

# A Pilot Model of Community-based Forest Management in Xuan Nha Nature Reserve, Son La Province, Vietnam

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## ABSTRACT

This study evaluated the implementation of a pilot model for promoting community-based conservation through a contracting program in Xuan Nha Nature Reserve, located in Son La province, northern Vietnam. To assess the program's effectiveness, in-depth interviews were conducted with 26 officials and 100 households from three villages. The findings revealed that the program successfully facilitated community-based conservation by involving local communities in participatory land-use planning and forest protection at the village level. The study identified four key lessons contributing to the program's successful implementation: (1) establishing clear objectives, (2) co-developing rules that integrate formal laws with traditional rules and practices, (3) gaining local support, and (4) establishing clear boundaries and assessment indicators. Given these positive outcomes, this model can be applied and scaled up throughout Vietnam, particularly in areas where local communities live within protected areas.

## KEYWORDS

Participatory conservation; Forest management; Protected areas; Special-use Forest; Local people; Vietnam.

## 1. INTRODUCTION

Three-quarters of Vietnam's total land area is mountainous terrain, highlighting the crucial role of forests in the country's socio-economic development and national security. With its unique location and diverse topography, Vietnam is recognized as a global biodiversity hotspot (Guignier & Rieu-Clarke, 2012). To prioritize biodiversity conservation, the Special-use Forest system (SUFs) was established and has witnessed significant expansion since 1986. Currently, Vietnam has 164 SUFs, covering an extensive area of 2,198,744 hectares (Notice No.9799/TB-BNN-VP, 2019). According to Vietnam's Law on Forestry, forests are classified into three types according to management purposes. They are: i) Production Forests that are designated for timber supply; ii) Protection Forests that are designated for protection functions, such as watershed and coastal areas; and iii) Special-use Forests (SUFs), which are for biodiversity conservation such as national parks, protected areas, biosphere, etc. Among the three types, SUFs are subjected to the most stringent protection measures per the management system. The responsibilities and functions of the SUF Management Boards, defined in the Law on Forestry, encompass the management, protection, and development of SUFs, thus acting as state organizations, serving as forest owners and ensuring the necessary conditions for their sustainable management (Vietnam Law on Forestry No.16/2017/QH14, 2017).

Throughout the history of Vietnam's protected area system, a restrictive management approach has been pursued, with SUFs being assigned to SUFs Management Board. However, despite sustained efforts over an extended period, forest protection and conservation outcomes have been modest. The management of SUFs

faces numerous challenges, including high pressure from local communities, inadequate budgetary allocations, and ineffective management practices. Consequently, forest resources have been overexploited and lost, resulting in fragmented habitats.

In Vietnam, many SUFs encompass traditional lands of local communities, and in some cases, even include residents within their boundaries. Conflict between inhabitants and the authorities responsible for protected areas is a common issue observed in many countries worldwide (Griffin & Meshack, 2002; P. McElwee, 2002; P. D. McElwee, 2003; McLean & Straede, 2003; Sato, Chatty, & Colchester, 2002; Schmidt-Soltau, 2003). These conflicts have engendered negative attitudes towards conservation, a lack of cooperation, and in certain instances, even hostility and vandalism.

To address conflicts between local communities and conservation efforts, the concept of Integrated Conservation Development Projects (ICDPs), which involve varying degrees of participation from local communities, has been widely promoted and implemented across diverse initiatives with a common objective: integrating biodiversity conservation in protected areas with local social and economic development (MacKinnon, 2001). While involving local communities in protected area management has yielded some successful outcomes, it also requires dedicated efforts (Brockington, Duffy, & Igoe, 2008; MacKinnon, 2001; Salafsky & Wollenberg, 2000; Schaik & Rijksen, 2002). This strategy requires participatory management, appropriate cultural and political systems, and the capacity of relevant authorities to ensure its success (Fedreheim & Blanco, 2017; Massiri, Nugroho, Kartodihardjo, & Soekmadi, 2019; Nepal, 2002; Stoll-Kleemann & Welp, 2008). Even in cases where these projects have achieved success, they have given rise to new conservation challenges (MacKinnon, 2001; Salafsky & Wollenberg, 2000; Schaik & Rijksen, 2002; Tallis, Kareiva, Marvier, & Chang, 2008). Achieving the ambitious objectives of aligning forest conservation with rural economic empowerment is a promising concept in theory. However, implementing it in the real world is particularly challenging, as highlighted by Ostrom and Cox (2010) and Tole (2010). Experiences from various communities have reported mixed results (Bowler et al., 2012; Tole, 2010).

There are many different frameworks for evaluating the success of conservation and development initiatives. Some authors emphasize administrative requirements and leadership capacity, while others focus on outcome indicators. Ostrom, for instance, concluded that a combination of legal and local rules is essential for sustainability (Ostrom, 1990). Case studies in different regions further substantiate this notion. They demonstrate that when management boards responsible for protected areas fail to secure local rights that align with formal regulations, they may struggle to achieve their forest protection goals (Acheson, 2006; Massiri et al., 2019; Yusran et al., 2017). Furthermore, the absence of clear indicators of success in integrated conservation and development projects has led to significant criticisms of these initiatives. While some authors prioritize the development outcomes (Znajda, 2014), it's important to note that even when these projects lead to development, they can inadvertently attract more people to settle in proximity to forests.

There exist varying perspectives regarding the indicators of successful conservation and development projects. However, many studies have found consensus on key factors influencing community forests. These factors include tenure security, clear ownership, alignment between the biophysical and socioeconomic boundaries of resources, and effective enforcement of rules and regulations (Baynes, Herbohn, Smith, Fisher, & Bray, 2015; Pagdee, Kim, & Daugherty, 2006). Other emphasized capacity-related factors

during the project's design and implementation phases. These factors encompass collaborative scoping and design, financial resources and equipment availability, and establishing trust among stakeholders (Bartlett, 2018). Several studies have collectively highlighted the challenges faced in community forest management, even within less strictly protected areas (Duguma et al., 2018). In practice, successful project implementation has proven inconsistent, and the ability to achieve both development and forest conservation in contexts such as Panama has appeared to be limited despite substantial time and effort invested (Duguma et al., 2018).

The community forest initiative within the Xuan Nha Nature Reserve has earned recognition as a successful participatory conservation model in Son La province of Vietnam. In this research, our objectives were to (i) understand the collaborative process through which the model was developed and implemented, (ii) assess management outcomes associated with the model and (iii) draw valuable lessons from the experience. The findings of this study have the potential to provide recommendation and valuable insights for the management of protected areas, not only in Vietnam but also in other regions where similar coexistence scenarios are present.

## 2. STUDY AREA

Xuan Nha Nature Reserve is situated in Moc Chau and Van Ho district, Son La province. Covering an area of 18,000 hectares, the nature reserve possesses a rich biodiversity, housing 1,131 species of vascular plants, 33 of which are rare and precious and are listed in the Vietnam Red Book. It has been recognized as a significant region for coniferous populations in northern Vietnam (Thai, 2012; Van Sang, Dang, & Truong, 2010). However, despite its ecological importance, the nature reserve is not among the prioritized biodiversity conservation areas in Vietnam. Consequently, conservation efforts face numerous challenges, including: (1) significant population pressure from local residents living both inside and near the nature reserve; (2) a considerable number of people living within the core zone; (3) ambiguities surrounding the boundaries separating the enclave villages from the nature reserve; and (4) the absence of clear regulations for forest exploitation.

As of 2014, there were 14 enclave villages covering 3,978 hectares within the core zone of Xuan Nha Nature Reserve. Scattered hill farms were also observed deep within the forest, even in strictly prohibited zones. The boundary between cultivation land and forest land had not been established in any form. Notably, the forest had experienced degradation, particularly in areas near human settlements. As previously mentioned, Xuan Nha Nature Reserve was not prioritized for alternative conservation strategies, making co-management or community forestry the only viable solutions. However, this strategy also requires specific conditions and management capacity.

In these circumstances, the Forest Protection Contract Program (FPCP), financially supported by the KFW7 project (Forest development in Hoa Binh and Son La province), emerged as an excellent opportunity to pilot a community forest management model. The program received approval from the National Project Management Unit and obtained funding in 2012. It was officially launched in March 2015. As a result, Xuan Nha Natural Reserve contracted with eight villages to protect a total of 2,000 hectares from 2014 to 2020 at a rate of 100,000 VND per ha per year. The process began by identifying forest areas on maps, followed by on-site visits to physically delineate the assigned areas for the villagers. The contracts also provided detailed descriptions of the forest's condition and the specific areas assigned to the villagers for protection. By 2014, the program had been replicated across all 14 enclave villages. Concurrently, the Nature Reserve Management Plan was officially approved. The establishment of the

inner buffer zone, which encompassed the 14 enclave villages, was initiated, with plans to issue land use certificates to households in the inner buffer zone in 2017.

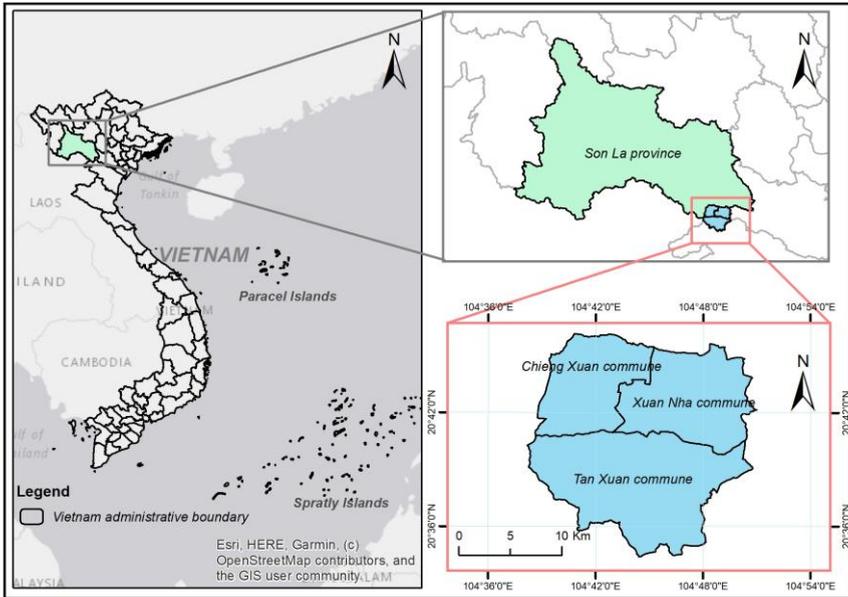


Figure 1. Location of the study areas.

### 3. METHODS

The study was conducted in three villages within Van Ho district, Son La province: Chieng Hin village in Xuan Nha Commune, Kho Hong village in Chieng Xuan Commune, and Ban Lay village in Tan Xuan Commune (Figure 1). Preliminary data collection took place from April to August 2014, followed by a first round of supplementary fieldwork from October to December 2018. A second round of data collection was carried out in November 2021, with data finalized in March 2022. The data collection methods are summarized in Table 1.

Table 1. Data collection through interviews and discussions

Respondents - Tools	Sample	Purpose
Government officer interview/group discussion - Open questions	4 provincial-level staff; 4 district-level staff; 6 commune-level staff (from three communes); 6 village-level staff (from three villages), and 6 staff from the Xuan Nha Nature Reserve.	<ul style="list-style-type: none"> <li>- Understanding conservation situations and challenges</li> <li>- Implementation process</li> <li>- Assessing the effectiveness of forest protection measures</li> </ul>
Household interview - Structured questionnaire	Households were selected randomly based on household lists of three villages: Kho Hong (35 out of 100 households) Chieng Hin (30 out of 74 households), Ban Lay (35 out of 95 households)	<ul style="list-style-type: none"> <li>- Evaluating changes in forest-based activities and local community involvement before and after six years of implementation</li> <li>- Assessing the effectiveness of forest protection measures</li> </ul>

We collected information through 18 small group discussions, which engaged a total of 26 officials representing various administrative levels, including province, district, commune, village, and Xuan Nha Nature Reserve. The group discussions were

conducted at different times during the study period. We explored a range of topics, including the local community's circumstances, potential threats, strategies employed, the role of resources in people's livelihoods, resource utilization practices, traditional knowledge, and rules related to these resources. In addition, during the group discussions, participants described the implementation process, assessed the effectiveness of forest protection measures, and collectively drew important lessons from their experiences.

To find out public perceptions regarding the effectiveness of forest protection, a total of 100 households residing in three villages were randomly selected for interview. A McNemar test was used to determine statistical differences in forest usage activities between 2015 and 2021.

The questionnaire used in this study was meticulously developed through close consultation with participants from the Xuan Nha Nature Reserve, as well as local communes and villages. These consultations were instrumental in identifying specific forest encroachment activities that required evaluation.

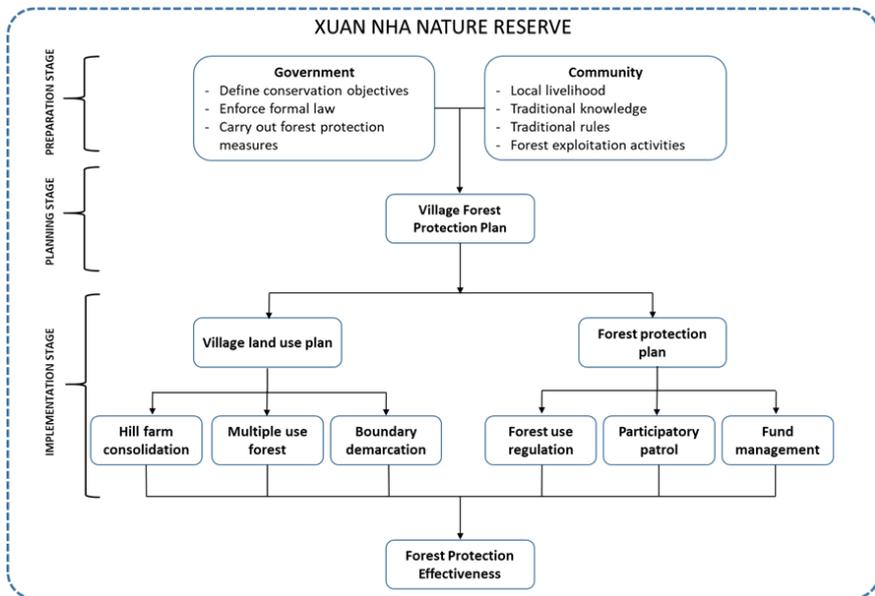
#### **4. RESULTS AND DISCUSSION**

##### **4.1 Model of community-based forest management in Xuan Nha Nature Reserve**

After six years of implementation, the model has effectively regulated forest use and strengthened law enforcement through a series of activities that can be categorized into three main stages: preparation, planning, and implementation (Figure 2).

During the preparation stage, a working team was formed with members from pertinent agencies, including the local communes, which are responsible for community aspects such as livelihoods, forest protection, and land management. The Xuan Nha Nature Reserve is also a key participant, tasked with safeguarding the forest within its jurisdiction, inclusive of the lands inhabited by local residents. Additionally, district authorities were actively involved in this collaborative effort. These agencies assessed the situation and established their priority objectives. As previously noted, the Xuan Nha Nature Reserve confronted four significant challenges in forest protection. The forest had been subjected to prolonged overexploitation in the absence of clear regulations or boundaries. Given these circumstances, the Xuan Nha Nature Reserve Management Board prioritized the establishment of a legal framework for forest use that would be voluntarily accepted by the local communities. In a key meeting in 2013, the involved agencies reinterpreted formal rules to align with the local context, with the objective of integrating formal and traditional law.

In the planning stage, formal law was integrated with traditional rules through the active involvement of local residents in the formulation of their own regulations. The first and second meetings were held in close consultation with the working team to ensure the proposed rules did not contravene formal law. In the first meeting, the local community drafted a Village Forest Protection Plan (VFPP), which detailed a comprehensive strategy for land use and forest protection within the villages. After receiving the forest and signing the contract, the community finalized the VFPP and agreed upon protection regulations at the second meeting. The completed VFPP was then approved by the Xuan Nha Nature Reserve Management Board, along with district and commune authorities, to affirm its legal validity. A summary of the forest use regulations was subsequently displayed on a board in the community house. This participatory process fostered a clear understanding of the regulations among local residents and garnered strong support for their enforcement.



**Figure 2.** Diagram of program implementation

In the implementation stage, the program's approach is primarily guided by the needs of the local people while concurrently considering the specific location and condition of the forest. Accordingly, the Xuan Nha Nature Reserve designates specific areas, including grazing lands, farmlands, and multi-use zones, for the villagers. This allocation is intended to meet their essential needs and functions as an incentive for their commitment to halt further encroachment into other forested areas.

As previously noted, prior to 2013, the core zone of the Xuan Nha Nature Reserve included 14 enclave villages that covered approximately 3,978 hectares. The absence of clearly defined boundaries between these villages and the land of the Special-Use Forests (SUFs) created considerable obstacles to the enforcement of forest protection laws. A three-step process was devised to resolve this problem and guarantee that these boundaries would be properly acknowledged and recognized. First, the boundaries separating the villages' property from the SUFs were accurately identified on official maps, and then inhabitants participated by sketching these boundaries on diagrams. Second, these mutually agreed-upon boundaries were physically marked in the field on natural features like trees and rocks or on pillars that had been built. Through formal agreements between the working group and farmers whose agricultural properties bordered the reserve, this physical demarcation was made official. Finally, detailed rules and procedures for the continuous upkeep and management of these boundaries were officially incorporated into the Village Forest Protection Plans (VFPP).

In 2013, a collaborative initiative between the working team and local farmers resulted in the installation of 151 boundary markers to formally delineate agricultural zones, as detailed in Table 2. Concurrently, all 53 farmers with agricultural holdings inside the Xuan Nha Nature Reserve guaranteed to confine their farming activities to the demarcated areas. It is noteworthy, however, that the terms of this agreement did not stipulate specific sanctions for non-compliance. In a further conservation measure, eight households with farms situated in the core protected zone voluntarily participated in a land exchange initiative, relocating to newly designated agricultural

plots. Additionally, reforestation was proposed for land belonging to three households in Chieng Hin village, located on steep 35-degree inclines to the west of the settlement.

**Table 2.** Outcomes of participatory boundary delineation in three villages

No	Outcomes	Kho Hong village	Chieng Hin village	Ban Lay village
1	Number of boundary markers	58	45	48
2	Number of agreements with households	17	21	15
3	Multiple-used Forest areas	50.1 ha	41.2 ha	68.4 ha

Regarding the multi-use forest areas, which provide firewood and grazing grounds for cattle, the working team has designated two specific areas for Kho Hong village. The first area, covering 32.8 hectares, is located near the village entrance, close to the bridge. The second area, covering 17.3 hectares, is situated on the outskirts of the village, adjacent to Tan Xuan commune. Although the total area for grazing seems relatively small, it sufficiently accommodates 134 cattle of Kho Hong village. In Chieng Hin village, the multi-use forest area covers 41.2 hectares in the southwest region of the village, which is more than sufficient to accommodate 51 cattle of Chieng Hin village. In Ban Lay village, three separate locations have been allocated for multi-use purposes, encompassing a total area of 68.4 hectares (Table 2). The effective management of these multi-use forest areas in all three villages has been attributed to the implementation of clear regulations by the respective village committees.

#### 4.2 Forest management outcomes

Residents of all three villages confirmed that the forests have been effectively safeguarded and that the quality of the forests has improved compared to their initial state. The assessment focused on two key aspects: (1) the perceived changes in activities impacting on the forest by both local people and outsiders, and (2) the level of household involvement in these activities. The summarized outcomes of this assessment are presented in Table 3 and Table 4, respectively.

**Table 3.** Villagers' assessment of forest-based activities (N = 100)

No	Activities	Villagers' assessment % (N=100)			
		Reduce	No change	Increase	Do not assess
1	Illegal timber logging	72	16	0	12
2	Wild animal poaching	60	5	15	20
3	Forest encroachment	84	6	4	6
4	Grazing cattle outside designated areas	84	13	0	3
5	Farming outside designated areas	96	4	0	0
6	Collecting firewood	62	14	4	20
7	Harvesting honeybee	22	23	0	55
8	Collecting bamboo shoots	30	27	15	28
9	Collecting Dong leaves	9	63	4	24
10	Cutting bamboo stems	77	8	4	11

Table 3 summarizes the responses of 100 households regarding activities impacting the forest by both local people and outsiders. The results reveal a general decrease in many harmful activities, suggesting a positive outcome from forest management initiatives.

Specifically, most villagers reported a reduction in activities such as illegal timber logging (72%), forest encroachment (84%), grazing cattle outside designated areas (84%), farming outside designated areas (96%), and cutting bamboo stems (77%). Wild animal poaching also saw a substantial reduction, with 60% of villagers reporting a decrease. This suggests that conservation efforts, potentially combined with stricter protective measures and alternative livelihood opportunities, have had a positive effect on wildlife protection. However, it is worth noting that 15 villagers reported an increase in the use of traps due to a rise in the wild pig population since 2015.

Similarly, 62% of respondents reported a reduction in firewood collection, indicating that strategies for managing this activity, such as designated collection areas or alternative fuel sources, may be yielding positive results. The collection of Dong leaves (*Phylloides placentaria* Lour) has not changed significantly, as local people continue to use them for wrapping steamed rice cakes during the Lunar New Year. Many respondents did not provide an assessment for "harvesting honeybees" (55%), because this activity often occurs in remote areas and is not widely observed by villagers.

**Table 4.** Changes in household involvement in forest usage activities (N=100)

No	Activities	Number of HHs involved in 2015	Number of HHs involved in 2021	Sig. (2-tailed)
1	Grazing cattle outside designated areas	32	0	0.000
2	Farming outside designated areas	24	0	0.000
3	Collecting firewood outside designated areas	31	0	0.000
4	Collecting bamboo shoots	32	35	0.678
5	Collecting Dong leaves	38	43	0.424
6	Cutting bamboo stems	68	72	0.503

Table 4 presents a quantitative comparison of the number of households involved in six specific forest usage activities in 2015 and 2021, along with the results of the McNemar test to assess the statistical significance of these changes. The McNemar test results indicated a statistically significant reduction (Sig. < 0.05) in three activities: grazing cattle outside designated areas, farming outside designated areas, and collecting firewood outside designated areas. This decline is the result of collaborative efforts between the Xuan Nha Nature Reserve Management Board and local government since 2013, which involved the participatory delineation of areas for cattle grazing, farming, and firewood collection. Furthermore, local residents have demonstrated strong support for the forest protection regulations.

Conversely, for activities such as collecting bamboo shoots, collecting Dong leaves, and cutting bamboo stems, the McNemar test showed no statistically significant difference (Sig. > 0.05), as these activities are permitted. In fact, the number of people involved in these activities slightly increased from 2015 to 2021: collecting bamboo shoots (32 to 35), collecting Dong leaves (38 to 43), and cutting bamboo stems (68 to 72). This increase can be attributed to the new agreement, which permits these activities at designated times and locations, thereby facilitating management and minimizing harm to forest resources. For example, before 2015, local people harvested bamboo shoots throughout the year. However, under the new regulation, they are only allowed to harvest after the full moon of the sixth lunar month. This aligns with the Muong people's traditional practices, as the climate during this period is favorable for bamboo shoot growth, and harvesting during this time minimizes damage to the bamboo trees.

While adhering to forest protection and management regulations, the local community also actively reports signs of violations. As evidence, in April and June 2016, based on reports from residents of Kho Hong village, the management board confiscated two cases of illegal logging: 1.5 cubic meters and 8 cubic meters of Fokieni (*Fokienia hodginsii*), respectively. In 2017, Chieng Hin village apprehended four cases of illegal bamboo shoot exploitation. These participatory activities have played a crucial role in conservation, aligning with other research findings (Andrade & Rhodes, 2012; Boissière, Sheil, Basuki, Wan, & Le, 2009; Usongo & Nkanje, 2004).

However, sustaining successful participation requires certain skills and conditions. Xuan Nha Nature Reserve has implemented reasonable measures to reach agreements with the local people. Initially, during the first two village meetings about Forest Protection and Conservation Programs (FPCP), the residents of Kho Hong village were reluctant to report violations to responsible agencies. However, after negotiations, the villagers agreed to report all violations without revealing the violators' identities. Although the FPCP is currently implemented on a small scale, the program is considered a successful model for community-based forest management. Son La province has proposed replicating Xuan Nha's FPCP model in other SUFs.

### **4.3 Lessons learned from the pilot model**

After six years of implementation, some key lessons have been drawn from the model, which include having clear objectives for the nature reserve, ensuring the alignment of community rules with the constitutional system, gaining local support, and establishing clear boundaries and assessment indicators. Below are the lessons learned.

*Establishing clear objectives:* A significant contribution to the model's success was the management board's clear prioritization of goals. They precisely identified what they could protect and what they had to prioritize, even if it meant making sacrifices in certain areas. Recognizing that Xuan Nha Nature Reserve was not a top-priority area for biodiversity conservation and faced numerous challenges, such as human presence in the core zone, unclear forest exploitation rules, high external pressures, and weak law enforcement, the nature reserve officers had to address three main considerations: (1) defining objectives or tasks, (2) focusing on conservation issues or situations requiring resolution, and (3) assessing available resources to tackle these conservation challenges. Based on these considerations, the officers determined that controlling forest usage required two main steps: (1) establishing clear forest regulations and (2) planning village land-use and delineating boundaries to facilitate resident adherence.

*Co-developing rules that integrate formal laws with traditional rules and practices:* The model effectively integrated formal laws with traditional rules and practices to develop community regulations, establishing a sustainable mechanism for community forest protection. Existing literature supports the notion that conservation strategies must adhere to legal rules and align with administrative structures; otherwise, local rules may diverge from legal requirements (Ostrom, 1990). Previous experiences, such as in Lore Lindu National Park, demonstrated that local community activities in resource extraction and management may not always align with formal laws, leading to failures in forest protection (Massiri et al., 2019). Conflicts between livelihood and conservation interests were observed within the National Park (Yusran et al., 2017). Similarly, officers in Lore Lindu National Park denied the rights of local communities, underscoring the need for Community Conservation Agreement rules to align with formal legal rules at the constitutional level (Massiri et al., 2019). Achieving conservation goals while meeting community needs often requires appropriate institutional arrangements that tailor broad goals and rules to local contexts (Acheson, 2006).

In the case of Xuan Nha Nature Reserve, the management board developed the Village Land Use Plan (VLUP) to propose the establishment of an inner buffer zone, despite the complexity of the situation. In Vietnam, Special-use Forests (SUFs) are managed by SUFs Management Board. Legal documents strictly prohibit residents from exploiting forest products in designated restricted zones and prohibit salvaging dead or fallen trees within the ecological restoration zone (Article 52, Vietnam Law on Forestry No.16/2017/QH14, 2017). Crucially, Article 54 of the Law allows residents who were already living in these areas prior to their designation as protected areas to settle there. In Xuan Nha, the local people had been residing there long before its designation, traditionally using the land for livelihood activities, which directly contradicted formal rules. Recognizing this conflict, the Xuan Nha Nature Reserve Management Board acknowledged the presence of people within the core zone and their need for land to sustain their livelihoods. The management board also recognized that weak law enforcement and insufficient forest usage regulations were key factors contributing to overexploitation. Consequently, the Xuan Nha Nature Reserve Management Board successfully achieved its objectives by combining traditional forest use with formal law to establish “community rules”.

This process not only facilitated the establishment of community rules but also enhanced the local community's capacity for decision-making, significantly contributing to effective forest management. Prior research indicates that the capacity for local rule-making is crucial for improved forest management that supports local livelihoods (Singh, Pandey, & Prakash, 2011). Similarly, government recognition and enforcement of community rights ensure institutional sustainability (Massiri et al., 2019). Throughout the implementation process, the management board enhanced the capacity of local communities, which is a crucial step for the success of any participatory community project (Schlager & Ostrom, 1992). Moreover, the participatory approach involving all villagers made the rules more sustainable, a point emphasized by Anderies and Janssen (2013), who link sustainability to collective action and collective decision-making processes (Anderies & Janssen, 2013). Through this comprehensive process, Xuan Nha Nature Reserve successfully aligned local rules with formal regulations, a critical factor in community development and participatory forest protection.

*Gaining local support:* Recognizing the significance of local support, officers at the Xuan Nha Nature Reserve prioritized building trust and gaining the support of local people, who depend heavily on natural resources. This was achieved through a series of activities, including respecting local rules, improving livelihoods, and fostering trust.

Throughout the process, the Xuan Nha Nature Reserve Management Board demonstrated respect for the local community and made sincere efforts to improve local livelihoods, striking a balance between conservation needs and community needs. As detailed in the results section, the working team used agreements to consolidate land designated for cultivation and utilization in suitable areas, providing clearly defined land boundaries for residents' livelihoods. Consequently, local people were more willing to adhere to the forest use regulations they themselves proposed, which were based on legal documents.

The nature reserve successfully gained the trust of local people—a fundamental aspect of any successful participatory conservation program. Beyond respecting local rules during the development of the Village Forest Protection Plans (as described earlier), they maximized benefits for local people by introducing practices such as opening bank accounts and implementing transparent fund management. Each village established a dedicated bank account under the village leader's name. Upon signing

the contract, the full six-year payment was deposited into this account. Annually, based on acceptance checks and the terms of the fund management agreements, villages were authorized to directly withdraw the payment and corresponding interest for that year. It is worth noting that in 2015, this was one of the first forestry programs in Son La province and one of the few in Vietnam to directly pay contracted villages via deposit accounts. Officials affirmed that this method would be applied to other programs because it ensures transparency, maximizes benefits for the targeted communities, and reduces administrative effort for the contracting party (the Nature Reserve). By the end of 2019, most forest programs had adopted this payment method, often with improvements facilitated by advanced technology. The countrywide gradual implementation of similar payment methods validates their effectiveness (Document 7491/BNN-TCLN, 2018).

*Establishing clear boundaries and assessment indicators:* Past experiences have demonstrated that even when local residents willingly comply with regulations, they may lack a strong awareness of the specific boundaries and criteria they should adhere to. To address this challenge, the formulation of new forest use rules emphasized establishing clear boundaries, precise assessment indicators, and a comprehensive reporting system.

Clear boundaries and regulations are essential for affected individuals to adjust their activities accordingly. Although local people may willingly follow forest regulations, they may inadvertently engage in illegal activities if they cannot identify restricted areas. Studies have confirmed that clear delineation of boundaries is a principal requirement for achieving sustainable forest management (Kartodihardjo, Nagara, & Situmorang, 2015; Sinabutar, Nugroho, Kartodihardjo, & Darusman, 2014). Evidence indicates that many people living around protected areas are not aware of the boundaries. For example, Sundberg (1998) found that almost 80% of the farmers in the Maya Biosphere Reserve buffer zone had no knowledge of the reserve or its boundaries (Sundberg, 1998). In Xuan Nha Nature Reserve, land use boundaries were delineated through participatory processes involving local people, both on maps and in the field. The results of this delineation were then announced to all villagers in subsequent community meetings.

Additionally, the program provided clear assessment indicators, enabling relevant agencies to easily monitor and evaluate compliance. At the time of the program, forest protection assessment criteria in Vietnam were considered unclear for various forest types, including SUFs (Pham, Wong, Le, & Brockhaus, 2016; To, Dressler, Mahanty, Pham, & Zingerli, 2012). To address this, the program developed comprehensive assessment criteria. Specifically, during field visits, the forest status was assessed in detail, considering signs of infringement and the overall condition of the forest. Based on the initial assessment, surprise visits and acceptance checks were conducted to evaluate the effectiveness of forest protection.

Furthermore, a reporting system was established to help villagers report violations. Villagers were provided with easy contact methods for forest protection officers and village forest protection teams to report illegal activities. This system enabled the community to effectively report violations and seek assistance when needed.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

The six year experiences in Xuan Nha Nature Reserve provides valuable lessons for the successful implementation of co-management in nature reserves. The first lesson highlights the importance of clear objectives, as the management board's determination of priorities and identification of key conservation tasks proved

instrumental in addressing challenges and focusing resources effectively. The second lesson emphasizes the need to establish a stable rule system that aligns community regulations with formal laws, thereby ensuring sustainable mechanisms for community forest protection. By integrating traditional rules with formal laws, the model successfully fostered community-developed rules and enhanced local decision-making capacity, which is crucial for participatory forest management. The third lesson underscores the significance of local support, as the nature reserve actively built trust, respected local rules, and improved livelihoods, gaining the trust and cooperation of the local community. Finally, the fourth lesson highlights the importance of establishing clear boundaries and assessment indicators, and implementing a comprehensive reporting system to support effective rule compliance and ensure sustainable forest management. It is important to note that while lessons from Xuan Nha Nature Reserve provide valuable insights for future conservation efforts, it did not comprehensively assess their impact on the livelihoods of local communities. Although alternative livelihood strategies are acknowledged for their role in reducing forest resource exploitation, the potential effects of these changes on the forest-dependent livelihoods of local villagers remain unexplored. Conservation efforts often involve complex trade-offs, and while this article did not conduct an exhaustive evaluation of such tradeoffs, it is worth acknowledging this limitation for a more comprehensive understanding of the broader implications of our conservation initiatives.

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