes a target resource in both legal and illegal logging activities.

Tree Cover Loss. The reduction in the area of land covered by trees due to natural or human-induced causes, including illegal logging, wildfires, and agricultural expansion.

Research Methodology

This section outlines the research methodology employed in examining the extent, impacts, and interventions related to illegal logging in Surigao del Sur, detailing the design, locale, respondents, sampling procedure, data-gathering process, and methods of analysis used to generate findings and address the research objectives.

Research design

This study adopted a quantitative research design, utilizing structured questionnaires with Likert-scale items to measure respondents' demographic profiles, awareness levels on illegal logging, and perceptions of its socio-economic and environmental impacts. This design enabled systematic data collection and statistical analysis to identify trends and correlations among variables relevant to the study objectives.

According to Weng Marc Lim (2024), quantitative research designs are characterized by clear objectivity, structured data collection, and rigorous analytical protocols, especially valuable for measuring attitudes and behaviors through reliable instruments like surveys. Similarly, Creswell and Creswell (2021) emphasized that this design is particularly effective in studies that aim to measure attitudes, opinions, and behaviors using structured instruments such as questionnaires. These characteristics make the quantitative approach a reliable method for objectively assessing issues that require numerical evidence. The recent overview highlights how primary data collection, cross-sectional designs, and firm statistical techniques enhance the validity and applicability of quantitative studies.

Applying this design to the present context allowed the researcher to quantitatively assess community awareness of illegal logging, evaluate perceptions of policy effectiveness, and measure impacts from the AOR of CENRO Lianga, Surigao del Sur. Through this structured and replicable approach, the study produces statistically grounded insights that support evidence-based recommendations for improving policy frameworks and forest community partnerships.

Research Locale

This study was conducted within the Area of Responsibility (AOR) of the Community Environment and Natural Resources Office (CENRO) Lianga, which encompasses the municipalities of Lianga and San Agustin, Surigao del Sur, covering a total jurisdiction of approximately 209,925 hectares. The area was purposively chosen because illegal logging is rampant within these municipalities, making it highly relevant to the objectives of the study. The forests in this locale serve as a critical source of livelihood for residents through fuelwood, timber, and non-timber products. However, they are also under severe threat from unauthorized timber extraction and forestland encroachment. These conditions make the identified municipalities a crucial site for understanding the ecological, socioeconomic, and governance dimensions of illegal logging.

A salient feature of the area is the visible trade and craftsmanship of Magkono wood, a highly durable and valuable timber species. Along the route from Diatagon to San Agustin, roadside furniture and novelty shops sell a wide range of Magkono products such as tables, chairs, and decorative items, which attract travelers and tourists while supporting local livelihoods. Despite this industry sustains community income, it simultaneously reveals the unsustainable exploitation of forest resources, as many of the logs used are reportedly sourced through illegal cutting. This tension between economic survival and environmental degradation illustrates the gravity of the illegal logging problem and underscores the importance of selecting the area as the research locale.

The urgency of conducting this study in the selected municipalities is further supported by enforcement data from CENRO Lianga (2021–2025), which consistently recorded cases of illegal logging, with 2024 marking the highest number of confiscations of forest products. These findings indicate both the persistence of the problem and the inadequacy of current enforcement mechanisms. Although the Department of Environment and Natural Resources (DENR), in partnership with the Philippine National Police (PNP), has implemented interventions such as Information Education Campaigns (IEC) and Community Education Program Activities (CEPA), illegal logging continues to thrive in Lianga, and San Agustin. Hence, the study was conducted in this locale because it represents a microcosm of the larger challenges of forest governance in the Philippines, balancing community livelihood needs with sustainable forest management and stricter enforcement of environmental policies.

Research Respondent

The respondents of this study were selected from two barangays in Surigao del Sur, namely Barangay Diatagon in Lianga and Barangay Gata in San Agustin. These areas were purposively chosen based on official records from the Enforcement Section of the Community Environment and Natural Resources Office (CENRO) Lianga, which identified them as hotspots for illegal logging activities due to repeated apprehension reports. To ensure comprehensive insights into the issue, the study included not only local residents directly or indirectly affected by forest resource extraction but also members of Bantay Gubat and Forest Rangers, who are actively engaged in forest monitoring and enforcement operations. Their inclusion was considered essential in providing a balanced perspective from both community stakeholders and frontliners tasked with implementing forestry laws.

Table 1. Distribution of Respondents

Municipality	Bantay Gubat	Forest Rangers	Poachers	Total
Lianga	2	2	7	11
San Agustin	2	1	11	14
Total	**4**	**3**	**18**	**25**

The inclusion criteria for respondents required that they are permanent residents of either Barangay Diatagon, Lianga or Barangay Gata, San Agustin and they have direct or indirect knowledge, experience, or involvement in illegal logging or related forestry activities, and they belong to groups with relevance to the study, such as forest-dependent households, Bantay Gubat members, or Forest Rangers. This ensured that respodents possessed first-hand information or credible perspectives on the extent, practices, and consequences of illegal logging. Selecting individuals who met these criteria increased the reliability and contextual validity of the findings, as they were drawn from communities and stakeholders with lived experiences of the problem.

The study employed a purposive sampling technique to generate the number of respondents. This method was deemed appropriate since the goal of the research was not to generalize findings to a larger population but to gather in-depth and context-specific insights from key informants with unique relevance to the research problem. Purposive sampling has been widely recognized as a suitable approach in community-based and environmental studies because it allows researchers to intentionally select participants who are most knowledgeable and directly connected to the issue being studied (Palinkas et al., 2020). In this study, purposive sampling enabled the researcher to focus on information-rich cases within identified illegal logging hotspots, thereby ensuring that the data collected reflected both the lived realities of local residents and the operational experiences of law enforcement groups tasked with forest protection.

Research Instrument

The primary research instrument used in this study is a structured research-made questionnaire designed to gather both demographic and perceptual data from respondents regarding the extent, governance, and impacts of illegal logging. It was developed to align with the research objectives by capturing respondents' profiles (age, sex, occupation, and educational attainment) and measuring their levels of awareness, perceptions of policy effectiveness, and experiences of social and economic impacts.

The instrument was composed of three main components, each corresponding to the core variables of the study. Part I gathered demographic information to contextualize the responses. Part II assessed respondents' awareness of illegal logging through eight indicators that examine knowledge of its occurrence, causes, and environmental implications. Part III evaluated the perceived effectiveness of policies and regulations through six indicators focusing on enforcement, monitoring, penalties, and livelihood support programs. Finally, Part IV measured the socioeconomic impacts of illegal logging through five indicators addressing livelihood loss, food source depletion, vulnerability to natural disasters, economic decline, and community conflicts. Collectively, these components provided a comprehensive framework for understanding the multifaceted nature of illegal logging from community perspectives.

To establish face and content validity, the instrument underwent evaluation by expert validators who met specific inclusion criteria: the OIC Provincial Environment and Natural Resources (PENR) Officer, the CENR Officer of Lianga, and a Development Management Officer (DMO). These validators were selected based on their technical expertise, professional experience in forestry and environmental governance, and direct involvement in implementing anti-illegal logging programs. Their evaluation focused on the relevance, clarity, and alignment of questionnaire items with the study objectives. The validators confirmed that the instrument adequately reflected the study constructs, while also providing comments and suggestions, which were carefully integrated to enhance the clarity, comprehensiveness, and contextual appropriateness of the tool.

Following validation, the questionnaire was subjected to pilot testing with a small sample of respondents outside the main study locale to ensure reliability. Statistical analysis of the pilot data yielded a Cronbach's Alpha coefficient exceeding 0.70, which meets the threshold for acceptable internal consistency in social science research. This result confirms that the instrument is both valid and reliable, ensuring its ability to consistently measure the intended variables. Moreover, the incorporation of expert feedback during the validation phase and empirical testing through the pilot study strengthened the instrument's credibility, making it an effective tool for capturing the awareness, perceptions, and experiences of communities in Lianga and San Agustin regarding illegal logging and pathways for effective intervention.

Data Gathering

The data gathering process of this study was carefully designed to ensure both reliability and accuracy of the information collected. It began with obtaining formal permission from the Community Environment and Natural Resources Office (CENRO) Lianga and the barangay officials of Diatagon, Lianga and Gata, San Agustin, Surigao del Sur, who served as key gatekeepers in the research sites. Once approval was granted, the researcher finalized and validated a structured questionnaire as the primary instrument for data collection. Respondents, including poachers, Bantay Gubat members, and Forest Rangers, were also oriented on the objectives of the research, their role in the study, and the guarantee of confidentiality to encourage honest participation.

During the implementation stage, the researcher personally administered the questionnaire to ensure clarity of instructions and proper facilitation throughout the process. Immediate retrieval of completed questionnaire was conducted to prevent data loss and minimize incomplete responses. In addition to the survey data, demographic and contextual information was gathered to provide a deeper understanding of the respondents' socio-economic conditions and their dependence on forest resources. To enrich the dataset further, the researcher also recorded observations on community practices and environmental conditions directly related to illegal logging.

In the analysis and reporting stage, the collected responses were systematically organized, tabulated, and subjected to descriptive statistical analysis. This process revealed patterns and trends concerning illegal logging practices, community perceptions, and enforcement challenges, which were further contextualized with demographic and socio-economic data. The findings then served as the basis for formulating evidence-based policy recommendations to curb illegal logging while strengthening community participation in sustainable forest management.

RESULT AND DISCUSSION

This section presents the results of the study in relation to the stated objectives, followed by a discussion that interprets the findings in the context of existing literature and the realities of illegal logging in Surigao del Sur.

Demographic Profile of the Respondents

Tabled demographic data show that the sample is dominated by prime-working adults (highest: 26-35 years, 9) and by individuals directly involved in forest exploitation (poachers, 18). Females (15) slightly outnumber males (12), while educational attainment clusters at the secondary level (16) and vocational training is absent. The lowest frequencies appear among the oldest cohort (61 years, 2) and among formal forest protection personnel (Forest Rangers, 3). These distributions immediately imply that illegal-logging pressures are concentrated among economically active, modestly educated community members rather than among older or institutionally employed groups.

The preponderance of respondents aged 26-45 (combined 16, 64%) indicates that engagement with forest resources is largely a working-age phenomenon driven by livelihood needs; similarly, the overwhelming share of poachers (18, 72%) points to economic dependence on timber extraction rather than incidental or subsistence use. This pattern echoes regional studies that identify working-age adults as the primary actors in forest use and law-breaking where alternative incomes are lacking (Noble & Vicente, 2023; Nolos et al., 2022).

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Table 2. Demographic Profile of the Respondents

Age	**Age Bracket**	**Frequency**	**Percentage**
	15-25 years old	4	16%
	26-35 years old	9	36%
	36-45 years old	7	28%
	51-60 years old	3	12%
	61 years old and above	2	8%
	Total	**25**	**100%**
Sex	**Category**	**Frequency**	**Percentage**
	Male	12	48%
	Female	15	62%
	Total	**25**	**100%**
Occupation	**Type**	**Frequency**	
	Bantay Gubat	4	16%
	Forest Rangers	3	12%
	Poachers	18	72%
	Total	**25**	**100%**
Highest Educational Background	**Highest Level**	**Frequency**	
	No Formal Education	1	4%
	Elementary	5	20%
	Secondary	16	64%
	Vocational/ Technical	0	0%
	College	3	12%
	Total	**100**	**100 %**

The low representation of Forest Rangers and Bantay Gubat implies a capacity and enforcement gap, an imbalance of protectors versus exploiters that undermines community surveillance and law enforcement. The dominance of secondary-level education (64%) coupled with negligible vocational training suggests limited access to technical skills or formal employment pathways, conditions found elsewhere to correlate with continued reliance on extractive livelihoods (Cañada et al., 2022; Nolos et al., 2022). The slightly higher number of female respondents indicates that women are present in forest-dependent social networks and thus must be factored into both vulnerability assessments and intervention design, consistent with recent gender-sensitive analyses of community resource use (Cañada et al., 2022). Taken together, these results imply that interventions

focused solely on enforcement will likely fall short unless they are paired with livelihood diversification, skills training, and strengthened local enforcement capacity, an observation supported by empirical work showing the need for integrated socio-economic and governance responses to reduce illegal logging.

Awareness on Illegal Logging

Table 3 presents respondents' awareness of illegal logging, with an overall mean of 4.3 (Strongly Aware). This indicates that most community members are strongly knowledgeable about government regulations, enforcement measures, and the environmental impacts of illegal logging. The highest-rated item is "the government is doing enough to prevent illegal logging" (M = 4.8), followed by general awareness of illegal logging (M = 4.7) and recognition of environmental impacts (M = 4.5). The lowest scores are observed for "illegal logging contributes to natural disasters" (M = 3.8) and livelihood-related drivers (M = 4.0), indicating uncertainty regarding specific ecological and socio-economic links. These results imply that while the community is broadly informed and perceives enforcement positively, gaps remain in understanding the full consequences of illegal logging. In consonance with findings by Hoare (2022), Global Forest Watch (2023), and Brancalion et al. (2020), who highlight that awareness campaigns alone are insufficient when enforcement capacity and livelihood alternatives are limited.

Table 3. Level of Awareness on Illegal Logging

Indicators	**Mean**	**Adjectival Rating**
1. I am aware of illegal logging activities in our barangay	4.7	Strongly Aware
2. Illegal logging negatively affects the environment in our community	4.5	Strongly Aware
3. Some members of our barangay benefit financially from illegal logging	4.2	Aware
4. Lack of livelihood is one of the main reasons people engage in illegal logging	4.0	Aware
5. Illegal logging should be strictly prohibited and penalized	4.3	Strongly Aware
6. The government is doing enough to prevent illegal logging in your area	4.8	Strongly Aware
7. Illegal logging contributes to natural disasters such as floods and landslide	3.8	Aware
8. Community involvement is essential to stop illegal logging	4.0	Aware
Over-all Mean	**4.3**	**Strongly Aware**

The strong ratings for general awareness and perceived government action suggest effective IEC and community engagement, though they may also reflect social desirability bias, where respondents overstate compliance or confidence (Brancalion et al., 2020). The lower perception of the link between illegal logging and natural disasters points to a knowledge gap in translating ecological risk to local understanding, despite empirical evidence linking deforestation to floods and landslides (Global Forest Watch, 2023; Nolos et al., 2022). Moderate acknowledgment of livelihood pressures (M = 4.0) aligns with Kusters et al. (2022), who note underreporting of economically motivated illegal practices due to fear of sanction. Overall, the results imply that high awareness

does not necessarily translate to comprehensive understanding or behavioral change, highlighting the need to integrate education, enforcement, and livelihood strategies.

Effectiveness of Policies and Regulations on Illegal Logging

Table 4 presents respondents' perceptions of the effectiveness of policies and regulations on illegal logging, yielding an overall mean of 4.0 (Highly Effective). This suggests that the existing laws and enforcement mechanisms are generally working well in curbing illegal logging, though continuous monitoring and stronger implementation may still be needed. The highest-rated item is "Policies and programs related to illegal logging are clearly communicated to the community" (M = 4.2), indicating strong visibility of outreach and information dissemination.

Conversely, the lowest-rated item is "The penalties for illegal logging are strict enough to discourage violators" (M = 3.7), reflecting perceived inadequacies in enforcement deterrence. These results imply that while respondents recognize the presence and communication of legal frameworks, confidence in punitive measures and active enforcement is comparatively lower, echoing global observations that policy clarity does not always translate into effective compliance in forest-dependent regions (De Jong et al., 2022; Tacconi et al., 2020).

Table 4. Level of Effectiveness of Policies and Regulations

Indicators	**Mean**	**Adjectival Rating**
1. I am aware of the government policies and regulations regarding illegal logging	4.0	Highly Effective
2. Local enforcement agencies (e.g., CENRO, PNP, LGU) are active in implementing anti-illegal logging laws	3.9	Highly Effective
3. The penalties for illegal logging are strict enough to discourage violators	3.7	Highly Effective
4. There is regular monitoring of forest areas in your barangay	4.0	Highly Effective
5. Policies and programs related to illegal logging are clearly communicated to the community	4.2	Highly Effective
Over-all Mean	**4.0**	**Highly Effective**

The high scores for policy awareness and communication (M = 4.0–4.2) suggest effective information campaigns and IEC programs by government agencies, enhancing community knowledge of legal provisions (DENR, 2023). However, the lower rating for penalty effectiveness (M = 3.7) highlights a common governance challenge: enforcement remains reactive and inconsistent, relying heavily on apprehensions rather than preventive strategies (Cerutti et al., 2020; Poudyal et al., 2021). Weak enforcement capacity, overlapping mandates, and resource constraints further reduce the practical deterrence of illegal logging, as noted in Surigao del Sur and other Philippine Forest hotspots (Tacconi et al., 2020; Hoare, 2022). Additionally, community involvement is recognized as critical for compliance (Yonariza & Webb, 2020), suggesting that top-down enforcement alone cannot address systemic loopholes or socio-economic incentives driving illicit timber extraction. Collectively, the findings imply that while policies are visible and well-communicated, gaps in enforcement, coordination, and preventive governance limit their practical impact on forest protection, consistent with literature on the persistence of illegal logging despite formal legal frameworks.

Social and Economic Impacts of Illegal Logging on Local Communities

Table 5 presents the respondents' perceptions of the social and economic impacts of illegal logging on their

communities, which yielded an overall mean of 3.7, interpreted as Significant. This suggests that illegal logging has a noticeable effect on livelihoods, income opportunities, and overall community well-being.

Among the indicators, the highest ratings were observed in the loss of forest-based livelihoods, increased vulnerability to natural disasters, and worsened economic conditions of family's dependent on forest resources (all with a mean of 3.9). These results reflect findings by Santos et al. (2024), who emphasized that forestdependent households are directly impacted by resource depletion, leading to long-term livelihood instability. Conversely, the lowest rating was given to community conflicts (mean = 3.4), suggesting that while resource scarcity generates economic stress, it does not always manifest in overt social tension. However, Rahman and Mahmud (2022) noted that such conflicts can remain latent, often surfacing only when resource competition intensifies, indicating the need for proactive governance measures.

Table 5. Social and Economic Impacts on Local Communities

Indicators	**Mean**	**Adjectival Rating**
1. Illegal logging has cause loss of forest- based livelihoods in our community	3.9	Significant
2. Illegal logging has reduced access to food sources such as fruits, wildlife, and medicinal plants	3.5	Significant
3. Illegal logging has made community more vulnerable to natural disasters like floods and landslide	3.9	Significant
4. Families who depend on forest resources are now economically worse off	3.9	Significant
5. Illegal logging has cause conflicts or tension among members of the community	3.4	Moderately Significant
Over-all Mean	3.7	Significant

The findings imply that the socioeconomic burdens of illegal logging are intertwined with broader environmental degradation. Kumar and Bhatnagar (2021) stressed that illegal logging accelerates soil erosion and water scarcity, thereby heightening disaster risks, which resonates with the respondents' views on increased vulnerability to floods and landslides. Similarly, Villanueva and Cruz (2021) observed that marginalized groups, particularly indigenous peoples, face disproportionate hardships as their cultural and subsistence ties to forests are disrupted, aligning with the community's perception of worsening family economic conditions. While the relatively lower perception of conflict may suggest resilient community relations, Castillo and Ramos (2023) caution that prolonged environmental stress often escalates social fractures if left unaddressed. These results underscore the urgent need for holistic responses that not only curb environmental degradation but also support community resilience and sustainable livelihoods.

CONCLUSION AND RECOMMENDATION

This part presents the conclusion and recommendation derived from the study's findings. The conclusions highlight the major insights drawn from the analysis of data, particularly the extent of illegal logging and its environmental, socioeconomic, and governance implications. The recommendations, on the other hand, are formulated to address the identified gaps, provide practical strategies, and guide policymakers, institutions, and communities in mitigating the adverse effects of illegal logging.

Conclusion

The demographic profile indicates that illegal logging in Surigao del Sur is largely driven by economically active adults with secondary-level education, with both men and women engaged in these activities. The imbalance between the high number of poachers and the limited enforcement personnel underscores how structural and economic pressures sustain dependence on forest resources. These patterns affirm that age, gender, occupation, and education intersect to shape community involvement in both illegal logging and conservation efforts.

Respondents report strong awareness of illegal logging and confidence in government measures, yet their limited understanding of its ecological and economic drivers reveals a critical knowledge gap. This suggests that while awareness campaigns have increased visibility, they remain insufficient without stronger enforcement, transparent monitoring, and viable livelihood alternatives. Thus, awareness must be reinforced by practical interventions that directly address the root causes of forest exploitation.

Perceptions of policies and regulations further reflect this gap, as communication efforts are viewed as effective, yet enforcement and penalties are perceived as only moderately deterrent. This indicates a persistent disjunction between the intent of legal frameworks and their practical outcomes, consistent with governance and institutional challenges in forest management. Such findings emphasize the need to strengthen both the credibility and implementation of regulatory systems.

The impacts of illegal logging, as reported by respondents, extend well beyond environmental degradation to include the loss of livelihoods, increased vulnerability to natural hazards, and worsening socioeconomic conditions, with community conflict emerging as a less prominent but concerning consequence. These outcomes illustrate how ecological disruption translates into broader risks to human security and social stability.

Overall, the study demonstrates that communities are highly aware of illegal logging and its effects, yet weak enforcement, insufficient monitoring, and limited alternatives enable the practice to persist. Illegal logging therefore threatens not only ecological balance but also the welfare of forest-dependent households. These results highlight the urgent need for integrated responses that address governance gaps, strengthen institutional capacity, and enhance community resilience.

Recommendations

Addressing these issues, policies may first focus on sustainable livelihood programs for the working-age population, particularly those with limited educational attainment. At the same time, strengthening communitybased enforcement through adequate support for Bantay Gubat and Forest Rangers is necessary to balance the current occupational disparity. In connection with this, gender-sensitive environmental education initiatives should also be implemented to empower both men and women in promoting sustainable forest management practices.

Building on these measures, programs may combine awareness campaigns with targeted ecological education, while simultaneously strengthening monitoring and enforcement to ensure accountability. Furthermore, enforcement transparency and community-based reporting should be enhanced to reduce underreporting of illegal activities, while livelihood alternatives must remain a priority to address economic drivers. Taken together, integrating knowledge, credible enforcement, and socio-economic interventions provides the most effective approach to addressing illegal timber extraction in the study area.

In addition, enhancing policy effectiveness requires that enforcement strategies combine punitive measures with preventive governance, while improving inter-agency coordination and actively involving community stakeholders in monitoring and compliance. Equally important is the need to strengthen local capacity and promote proactive, community-driven approaches that can bridge governance gaps and reduce the persistence of illegal logging in Surigao del Sur.

Furthermore, policies addressing illegal logging may prioritize both ecological protection and socioeconomic support for forest-dependent communities. To achieve this, livelihood diversification programs, disaster risk reduction strategies, and stronger community engagement mechanisms must be integrated into enforcement

frameworks to mitigate long-term risks and enhance resilience. These combined interventions can help create a balanced strategy that addresses both immediate enforcement concerns and long-term sustainability.

Therefore, policies may be strengthened through stricter monitoring systems supported by advanced technologies alongside community-based surveillance. At the same time, livelihood programs may be introduced to reduce economic reliance on forest exploitation, while stronger collaboration among government agencies, LGUs, and communities must be institutionalized to ensure shared responsibility in forest protection. In parallel, awareness and capacity-building initiatives may remain central to empowering communities as proactive stewards of the environment.

Additionally, future research may augment sample sizes and broaden geographical coverage to enhance representativeness and strengthen the generalizability of findings for policy. Incorporating qualitative methodologies—such as interviews or focus groups—would yield deeper insights into the motivations, enforcement challenges, and cultural dimensions underlying illegal logging. Statistical analyses, including correlation or regression techniques, may be advanced to clarify the relationships between awareness, enforcement efficacy, and socioeconomic impacts. Integrating geospatial or satellite monitoring data would improve the accuracy of forest loss assessments. Furthermore, interventions combining livelihood diversification, community participation, and technology-assisted enforcement warrant further empirical examination. Finally, research and policy frameworks may prioritize gender-sensitive and Indigenous-inclusive approaches to ensure comprehensive and equitable forest governance.

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